

Two Days National Conference
on
“Recent Advances in Engineering,
Technology & Science - 2K19”

NCRAETS - 2K19



Date: 26th & 27th April 2019



Not Member of Charitable Trust (N.C.T.)

SHRI DEVI INSTITUTE OF ENGINEERING & TECHNOLOGY

Approved & Affiliated to Government Engineering College, Bangalore and Approved by AICTE, New Delhi.
D-10 Road, Tumkur - 575 106, Karnataka.



www.shrideviengineering.org

Domain Adaptation for Biomedical Image Segmentation Using Adversarial Training

Aditya Pai H¹, Sameena H S², Sandhya Soman³, Ramesh B N⁴, Dr. Piyush Kumar Pareek⁵
^{1,2,3,4,5}Department of CSE, ¹K.S.Institute of Technology, Bengaluru ²Global Academy of Technology, Bengaluru, ³Kristu Jayanti College, Bengaluru, ⁴East West Institute of Polytechnic, Bengaluru, ⁵East West Institute of Technology, Bengaluru
¹ adityapaih2007y@gmail.com

Abstract: Medical Image Segmentation is the process of automatic or semi-automatic detection of boundaries within a 2D or 3D image. A major difficulty of medical image segmentation is the high variability in medical images. First and foremost, the human anatomy itself shows major modes of variation. Furthermore many different modalities like X-ray, CT, MRI, microscopy, PET, SPECT, Endoscopy, OCT, and many more are used to create medical images. The result of the segmentation can then be used to obtain further diagnostic insights. Possible applications are automatic measurement of organs, cell counting, or simulations based on the extracted boundary information. The role of segmentation is to subdivide the objects in an image; in case of medical image segmentation the aim is to study anatomical structure, identify region of interest i.e. locate tumor, lesion and other abnormalities, measure tissue volume to measure growth of tumor, help in treatment planning prior to radiation therapy; in radiation dose calculation. Automatic segmentation of medical images is a difficult task as medical images are complex in nature and rarely have any simple linear feature.

This paper focuses on some image segmentation and methods of image segmentation, some literature survey on image segmentation and adversarial machine learning training

Keywords: Image, Segmentation, Adversarial machine learning, 2D, 3D

I INTRODUCTION

The huge and rapid growth of medical and biomedical image data, energy-efficient solutions for analyzing such image data that can be processed fast and accurately on platforms with low power budget are highly desirable.[1]

Deep learning based methods for segmentation in medical imaging are being vastly explored in recent years and may vary in the specifics on how they handle the task. With the growing interest on deep learning for several computer vision tasks, the first attempts on using Convolutional Neural Networks (CNNs) for image segmentation were based on processing image patches through a sliding window, which yielded segmented patches. Those independent segmented patches were then concatenated for the creation of the final segmented image. The main drawbacks of this approach are regarding computational cost several forward passes for generating the final result as well as regarding inconsistency in predictions which can be fixed by overlapping sliding windows.[2] The most common deep architecture for segmentation nowadays is the so-called

Fully Convolutional Network (FCN). This architecture is based solely on convolutional layers with the final result not depending on the use of fully-connected layers. FCNs can provide a fully-segmented image within a single forward step with variable output size depending on the input tensor size. One of the most well-known FCNs for medical imaging is U-net which combines convolutional, down sampling, and up sampling operations with skip non-residual connections.[2] Deep Domain Adaptation (DDA), which is a field unrelated in essence to medical imaging, has been widely studied in the recent years.

II LITERATURE REVIEW

1) Mehran Javanmardi and Tolga Tasdizen focus on biomedical image segmentation in the context where there is variation between source and target datasets and ground truth for the target dataset is very limited or non-existent. They use an adversarial based training approach to train CNNs to achieve good accuracy on the target domain. They use the DRIVE and STARE eye vasculature segmentation datasets and show that their approach can significantly improve results where they only use labels of one domain in training and test on the other domain. They also show improvements on membrane detection between MICCAI 2016 CREMI challenge and ISBI 2013 EM segmentation challenge datasets.[3]

2) Yroslav Ganin, Evgeniya Ustinova and et al introduce a new representation learning approach for domain adaptation, in which data at training and test time come from similar but different distributions. Authors are directly inspired by the theory on domain adaptation suggesting that, for effective domain transfer to be achieved, predictions must be made based on features that cannot discriminate between the training (source) and test (target) domains. The approach implementation is in the context of neural network architectures that are trained on labeled data from the source domain and unlabeled data from the target domain (no labeled target-domain data is necessary). As the training progresses, the approach promotes the emergence of features that are (i) discriminative for the main learning task on the source domain and (ii) indiscriminate with respect to the shift between the domains. Here in this paper authors show that this adaptation behavior can be achieved

Medical Image Segmentation Use Neural Network for Novel Domain Variation Framework

Aditya Pai H¹, Sameena H S², Sandhya Soman³, Ramesh B N⁴, Dr. Piyush Kumar Pareek⁵

^{1,2,3,4,5} Department of CSE, ¹K.S.Institute of Technology, Bengaluru, ²Global Academy of Technology, Bengaluru, ³Kristu Jayanti College, Bengaluru, ⁴East West Institute of Polytechnic Bengaluru, ⁵East West Institute of Technology Bengaluru
¹adityapaih2007y@gmail.com

Abstract: We propose a division structure that utilizes profound neural systems and present two developments. In the first place, we portray a biophysics-based space adjustment technique. Second, we propose a programmed strategy to portion white and dark issue, and cerebrospinal liquid, notwithstanding faint tissue. Concerning first development, we utilize a space adjustment structure that consolidates a novel multispecies biophysical tumor development display with a generative ill-disposed model to make sensible looking engineered multimodal MR pictures with known division. With respect to second advancement, we propose a programmed way to deal with enhance accessible division information by processing the division for solid tissues. This division, which is finished utilizing diffeomorphic picture enrollment between the BraTS preparing information and many relabeled map books, gives more data to preparing and diminishes the class irregularity issue. Our general methodology isn't explicit to a specific neural system and can be utilized related to existing arrangements. We exhibit the execution improvement utilizing 2D U-Net for the BraTS'18 division challenge. Our biophysics based space variety accomplishes better outcomes, when contrasted with the current best in class GAN demonstrate used to make manufactured information for preparing.

Keywords:-Segmentation, Neural Network, Machine Learning, tumor growth models

I INTRODUCTION

Programmed division techniques can possibly give precise and reproducible names prompting improved tumor anticipation and treatment arranging, particularly for situations where access to master radiologists is constrained.

In the BraTS rivalry, we try to section multimodal MR pictures of glioma patients. Normal cerebrum MRI modalities incorporate post-Gadolinium T1 (used to improve difference and representation of the blood-mind boundary), T2 and FLAIR (to feature distinctive tissue liquid powers), and T1. We utilize the information for these four modalities to create the divisions utilizing a philosophy that we diagram beneath.

REVIEW OF LITERATURE:-

In most image classification tasks, deep neural networks (DNNs) have been a very powerful technique that tends to outperform other approaches and BraTS is no different. From past BraTS competitions two main DNN architectures have emerged- Deep Medic and U-Net. How can we further improve this approach? Most research efforts have been on further improving these architectures, as well as coupling them with post-processing and ensemble techniques. In our work here, we propose a framework to work around the relatively small training datasets used in the BraTS competition. Indeed, in comparison to other popular classification challenges like Image Net (which consists of one million images for training), the BraTS training set contains only 285 instances (multimodal 3D MR images), a number that is several orders of magnitude smaller than the typical number of instances required for DNNs to work well.

As we can see from the intensity distributions, the values in the adapted images are qualitatively closer to the real images.

1. **Data augmentation-** We propose a biophysics based area adjustment methodology to include engineered tumor-bearing MR pictures to the preparation precedents. There have been numerous striking attempts to mimic tumor development. We utilize an in-house PDE based multispecies tumor development model to recreate engineered tumors. Since recreated information does not contain the right powers circulation of a genuine MR picture, we train a helper neural system to change the mimicked pictures to coordinate genuine MRIs. This system gets a multimodal input and changes this information to coordinate the dispersion of BraTS pictures by forcing certain cycle consistency limitations. As we will appear, this is an exceptionally encouraging methodology.
2. **Extended division-** We stretch out the division to the solid parenchyma. This is done in two stages. To begin with, we section the preparation dataset utilizing a chart book based gathering enrollment (utilizing an in-house diffeomorphic enlistment code). Second, we train our DNN system to fragment both tumor and sound tissue (four classes, glial issue, and cerebrospinal liquid, dim, and white issue). Our methodology includes imperative data

Feature Extraction and Analysis of MRI Images for Breast Cancer

Aditya Pai H¹, Sameena H S², Sandhya Soman³, Ramesh B N⁴, Dr. Piyush Kumar Pareek⁵

^{1,2,3,4,5}Department of CSE, ¹K.S.Institute of Technology, ²Global Academy of Technology, ³Kristu Jayanti College, ⁴East West Institute of Polytechnic, ⁵East West Institute of Technology, Bengaluru.
adityapaih2007y@gmail.com

Abstract: Breast cancer is a disease that starts in the breast with a malignant tumor. A malignant tumor is a mass of cells that grows out of control. The cancerous cells can also metastasize, or move to other tissues or parts of the body. The cancer can develop in any of the three types of breast tissue-lobules, ducts, and connective tissue. Breast cancer that spreads into normal tissue is called invasive breast cancer. Noninvasive breast cancer stays within the breast lobule or duct. Feature extraction is a process of image processing which is used to select and extract those features/properties which are helpful in identifying the problem of interest. It is a methodology followed not only in digital image processing but also in machine learning, pattern recognition and computer vision. Feature extraction involves reducing the amount of resources required to describe a large set of data. When performing analysis of complex data one of the major problems stems from the number of variables involved. Analysis with a large number of variables generally requires a large amount of memory and computation power, also it may cause a classification algorithm to overfit to training samples and generalize poorly to new samples. Feature extraction is a general term for methods of constructing combinations of the variables to get around these problems while still describing the data with sufficient accuracy. Many machine learning practitioners believe that properly optimized feature extraction is the key to effective model construction. This paper focus on some symptoms and causes of breast cancer, some literature survey on Feature extraction.

Keywords: Cancer, Malignant tumor, Feature extraction, machine learning

I INTRODUCTION

There are around 3.1 million breast cancer survivors in the United States (U.S.). The chance of any woman dying from breast cancer is around 1 in 37, or 2.7 percent. Awareness of the symptoms and the need for screening are important ways of reducing the risk. Breast cancer can affect men too, but this article will focus on breast cancer in women. Here are some fast facts about breast cancer. Breast cancer is the most common cancer among women. Symptoms include a lump or thickening of the breast, and changes to the skin or the nipple. Risk factors can be genetic, but some lifestyle factors, such as alcohol intake, make it more likely to happen. A range of treatments is available, including surgery, radiation therapy, and chemotherapy. Many breast lumps are not cancerous, but any woman who is concerned about a lump or change should see a doctor.

The exact cause remains unclear, but some risk factors make it more likely. Some of these are preventable. The risk increases with age. At 20 years, the chance of developing breast cancer in the next decade is 0.6 percent. By the age of 70 years, this figure goes up to 3.84 percent.

Women who carry the BRCA1 and BRCA2 genes have a higher risk of developing breast cancer, ovarian cancer or both. These genes can be inherited. TP53 is another gene that is linked to a greater breast cancer risk. Women who have had breast cancer before are more likely to have it again, compared with those who have no history of the disease. Having some types of benign or non-cancerous breast lumps increases the chance of developing cancer later on. Examples include atypical ductal hyperplasia or lobular carcinoma in situ. Breast cancer is more likely to develop in higher density breast tissue. Being exposed to estrogens for a longer period appears to increase the risk of breast cancer.

This could be due to starting periods earlier or entering menopause later than average. Between these times, estrogens levels are higher. Breast-feeding, especially for over 1 year, appears to reduce the chance of developing breast cancer, possibly because pregnancy followed by breastfeeding reduces exposure to estrogens. Women who are overweight or have obesity after menopause may have a higher risk of developing breast cancer, possibly due to higher levels of estrogens. High sugar intake may also be a factor. A higher rate of regular alcohol consumption appears to play a role. Studies have shown that women who consume more than 3 drinks a day have a 1.5 times higher risk. Undergoing radiation treatment for a cancer that is not breast cancer increases the risk of breast cancer later in life.

The use of hormone replacement therapy (HRT) and oral birth control pills have been linked to breast cancer, due to increased levels of estrogens. In 2012, researchers concluded that exposure to certain carcinogens and endocrine disruptors, for example in the workplace, could be linked to breast cancer. In 2007, scientists suggested that working night shifts could increase the risk of breast cancer, but more recent research concludes this is unlikely.

Comparative Study and Analysis of Security Mechanism in IoT

Aditya Pai H¹, Sameena H S², Sandhya Soman³, Ramesh B N⁴, Dr. Piyush Kumar Pareek⁵

^{1,2,4,5}Department of CSE, ¹K.S.Institute of Technology, ²Global Academy of Technology, ³Kristu Jayanti College, ⁴East West Institute of Polytechnic, ⁵East West Institute of Technology, Bengaluru
¹adityapaih2007y@gmail.com

Abstract: The paper deals with the comparative analysis of the security of the services used in IoT. The paper presents theoretical foundations and the IoT architecture. It describes in detail the architecture and types of IoT services in IoT, as well as the protocols used to communicate with the services in order to review possible security issues and suggest possible improvements regarding the security of IoT services. The work includes IoT devices, which are the basis of IoT, and their importance in the safe operation of IoT services. The work includes IoT devices, is based on sensors, communication networks and intelligence that manage the entire process and the generated data. Sensors are the senses of systems, because of this; they can be used in large quantities. Sensors must have low power consumption and cost, small size and great flexibility for its use in all circumstances. Therefore, the security of these network devices, data sensors and other devices is a major concern as it grows rapidly in terms of nodes interconnected via sensor data.

Keywords: IoT security, IoT services, data sensors, communication networks

I Introduction

The term Internet of Things (IoT) was created in 1999. It was conceived as a world of objects that exchange data. Data exchange is not only between man and machine; but communication between machines (M2M) is also introduced. Kevin Ashton, in his paper published in 2002, under the title IoT, said- "We need an internet for things, and a standardized way for computers to understand the real world." The International Organization for Standardization (ISO), in 2012 founded the group ISO/IEC JTC 1/SWG 51, which will deal with standardization in the area of Internet of Things (IoT). This group defined IoT as- "An infrastructure of interconnected objects, people, and systems and information resources together with intelligent services to allow them to process information of physical and virtual world and react." [1][2] Nikola Tesla had a vision of IoT almost 100 years ago, when wireless is perfectly applied, the whole earth will be converted into a huge brain ...". Researchers Caceres and Friday identified two critical infrastructures that will impact ubiquitous computing - Cloud Computing and the Internet of Things. [3] IoT can be viewed from two perspectives. The first, where IoT is viewed from the perspective of the Internet where attention is paid to Internet services, while the second perspective focuses attention on smart things. [4]

1.1 Security Challenges in IoT

As more and more IoT devices make their way into the world, deployed in uncontrolled, complex, and often hostile environments, securing IoT systems presents a number of unique challenges. According to Eclipse IoT Working Group's 2017 IoT developer survey, security is the top concern for IoT developers [5].

Follow are the top ten challenges for IoT security-

1. **Secure constrained devices** - Many IoT devices have limited amounts of storage, memory, and processing capability and they often need to be able to operate on lower power, for example, when running on batteries.
2. **Authorize and authenticate devices** - With so many devices offering potential points of failure within an IoT system, device authentication and authorization is critical for securing IoT systems.
3. **Manage device updates** - Applying updates, including security patches, to firmware or software that runs on IoT devices and gateways presents a number of challenges.
4. **Secure communication** - Once the devices themselves are secured, the next IoT security challenge is to ensure that communication across the network between devices and cloud services or apps is secure.
5. **Ensure data privacy and integrity** - It is also important that wherever the data ends up after it has been transmitted across the network, it is stored and processed securely. Implementing data privacy includes redacting or anonymizing sensitive data before it is stored or using data separation to decouple personally identifiable information from IoT data payloads.
6. **Secure web, mobile, and cloud applications** - Web, mobile, and cloud apps and services are used to manage, access, and process IoT devices and data, so they must also be secured as part of a multi-layered approach to IoT security.
7. **Ensure high availability** - As we come to rely more on IoT within our day-to-day lives, IoT developers must consider the availability of IoT data and the web and mobile apps that rely on that data as well as our access to the physical things managed by IoT systems.



**Second International Conference on
Emerging Trends in Science & Technologies for Engineering Systems**

ICETSE -2019, 17th & 18th May, 2019

Organized by

SRIRADHICHAMACIHI SHIKSHANA TRUST[R]

SJC INSTITUTE OF TECHNOLOGY

(Affiliated to VTU, Belagavi, Recognized by AJCTE, New Delhi, Accredited by NBA, New Delhi & ISO 9001-2008 Certified)

Chickballapur, Karnataka

In association with

Institute of Scholars (InSc)

(An ISO 9001:2015 certified institute by International Accreditation Certification, Accredited by UAN)

Bengaluru Region



www.insc.in

Analysis of Causes and Effects of Longer Lead Time in Software Process Using FMEA

F Aditya Pai H, Sameena H S, Sandhya Soman, Dr. Piyush Kumar Pareek

Abstract— Longer lead time in small and medium enterprises results in direct impact on delivering the project at the stipulated time period, hence resulting in more costs involved. The reason for the delay in the lead time is because of the various 'waste' factors which can be analyzed by using Failure Mode Effective Analysis (FMEA). The paper discusses on the steps used in FMEA right from listing of potential failure modes to taking necessary actions in eliminating or reducing the high-risk failure modes.

IndexTerms— Longer Lead Time; Smaller and Medium Enterprises (SMEs); Waste; Failure Mode.

I. INTRODUCTION

As per the definition the "Lead time" refers to the time required for the organization in delivering the order being placed by the customer. The "Longer Lead Time" is delay in delivering the order placed by the client. The reason for the longer lead time is because of various factors:

A. Handoffs

When the requirement flows from one batch to another batch, it flows in the forms of queues. During batch flow the information flows between various departments. The delay in sending information from one batch will lead to delay in receiving the information in another. As a result it will lead to longer lead time, the solution to this is to have an automated approach also to make batches work in parallel so as to save time and hence delivering the order within the stipulated time period.

B. Approval Process

The SMEs handling larger projects, the most important factor here is sharing of the data. The lack of data sharing between the departments leads to the complexity hence resulting in approval process being near to impossible for the delivery team. Thus there is a need of usage of automated tool known as the Jira tool, which is a repository for storing all the codes developed by different departments.

C. Environment Management and Provisioning

The development team requires a platform where new feature can be tested. Lack of availability of such environment leads to delay in addressing the problems with different versions of the software. For example, there is a version control software which is a repository of storing multiple versions of the software. The version control provides access the different versions of the code and thus reducing the complexity between various versions of software code.

D. Deployments of the software manually

The deployment of the software manually are prone to errors as it is difficult to handle the large code manually. Thus there is a need of reliable of automated process like Jira tool where different modules of codes are integrated in the common platform.

E. Manual Software Testing

It is always better to have code tested automatically that is in case of the project of huge scale. If manually tested the amount of bug detected is less and amount of investment done will be huge. If automatically tested using automated testing tools like Selenium, we will be to test the code at faster rate and amount of bugs detected will be more.

II. LITERATURE SURVEY

According to the paper by Baiqiao Huang et.al. [1] - it aims at classifying failure modes in the database first one being the general failure and the second being the special failure. The Failure mode databases is one of the prominent analysis techniques for workers analyzing FMEA, where it makes process not only software operate but also improves the efficiency. [6] [7] [8]

According to the paper by Peter L. Goddard [2] - it shows the methods that allows to assess the behavior of the software process. The paper also explains the use of fault tolerant platform. The author of the paper has successfully explained the Failure Mode Effective Analysis in the automotive platforms using brakes etc. The same concept has applied in the Software to find out the hardware failure causing failure of the software operation.

According to John B. Bowles et.al. [3] -The paper explains how FMEA can be effectively used in the embedded chip with not hardware protection. To begin with functionality of the system is being described followed by

Manuscript revised May 13, 2019 and published on June 5, 2019

Aditya Pai H, Assistant Professor, Department of CSE, K.S. Institute of Technology, Bangalore, India

Sameena H S, Assistant Professor, Department of CSE, Global Academy of Technology, Bangalore, India

Sandhya Soman, Assistant Professor, Department of CSE, KristuJayanti College, Bangalore, India

Dr. Piyush Kumar Pareek, Associate Professor, Department of CSE, East West Institute of Technology, Bangalore, India

between hardware and software. In the end FMEA is done to analyses the cause and effect of the software variables used.

According to Nathaniel Ozarin et.al. [4] - The paper explains how FMEA is performed on the software where there are many errors related to electronic hardware. The author explains the accuracy of the FMEA reduces as there is movement of analysis from lowest level to highest level. Lowest Level are the method to module level coding, highest level is the package level coding. The accuracy level for the package level coding is less when compared to the method level coding.

According to Dong Nguyen et.al. [5] The paper presents very appropriate method of providing solution the problem of causes and effects of the waste using FMEA. This approach provides every information that is required for causing the failure and its effect on the software system in every software process. FMEA also checks for what are the possible failures that are going to occur at each stage in the software process. The author also explains what are the corrective actions need to be taken. [9] [10].

III. RESULTS ON FAILURE MODE EFFECTIVE ANALYSIS

Adopting FMEA - With usage of FMEA used in the three software development firms to assess the Software Development Life Cycle (SDLC). During the course of the cycle nine steps were being followed:

The first step is the process review -To begin with the software team had assessed the complete SDLC to give FMEA team the thorough knowledge of the project development done on the web application. The following Figure 1 shows the step by step analysis of the software development process for the web application.

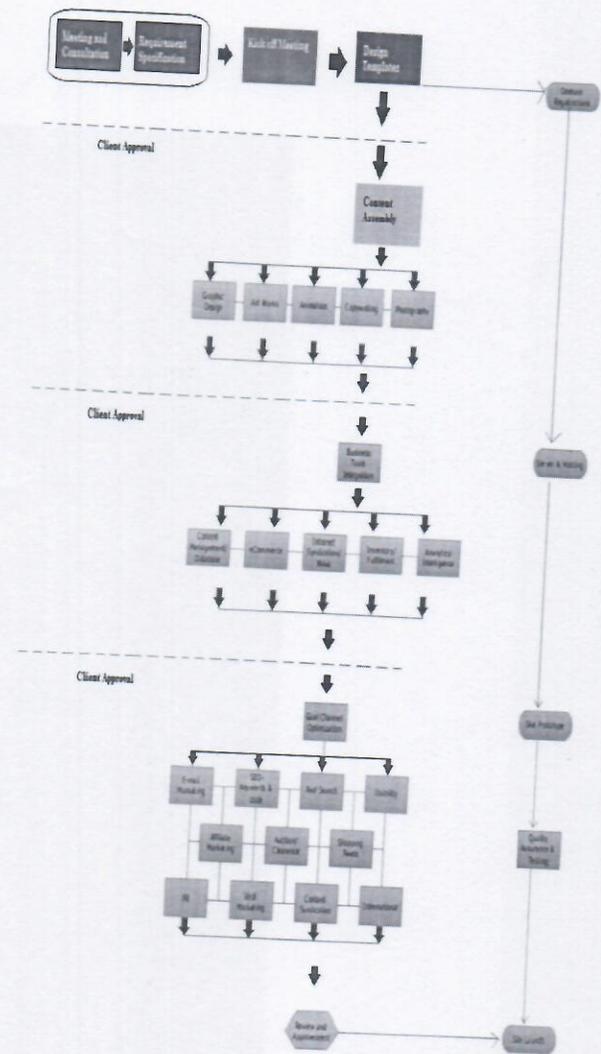


Figure 1: Step by step analysis for web application development.

As shown in the Figure 1, the software development process of the web application is done. In the beginning there will be continuous meetings and consultations with the clients and the development team. The outcome of this leads to finalization of the requirements for the web applications. After this kick off meeting is done to decide on the templates for the web applications and decide on the domain perspective. The next step is divided into two sets of stages one is the business perspective of the development process and the other is the technical stages. The business perspective has the following stages where the assembling of the contents is done according to the graphic designing, user interface etc. Which is followed by the integration of the various business tools like e-Commerce, content management system etc. Next step is to do decide on the profitable channel to market the web application. To this the client reviews and gives the approval for the same. On the technical perspective domain registration is done for the kind of website to be developed. Which is followed by hosting of the website is decided. Next step is done to prepare the prototype of the website followed by the quality assurances and testing. Once this is completed the website is launched.

1. Finding out what are the potential failure modes –

Once the team understand about the software process, the team members started analyzing the causes of the potential failure and that which could influence the software process and its quality. After the rigorous brainstorming session the result of team members expressed the potential failure modes as shown in Table 1

Table 1: Potential Failure Modes for the following codes

Code	PotentialFailureForm
PFF1	Requirements defined pending
PFF2	Number of actual requirements and the addressed requirement is different
PFF3	Number of errors fixed versus no of errors pending
PFF4	The actual number of units coded, tested is less than those tested at the execution stage
PFF5	The number of unittesting pending
PFF6	The number of testing stage that was used
PFF7	The total number of errors being after testing
PFF8	Lack of understanding the requirement by the developers from the client
PFF9	Number of errors being rectified or fixed by the developers
PFF10	What are the gaps between every process
PFF11	Technical Skill of the customer is weak
PFF12	Increase in the requirements
PFF13	Lack of knowledge required for current technology
PFF14	Market and technological opportunities not translated into requirement
PFF15	The Defects of the software listed at one instances listed in the later stages.
PFF16	Lack of end user participation

What are the impacts for each potential failures caused– As shown in the Table 1 which shows different potential failure modes, where each failure modes are grouped and assessed for the potential impacts from the existing failure which is shown in the Table 2 below

Table 2: Effects for each failure modes

PFF1	Customer unsatisfied	PFF2	Business Loss	PFF3	Customer Unsatisfied	PFF4	Customer Requirements not understood
PFF5	Delay in Order Processing	PFF6	Delay in Order Processing	PFF7	System Compatibility requirements not evaluated	PFF8	Delay in Order Processing
PFF9	Customer expectations not met	PFF10	Delay in Order Processing	PFF11	Delay in Order Processing	PFF12	Delay in Order Processing
PFF13	Time delivery Failure	PFF14	Time delivery Failure	PFF15	Business Loss	PFF16	Customer expectations not met

Ranking for Severity of each Failure – The ranking is given as per the Table 3 below:

Table 3: Potential Failure Severity Ranking

Nature of the failure impact	The severity of the failure	Ranking
Dangerous without any warning	Rated very high in the severity index as the impact of the failure effects the function of the safe system without warning	10
Dangerous with warning	Severity wise is less effective but still hazardous as it effects the functioning of the safe system with a warning.	9
Impact very high	The functioning of the system is not operable causing destructive failure and not compromising the safety	8
High Impact	The functioning of the system becomes inoperable with	7

	damaging the equipment	
Medium Impact	The functioning of the system becomes inoperable with possibility of damaging the equipment being minimal	6
Low Impact	The functioning of the system becomes inoperable with possibility of little damage	5
Very Low Impact	System functional performance is significantly degraded	4
Minimal Impact	System functional performance is degraded slightly	3
Very Minimal Impact	System is functional with slight error	2
No Impact	No potential failure	1

Table 4: Frequency of Failure Occurred Ranking

Nature of the failure impact	The severity of the failure	Ranking
Very Hazardous	Rated very high as the failure is occurred frequently leading to failure in system functionality without warning.	10
Hazardous	Rated very high as the failure is occurred frequently leading to failure in system functionality with warning.	9
Very high occurrences	The functioning of the system is not operable causing destructive failure and not compromising the safety	8
High occurrences	The functioning of the system becomes inoperable with possibility of damaging the equipment	7
Medium occurrences	The functioning of the system becomes inoperable with possibility of damaging the equipment being minimal	6
Low occurrences	The functioning of the system becomes inoperable with possibility of little damage	5
Very low occurrences	System functional performance is significantly degraded	4
Minimal occurrences	System functional performance is degraded slightly	3
Very Minimal occurrences	System is functional with slight error	2
No occurrences	No potential failure occurrences	1

Based on the Table 3, the Figure 2 showing the Pie Chart, ranking severity for each failure is done.

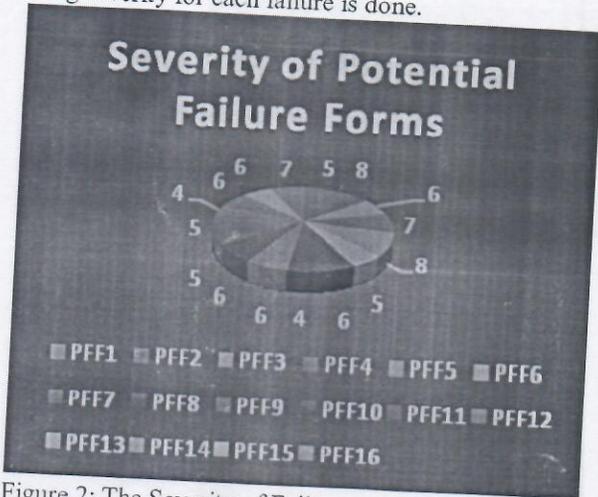


Figure 2: The Severity of Failure

As shown in the Figure 2, the potential failure forms PFF8, PFF13 has severity ranking 4 which means it is very low impact. The potential failure forms PFF1, PFF6, PFF11, PFF12 has severity ranking 5 which means low impact. The potential failure forms PFF3, PFF7, PFF9, PFF10, PFF14, PFF16 has severity ranking 6 which means medium impact. The potential failure forms PFF4, PFF16 has severity ranking 7 which means high impact. The potential failure forms PFF2, PFF5 has severity ranking 8 which means very high impact

Ranking for Occurrences of each Failure – The ranking is done based on the Table 4, which signifies how likely the failure is occurred frequently. The Figure 3 shows the ranking of occurrences of each failure.

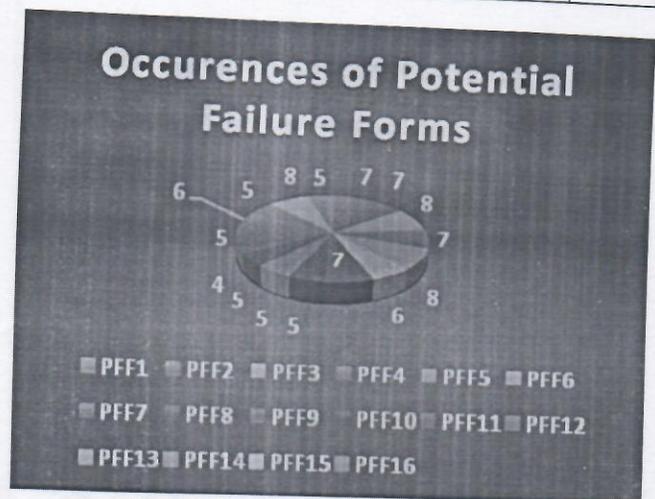


Figure 3: The Occurrences of Failure

From the above Figure 3, the occurrences of the failure forms for PFF11 is 4 which means very low. The occurrences of the failure forms for PFF8, PFF9, PFF10, PFF12, PFF14,

failure forms of PFF6, PFF13 is 6 which means medium. The occurrences of the failure forms of PFF1, PFF2, PFF4, and PFF7 is 7 which means high. The occurrences of the failure forms of PFF3, PFF5, and PFF15 is 8 which means very high.

To identify the ranking for each failure rates – The ordering of the failure is done based by giving ranking to each of the failure modes on the Table 5. As per the Figure 4, the detection of failure mode ranking is shown

Table 5: Frequency of Failure Identified Ranking

Nature of the failure impact	The Identification of the failure	Ranking
Very Hazardous	Rated very high as the failure is detected frequently leading to failure in system functionality without warning.	10
Hazardous	Rated very high as the failure is detected frequently leading to failure in system functionality with warning.	9
Very highly detected	The functioning of the system is not operable causing destructive failure and not compromising the safety	8
Highly detected	The functioning of the system becomes inoperable with possibility of damaging the equipment	7
Medium detected	The functioning of the system becomes inoperable with possibility of damaging the equipment being minimal	6
Low detected	The functioning of the system becomes inoperable with possibility of little damage	5
Very low detected	System functional performance is significantly degraded	4
Minimal detected	System functional performance is degraded slightly	3
Very Minimal detected	System is functional with slight error	2
Not detected	No potential failure detected	1

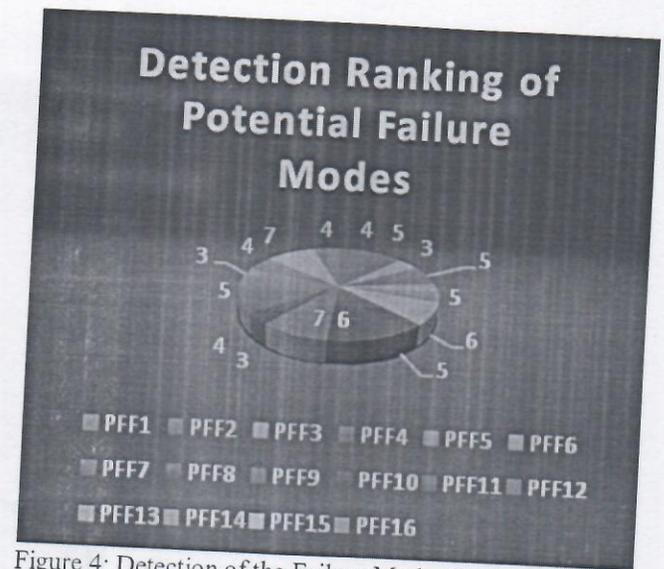


Figure 4: Detection of the Failure Modes Ranking

From the above Figure 4, the detection of the failure forms PFF3, PFF10, PFF13 is 3 which means minimal. The detection of the failure forms PFF1, PFF11, PFF14, and PFF16 is 4 which means very low. The detection of the failure forms PFF2, PFF4, PFF5, PFF7, and PFF12 is 5 which means low. The detection of the failure forms PFF6, PFF8 is 6 which means medium. The detection of the failure forms PFF9, PFF15 is 7 which means high.

The summary of the ranking for Potential Failure Modes in terms of Occurrences, Severity and Detection is shown in Table 6

Table 6: Summary of Ranking of each Potential Failure Modes in terms of severity, occurrences and detection

Potential Failure Forms	Failure Severity Index	Failure Occurrence Index	Detection of the Potential Failure
PFF1	7	5	4
PFF2	7	8	5
PFF3	8	6	3
PFF4	7	7	5
PFF5	8	8	5
PFF6	6	5	7
PFF7	7	6	5
PFF8	5	4	6
PFF9	5	6	7
PFF10	5	6	3
PFF11	4	5	4

PFF12	5	5	5
PFF13	6	4	3
PFF14	5	6	4
PFF15	8	6	7
PFF16	5	7	4

Calculating the priority of the risks for each failure modes

-To calculate this we use need to find out The Risk Precedence Index(RPI) is calculated by

$$RPI = \text{Severity of the Failure Index} \times \text{Occurrence of the Failures Index} \times \text{Detection of the Potential Failure Index}$$

The following Table 7 and Figure 5 shows the Risk Precedence Index for each failure modes

Table 7: Risk Precedence Index Calculation for each potential failure.

Potential Failure Forms	RPI
PFF1	140
PFF2	280
PFF3	144
PFF4	245
PFF5	320
PFF6	210
PFF7	210
PFF8	120
PFF9	210
PFF10	90
PFF11	80
PFF12	125
PFF13	72
PFF14	120
PFF15	336
PFF16	140

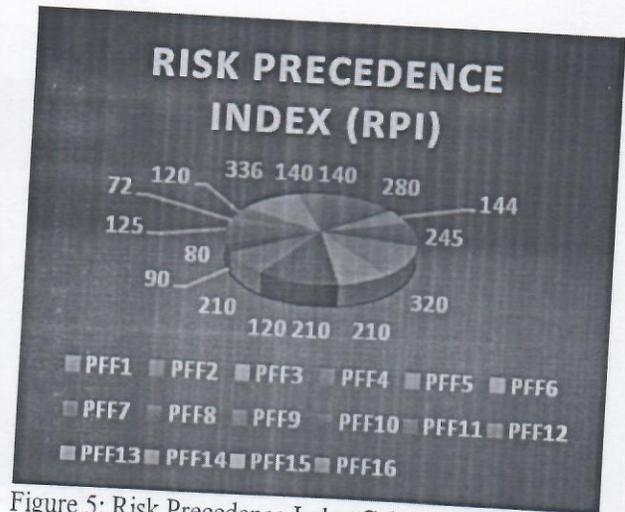


Figure 5: Risk Precedence Index Calculation for each Failure Modes/ Forms

From the above Figure 5, The Risk Precedence Index for PFF1 is 140, PFF2 is 280, PFF3 is 144, PFF4 is 245, PFF5 is 320, PFF6 is 210, PFF7 is 210, PFF8 is 120, PFF9 is 210, PFF10 is 90, PFF11 is 80, PFF12 is 125, PFF13 is 72, PFF14 is 120, PFF15 is 336 and PFF16 is 140.

Prioritize the Failure Forms for Action – Based on the highest Risk Priority Index (RPI) the potential failure forms are being prioritized. As per the Table 8 the highest priority listed to potential failure forms/ modes that is the failure with highest risk to lowest risk is sequenced as

follows – PFF15, PFF5, PFF2, PFF4, PFF6, PFF7, PFF9, PFF3, PFF1, PFF16, PFF12, PFF8, PFF14, PFF10, PFF11, PFF13. Table 8 shows the prioritizing of the potential failure forms based on RPI.

Table 8: Priority of Potential Failure Forms based on RPI

Potential Failure Forms	Severity of the Failure Index	Occurrence of the Failure Index	Detection of the Potential Failure Index	RPI
PFF15	8	6	7	336
PFF5	8	8	5	320
PFF2	7	8	5	280
PFF4	7	7	5	245
PFF6	6	5	7	210
PFF7	7	6	5	210
PFF9	5	6	7	210
PFF3	8	6	3	144
PFF1	7	5	4	140
PFF16	5	7	4	140

PFF12	5	5	5	125
PFF8	5	4	6	120
PFF14	5	6	4	120
PFF10	5	6	3	90
PFF11	4	5	4	80
PFF13	6	4	3	72

Number of errors being rectified or fixed by the developer	It is a necessary that the staffs who are being involved in the project have worked on the requirement will eventually do the testing and must report the errors to the developers to fix it.
--	---

Take Necessary Action to eliminate the high risk rate – As shown in Table 9 we tried to eliminate the high risk failure modes either completely or reduce to certain extent. Ideally it is not possible to eliminate the risk for all the potential failure modes/forms.

Table 9: Necessary action to eliminate high risk failure forms

Problems	Suggested Actions
Pending targets	Shows the details that are slowing the process. The errors that are found are needed to be fixed and then it is allowed to go the next stage. If there is any irregularity while collecting the data. Then the interview with the client must be stopped and ensure the right data is being collected. Once collected the data needs to be analyzed for practical applicability.
High number of detail changes got versus number finished	As the software process is Agile, which is incremental in nature, with each increments there are prerequisites that stops the advancements of the process. Thus whole process must be split into two Sprints
More or less errors in testing	The outcome of the Tests produces wrong results. An experienced tester ensures that each module is tested to accuracy of the outcomes and regular re-testing are done to ensure the outcome is accurate.

IV. CONCLUSION

The Failure Mode Effective Analysis is technique in which we will be able to know from the potential failures caused during development process and its effects towards the system. As mentioned in this paper from the Table 1 we mentioned what are the Potential Failure Modes identified for the particular development project. With the order of ranking we found out the severity, occurrences and detection of the defects, from which we have prioritized the risk using RPI because of which it was possible as to what caused delay in the lead times or the longer lead time being caused in the software development process as mentioned in Table 2 to 8. To this suggested action is being provided to the problems listed in Table 9. From this we can conclude that although we have prioritized the risks for the potential failure modes, it is not always possible to eliminate high risk failures for all the potential problems.

REFERENCES

- [1] Baiqiao HUANG, Hong ZHANG and Minyan LU, "Software FMEA Approach Based on Failure Modes Database", 8th International Conference on Reliability, Maintainability and Safety, July 2009.
- [2] P.L. Goddard, Software FMEA Techniques. Annual Reliability and Maintainability Symposium, 2000.
- [3] J.B. Bowles, and C. Wan, "Software Failure Modes and Effects Analysis For a Small Embedded Control System," Proceedings Annual Reliability and Maintainability symposium, 2001.
- [4] N. Ozarin, "Failure Modes and Effects Analysis during Design of Computer Software," RAMS, 2004.
- [5] Dong Nguyen et.al. "Failure modes and effects analysis for software reliability", Annual Reliability and Maintainability Symposium. 2001 Proceedings. International Symposium on Product Quality and Integrity (Cat. No.01CH37179), Jan. 2001.
- [6] W. Dong, J. Wang, C.Z. Zhao, X. Zhang, and J. Tian, "Automating software FMEA via formal analysis of dependence relations," Annual IEEE International Computer Software and Application Conference, 2008.
- [7] N. Ozarin, "The Role of Software Failure Modes and Effects Analysis for Interfaces in Safety and Mission-Critical Systems," IEEE International Systems Conference, 2008.
- [8] B. Wu, and R.Z. Tang, "Study on software FMEA technology," Mechanical and Electrical Engineering Magazine, Vol.21, No.3.753, 2004.
- [9] Amljot Hoyland and Marvin Rausand, "System Reliability Theory", John Wiley & Sons, Inc., pp 73-80, 1994
- [10] Paul Kales, Reliability for Technology, "Engineering, and Management", Prentice Hall, pp 289-295, 1998

ROC Structure analysis of Lean Software Development in SME's Using Mathematical CHAID Model

Aditya Pai H
Assistant Professor
Department of CSE
K.S. Institute of Technology,
Bangalore, India
adityapaih2007y@gmail.com

Sandhya Soman
Assistant Professor
Department of CSE
Kristu Jayanti College
Bangalore, India
sandhyasomancg@gmail.com

Sameena H S
Assistant Professor
Department of CSE
Global Academy of Technology
Bangalore, India
sameena.hs@gat.ac.in

Dr. Piyush Kumar Pareek
Associate Professor
Department of CSE
East West Institute of Technology
Bangalore, India
piyushpareek88@gmail.com

ABSTRACT

These days, numerous software associations are utilizing agile philosophies to improve the execution of their procedures. In any case, some of them are discovering benefits in the better approaches for improving these officially settled procedures. Lean software development has been utilized to upgrade these procedures significantly more, for the most part because of the decrease of waste. So as to have the capacity to push forward the impact of this marvel, giving progressively empiric proof on this theme is required. This Paper attempts to present a questionnaire survey summarized results of SME's in Bengaluru regarding Lean software development , Results are analyzed using IBM SPSS package , The questionnaire used was verified using Cronbach alpha test reading a high reliable and valid status of the conduction of collection process .

Keywords –Agile, IBM SPSS, Cronbach Alpha Test,SMEs

I. INTRODUCTION

"Lead time" is a term obtained from the assembling technique known as Lean or Toyota Production System, where it is characterized as the time passed between a client submitting a request and getting the item requested. There are different advantages of lead time:

- Flexibility amid fast moves in the market
- The capacity to outpace your rivals with quicker, progressively productive yield
- Quicker renewal of stock to maintain a strategic distance from stock outs, lost deals, and lost clients
- Meeting due dates reliably and effectively
- Increases in income on account of expanded request satisfaction

A. Difficulties looked in Lead times

Long Lead Times-Every venture IT association is extraordinary in that it will have diverse bottlenecks and requirements in its arrangement pipelines.

Handoffs-DevOps culture endeavors to separate the authoritative storehouses and progress more to item groups. This is on the grounds that the current siloed hierarchical structure gives headwinds to the goal of short lead times and persistent stream.

Endorsement Processes-Approval forms were initially created to moderate hazard and give oversight to guarantee adherence to auditable principles for moving changes into generation.

Condition Management and Provisioning-There is nothing more debilitating to a dev group than holding on to get a domain to test another element. Absence of condition accessibility as well as condition dispute because of manual procedures and poor booking can make incredibly long lead times, defer discharges, and increment the expense of discharge arrangements.

Manual Software Deployments-Machines are obviously better and substantially steadier at conveying applications than people. However there still are countless that still physically send their code. Robotizing manual arrangement can be a speedy win for these associations. This methodology can be conveyed quickly without major hierarchical changes. It isn't exceptional for associations to see sending lead times diminished by over 90%.

Manual Software Testing-Once nature is prepared and the code is sent, it's time to test to guarantee the code is functioning of course and that it doesn't break whatever else. The issue is that most associations today physically test their code base. Manual software testing drives lead times up on the grounds that the procedure is exceptionally moderate, blunder inclined, and costly proportional out crosswise over vast associations.

B. Problem Statement

The software advertise is winding up progressively powerful which can be seen in every now and again changing client needs. Software organizations should almost certainly rapidly react to these changes. This implies they need to end up light-footed with the target of creating highlights with exceptionally short lead-time and of high caliber.

An outcome of this test is the organizations should convey in all respects rapidly, in the meantime keeping up the quality. Our Research goes for Understanding the total procedures directly utilized in SME's, further recognizing the Non Value Added exercises and diminishing it by proposing a model.

II. LITERATURE SURVEY

According to EetuKupiainen, Mika V. Mantyla and JuhaItkonen [1] - The aim of the paper is to know the causes and effects of using the software metrics in agile development. The paper indicates that usage of metrics in agile approach is similar to the conventional method and hence the sprints and projects in the agile approach need to be detected and fixed.

According to Brian Fitzgerald, Klaas-Jan Stol, Ryan O'Sullivan, and Donal O'Brien [2] - The paper explains that the main aim of the research is to examine how in the controlled environment the standards can be met by agile development process. The paper also explains that in the controlled environment the product is first strategized for 3 months where numerous product backlogs are being listed which will be taken care during the sprints. Where each sprint has the daily scrum managed by the scrum master. During daily scrum the highly prioritized backlogs are being taken care and after the end of the sprint. The feedback is being taken from the client. The paper concludes that how the agile process works well in the controlled environment.

According to Robert Imreh and Mahesh S. Raisinghani [3] - The main objective of the study is to know the impact of using agile development process in improving the quality of the organizations. The methodologies followed in this paper is to find out the individuals thorough with the software tolls. Ensuring that every work is being documented. Making sure that the negotiation with the customer over scheduling and pricing is done and lastly to make sure the software responds to any alteration being asked by the client. The main outcome of the study with the usage of agile development process it is possible to establish the standardized approach to software development.

According to SandhyaTarwani and Anuradha Chug [4] - The point of this methodical writing audit: - Various Agile strategies for better software upkeep; Comparison of cascade demonstrate and nimble philosophy; the change from cascade model to dexterous techniques; various devices accessible for Agile approaches; Summarize the quality and shortcomings of Agile Methodologies. In the wake of watching the confirmations from the exploration ponders, it was seen that by presenting light-footed software development procedures there has been a constant improvement in the field of software development.

**2019 3rd International Conference
on Computing Methodologies and
Communication (ICCMC 2019)**

**Erode, India
27 – 29 March 2019**

Pages 1-627

IEEE Catalog Number: C977925-P00
ISBN: 978-1-7344-7091-4



An Fully Automated CAD System for Juxta-Vascular Nodules Segmentation in CT Scan Images

Vijayalaxmi Mekali

Department of Computer Science and Engineering
K S Institute of Technology

Bangalore, India

durutth.viju@gmail.comline 4-e-mail address if desired

Dr. Girijamma H. A

Department of Computer Science and Engineering
R N S Institute of Technology

Bangalore, India

girijakasal@gmail.com

Abstract — Early detection of all kinds of lung nodules with different characters in patient's medical modality images is the best acceptable remedy to save the life of lung cancer sufferers. Even though day by day the prominence of Computer-Aided Detection/Diagnosis (CADe/x) systems have been increasing as a part of medical routine in detection of different types of lung nodules, but detection rate performance depends on accuracy of lung parenchyma and nodule segmentation procedures. Segmentation of Juxta-Vascular nodules attached very complex. In this paper new fully automated CAD system is developed to detect and classify Juxta-Vascular nodules. In proposed methodology, lung parenchyma is segmented using iterative thresholding algorithm and lung nodules are segmented using proposed modified region growing algorithm. Since in vascular nodules, separation of blood vessel from nodule is difficult as intensity feature of attached blood vessel and nodule is same. Two new methods nodule segmentation method and vessel removal based on multi features to separate the vascular nodule part from the attached blood vessels are developed. To achieve the higher nodule-vessel separation accuracy, nodule-vessel attached region is refined. Validation of proposed method is performed on LIDC-CT lung images. A fully automated method segments the vascular nodules with less computational time and high accuracy.

Keywords—Lung parenchyma, Benign and malignant nodule, Juxta-Vascular nodule, Computed Tomography)

I. INTRODUCTION

Lung cancer is disease with highest death rate as compared to breast, prostate, brain and cervical cancers. Even with greater improvement in detection methodologies for lung cancer, death rate is still very high in patient with stage III and IV lung cancer. Thus early stage lung nodules detection followed by the proper treatment is best choice to avoid conversion of early stage nodules into malignant tumors and to reduce mortality rate. Lung nodules possible size ranges from 3mm to 30mm. Small, non-cancerous and smooth boundary lung nodules are benign nodules. Large, cancerous and irregular boundary lung tumors are known as malignant nodules. Non-detected benign nodules may get converts into cancer tumors if left them without detecting and treating. Based on nodule's intensity variation, texture and additional connected components which are not a part of nodules, lung nodules are differentiated into well circumscribed, Juxta-Vascular Nodule (JVN) these are nodules attached to blood vessels, Juxta-Pleural Nodules (JPN) these are nodules attached

to lung pleural and Ground Glass Opacity (GGO) nodules. Depending on solidity feature of the nodules, they are further classified into solid, partly solid or non-solid. Table I gives the complete details of non-solid, partly solid and solid lung nodules. Medical imaging modalities like X-ray, Magnetic Resonance Imaging (MRI), Diffusion Weight MRI (DWMRI), Computed Tomography (CT), Ultrasound (US) and other modalities have been part of medical routine for lung cancer detection. On medical images lung nodules appears as white patch. CT is GOLD STANDARD modality for detection of all types and stages lung nodules. As CT generates huge amount of images in single scan, interpretation of these images by radiologist to study the characteristic of nodules for further treatment is time consuming. Computer Aided Detection (CAD) system for lung cancer is different lung nodules detection tool that provides proper information about nodules for a radiologist to draw the useful conclusion about CT lung nodules (characteristic, size, benign or malignant), thus improves treatment option. Major steps of lung CAD system are pre-processing, lung parenchyma segmentation, nodule detection and nodule classification. Accurate nodule segmentation determines the performance of CAD system. Main challenges in lung CAD system are detection of all types of nodules. The main reasons are lung lobes shape is not same in all patients, high variation in geometric aspect of lung in different patients, existence of Juxta-Pleural and Juxta-Vascular nodules, overlap of chest wall, connected lung lobes. Lung region segmentation accuracy determines CAD system's nodule detection accuracy.

But segmentation of nodules with externally attached structures is highly challenging. In case of blood vessels attached nodules, identification of blood vessel and nodule part is very tough due to gray level similarity of blood vessel and attached nodule as shown in Figure 1. But properties of attached blood vessels such as their radius, length longer than nodules boundary irregularities and compactness of nodules are clues to separate the external connected blood vessels from nodule. By considering all above mentioned complexity it is required to design new method for automatic segmentation of vascular nodule with high accuracy and clinically acceptable time.

The rest of paper is organized as follows section I is about lung cancer, LIDC dataset, usage of CAD system in lung cancer detection. Section II gives previous related work,

section III describes proposed methodology, and IV discusses results and conclusion.

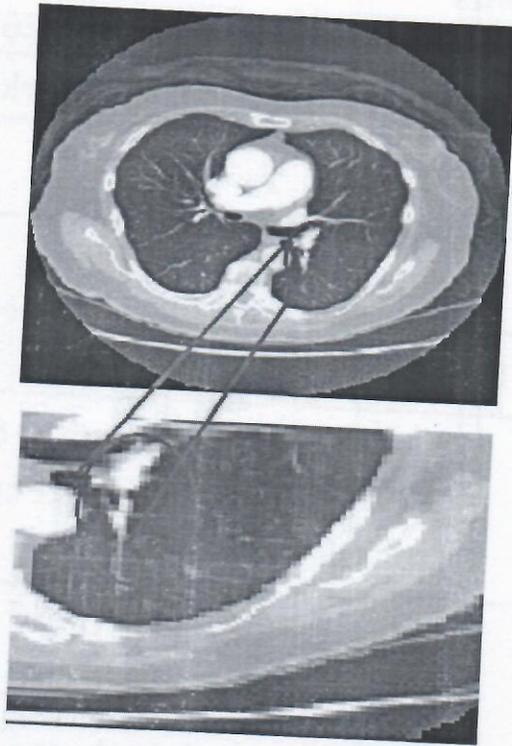


Fig. 1. Juxta-Vascular Nodule in CT scan image.

TABLE I. CHARACTERISTICS OF SOLID, PART SOLID AND NON-SOLID

Sl. No	Characteristics	Solid	Part solid	Non-Solid
1.	Shape	Round or irregular	Round or irregular with some solid sections.	Round
2.	Size in Diameter	3cm to 3cm	0.3cm to 3cm.	<0.3cm
3.	Attenuation	Homogeneous soft-tissue attenuation.	Large variations of intensity. Pure GGO.	Hazy increase in attenuation
4.	Obscuration of the underlying structures	Complete	Incomplete	Pure GGC
5.	Malignancy	Less malignant	More malignant	More malignant

II. RELATED WORK

In [1] supervised segmentation based on features such as shape, intensity and contrast of lung nodule was proposed. ANN was used to improve the segmentation accuracy. In [2] author proposed method to analysis the shape of lung nodule using nodule shape model with image intensity also. A. In [3]

Fuzzy connectedness algorithm was used by author for lung segmentation. Author used texture features for accurate detection of lung nodules. Y. Lee et al. [4] proposed CAD for lung nodules segmentation in CT images. In this methodology Genetic Algorithm Template Matching (GATM) to Target position in input CT images, conventional template matching to determine the presence of nodules and Lung Wall Template Matching (LWTM) algorithms with semicircular models as reference patterns were used. Suzuki et al. [5] developed new CAD system based on supervised filter-Massive-Training Artificial Neural Network (MTANN) to detect the lung nodules. With this new approach 97% sensitivity was achieved with reduced false positive rate. MTANN was also used for classification of nodules. In [9] lung nodule detection was achieved with new automated method based on sign distance field. In testing phase 54 LDCT scan images with 184 lung nodules including part solid, non-solid were considered. A new CAD system to detect lung nodules with removal of attached external structures such as blood vessels was proposed in [10]. Significant nodule enhancement and blood vessel removal by selective nodule enhancement filter and automated rule-based classifier to reduce false positive were key features of this work. 153 nodules of different sizes, shapes and patterns from 117 thin section CT images were used. Experimental results showed that CAD system performance was high to detection nodules with high variation in size, shape and pattern. S. Diciotti et al. [11] proposed the methodology for segmentation of lung nodules which are small in size based on local shape analysis. In the process author also considered Juxta-Vascular and Juxta-Pleural nodules segmentation. CT images with 157 nodules were taken from LIDC public database and achieved sensitivity of 88.5%. SCES approach was used in [12] for solid tumor segmentation. Proposed method obtained 78.72% accuracy with one human interaction. Dynamic programming together with multidirection fusion techniques were used in [13] for lung nodules segmentation. LIDC set1 and set2 were used for validation purpose and 75% accuracy was achieved by this new approach. New method based on morphology operations and convexity models was proposed by T. Kubota et al. [14] for a segmentation of various densities pulmonary nodules. The implanted work was tested on CT scan images were taken from public database LIDC and 69% of segmentation accuracy was achieved. T. Messay et al. [15] proposed method for extraction and detection of lung nodule using multiple thresholds, morphological operations. For each extracted nodule 245 features were calculated. Optimal feature set were determined using SFS. Two classifier Fisher FLD classifier and Quadratic classifier were used for classification. Since FLD performance was outstanding it was considered for implemented CAD system. Author developed multistage CAD system Multiple thresholds, isosurface triangulation and phenotype feature were used by author for lung lesion detection in [16].

Lung cancer clinical diagnosis demands the fast, accurate and reliable CAD system with automatic lung parenchyma segmentation in turn different type of lung nodule detection at their earliest stage. To satisfy above mentioned point we present a new CAD system with proposed methodology for detection of vascular nodules.

III. METHOD

Segmentation of different types of lung nodules is not same. Well circumscribed, Juxta-Vascular, Juxta-Pleural and GGO nodules demands specific type of segmentation method as nodules differs very much in their properties. Thus accurate segmentation of different types of nodules is very challenging. Main difficulty in Juxta-Vascular nodule segmentation is separation of blood vessels attached to the nodule as both have similar intensity values and non-spherical shape of nodules. As discussed in literature CAD systems from many researcher have been developed, but accurate segmentation of different types of pulmonary nodules remains one of challenging research area. As non-solid and part solid nodules are highly malignant in nature with poor contrast and indistinct boundary from surrounding tissues results in high mortality rate. High intensity inhomogeneity and boundary irregularity of part solid nodules also challenging parameters for segmentation. Intensity and model based traditional segmentation methods leads to boundary leakage and over segmentation of Juxta-Vascular nodules.

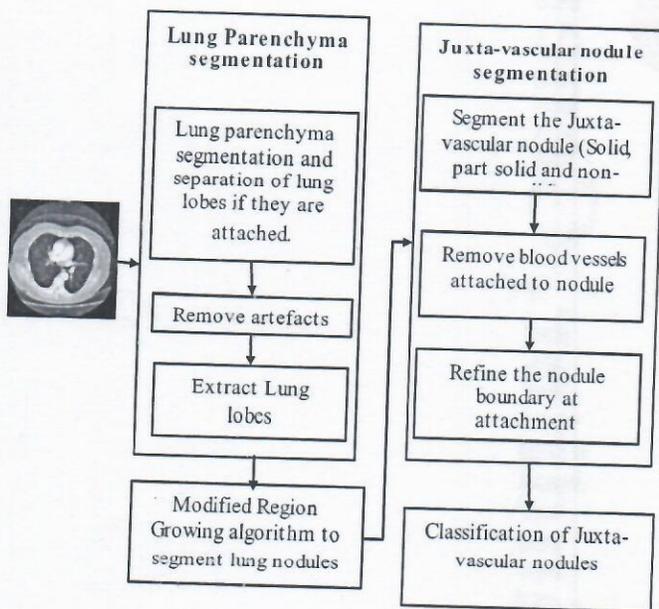


Fig. 2. Architecture of proposed system

A. Lung parenchyma segmentation

In this work, lung parenchyma segmentation is performed by

- a. Apply iterative thresholding algorithm to obtain binary output image.
- b. Apply automatic seed selection region growing algorithm to obtain lung lobes. If lobes are connected separate them.

B. Juxta-vascular lung nodule segmentation

Lung nodule detection process consists of two steps

- i. Identify the center pixel of nodule candidates
- ii. Detect the nodules based on intensity.

In segmented image lung lobes and nodule candidates are with black edges. Non-cancerous ($< 3\text{mm}$, benign) nodules are smaller in size compared to cancerous nodules ($> 3\text{mm}$, malignant). Thus nodule size calculation is also key feature of this proposed nodules detection method. Black pixels collection in lung lobes shows the possibility of nodule candidates. Nodule Segmentation algorithm (Algorithm 1) first determines the center pixel of nodule candidates. In second step using center pixels, approximate elliptical boundary for each nodule candidate is identified to calculate average intensity of pixels within the boundary. As in CT lung image nodules appears as white spot with higher intensity value. Algorithm 1 uses this intensity feature to locate the exact nodules in segmented image. Nodule candidates with average pixel intensity greater than specified threshold are extracted and are correctly identified as lung nodules.

Algorithm-1 Nodule Segmentation algorithm

Input: Edge detected image
Output: Image with segmented nodules

Step 1: Begin with black edge pixels,
 for each considered black edge pixels
 Determine 8 - connected neighborhood black pixels and add to center pixels set
 end /*Results in image CN */

Step 2: Obtain the mask image M of original input image.

Step 3: Superimpose CN with image M to obtain superimposed image S.

Step 4: Enhance the resultant image S of Step 3 to obtain enhanced image E.

Step 5: For nodule candidate i with center pixels P_{xi} in image E

- i. Obtain elliptical boundary region.
- ii. Calculate the average of pixels intensity (API) with in the nodule candidate.
 if $API > NT$,
 nodule candidate is correctly identified as lung nodule and set C_{xj} as its center pixels
 end if

end for

C. Separation of nodule part and vessel part

Separation of only nodule parts from Juxta-Vascular Nodules - Region of Interest (ROI) in this study from blood vessel is challenging task as gray level component of both attached vessel and nodules is very much similar. Thus only gray level component is not enough in removal of attached vessel from the Juxta-Vascular Nodule. Multi features such as flow of blood direction in the vessels, shape of blood vessel (elongated tube form with length greater than boundary irregularities of nodules), absence of holes in vessels and distance of end points of blood vessels from center of nodules plays a crucial role in segmentation of vessel from attached nodule. To obtain only the nodule part accurately from Juxta-Vascular Nodules, multi features-nodule segmentation is

proposed, which is based on two proposed methods vascular nodule segmentation method and vessel removal method. To achieve the higher accuracy boundary between the nodule and attached vessel is refined.

Algorithm-2 Vascular nodule segmentation Algorithm

Step 1: Let the segmented nodule is N_v which is ROI in this study. Obtain the size of ROI. Identify the center point (CP) of segmented nodule N_v using the Eq. 1

$$CP = \sum_{i=1}^N N_{V_i} / N \quad (1)$$

Where N is number of pixels in N_v and N_{V_i} is i^{th} pixel in the nodule.

Step 2: Extract the boundary pixels of segmented nodule
 Calculate the distance between the boundary point b_i and the center point CP of N_v using Eq.2

$$D_i = \|b_i - CP\|_2, (i = 0, 1, 2, \dots, n) \quad (2)$$

Where D_i holds the distance between the boundaries point b_i and CP and n is number of boundary points.

Step 3: Determine end points of attached blood vessel

Case 1: For vessel end points the D_i is very larger compared to boundary points of nodule. In D_i set if only one D_i is there with largest value then nodule is attached to one end of blood vessel and other end V_0 is free.

Case 2: If two D_i values are larger, then nodule is attached somewhere in between the two ends of blood vessel. V_l and V_r are vessel left end point and right end point with largest D_i values. Using V_l and V_r or V_0 blood vessels are tracked along the its path.

Step 4: Determine points of intersection of blood vessel and nodule

In order to find the points of attachment of blood vessel and nodule, nodule-vessel attachment method is proposed.

- a. Consider vessel opposite boundary point B_0 using center point of nodule CP.
- b. Starting from B_0 ,
- i. Boundary of nodule is tracked in anti-clockwise direction and starting with V_l left part of vessel is tracked along its boundary, II is obtained left nodule-vessel attachment point.
- ii. To obtain I_r right nodule-vessel attachment point, nodule boundary tracked clockwise direction starting with B_0 and right vessel path is tracked starting with V_r as shown in Figure 3.

Step 3: Determine nodule-vessel region of attachment

Segmentation of blood vessel from attached nodule is

achieved by determining nodule-vessel region of attachment.

Blood Flow Direction (BFD) constrained Region growing is proposed to extract the nodule-vessel attachment region.

- a) Starting with V_l and V_r apply region growing by considering flow direction vector F_v of attached blood vessel.
- b) Obtain gradient value of each considered pixel to calculate eigenvalues λ_1 , λ_2 and λ_3 vessel region. F_v is obtained using the Eq.3

$$F_y = I1 * \sqrt{\lambda_1 + \lambda_2} \quad (3)$$

Where $I1$ first eigenvalue's unit length.

This determines the nodule-attachment region.

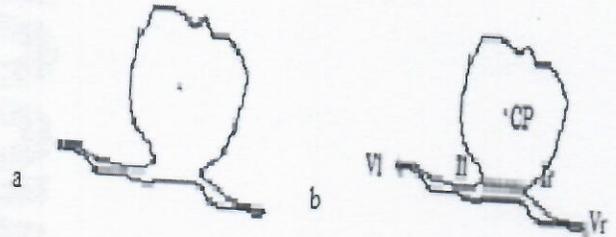


Fig. 3. a. Justa vascular nodule with attached blood vessel b. End points of vessels and attachment points of nodule and blood vessel

Algorithm-3 Vessel removal algorithm

Step 1: Starting with V_l and V_r move along with vessel path,
Step 2: At each step of movement determine number of pixels PC_k between vessel end point and center pixel of nodule.

Step 3: Calculate the difference in pixels counts of previous and current step using Eq.4

$$DC_i = (PC_{k+1} - PC_k) / PC_k \quad (4)$$

Step 4: Apply morphology erosion from end of vessel

Step 5: Repeat step 2, 3 and 4 until obtained DC_i is maximum value and it indicates nodule-vessel attachment region.

- a) Apply morphology erosion from end of nodule to attachment region to remove the vessel.

IV. RESULT

Total 26 CT scan images with JVN nodules (32) and GGO-JVN (4) nodules from LIDC public dataset [17] were taken to validate the performance of the newly developed CAD system. Table II provides nodule description and Table III explains considered 26 CT scan images from LIDC database. Nodules are either solid or GGO at uncertain locations with a possible size 3 to 30mm.

TABLE II. LIDC-CT IMAGE DESCRIPTION

LIDC-CT image description					
Intensity Value	Resolution	Slice-thickness	Average no of slice/scan	Current range in X-ray tube	Pixel size
16-bit	512*512	.5 to 2.5 mm	136	30-80mA	.5 to .75 mm/pixel

Proposed method segments and detects both JV and GGO-JV nodules. Obtained results of very steps are discussed as shown in following figures.

TABLE III. LIST OF 26 CT SCAN IMAGES FROM LIDC DATABASE

SLNo	LIDC CT Images	Nodule No	Nodule Type
1.	LIDC-0003	Nodule 2	JVN(GGO type)
2.	LIDC-0008	Nodule 1	JVN(GGO type)
3.	LIDC-0017	Nodule 1	JVN
4.	LIDC-0021	Nodule 2	JVN
5.	LIDC-0044	Nodule 2, Nodule 3	JVN4
6.	LIDC-0047	Nodule 2	JVN5
7.	LIDC-0114	Nodule 1	JVN6
8.	LIDC-0131	Nodule 1, Nodule 2	Nodule 1-JVN(GGO type) Nodule 2-JVN7
9.	LIDC-0141	Nodule 4, Nodule 6	JVN8, JVN9
10.	LIDC-0146	Nodule 1	JVN10
11.	LIDC-0152	Nodule 1	JVN11
12.	LIDC-0159	Nodule 1	JVN12
13.	LIDC-0160	Nodule 1, Nodule 4	JVN13, JVN14
14.	LIDC-0162	Nodule 2, Nodule 3	JVN15, JVN16
15.	LIDC-0168	Nodule 1	JVN17
16.	LIDC-0175	Nodule 1	JVN18
17.	LIDC-0177	Nodule 1	JVN19
18.	LIDC-0252	Nodule 1, Nodule 2	Nodule 1-JVN20 Nodule 2-JVN(GGO type)
19.	LIDC-0273	Nodule 1	JVN21
20.	LIDC-0477	Nodule 1, Nodule 2	JVN22, JVN23
21.	LIDC-0580	Nodule 1	JVN24
22.	LIDC-0915	Nodule 1	JVN25
23.	LIDC-0928	Nodule 2	JVN26
24.	LIDC-0941	Nodule 1, Nodule 2, Nodule 3	JVN29
25.	LIDC-0953	Nodule 1, Nodule 2	JVN31
26.	LIDC-0986	Nodule 1	JVN32

A. Qualitative analysis

In this section, segmentation of JVN by RG, FCM, ACM and proposed method was presented. In proposed system iterative thresholding is used to obtain the binary image. On binary image Automatic seed selection region growing algorithm is applied to obtain lung lobes. To improve the segmentation of nodules lung lobes if attached are separated. Artefacts such as CT examination bed, thorax etc. are removed. Small objects in processed images are eliminated. This reduces the search space for the nodules. In Figure 4 (a) shows the original input CT image with JVN, (b) is output of iterative thresholding, (c), (d) and (e), images with removed artefacts and small objects, (f) and (g) shows the obtained lung lobes mask and enhanced mask.



Fig. 4. (a) Original CT scan image, (b) Binary image-Output of iterative thresholding, (c), (d) and (e) images with removed artefacts and small objects (f) and (g) lung lobe mask and enhanced mask.

The images in Figure 5 were grouped as i. Original CT lung image (a)-row1, row2, row3. ii (b) and (c)-row1, row2, row3 JVN segmentation by RG and FCM methods respectively, (a) and (b)-row4, row5, row6 JVN segmentation by ACM and proposed method. iii (c) - row4, row5, row6 Ground truth of nodules of CT images (a) - row1, row2, row3.

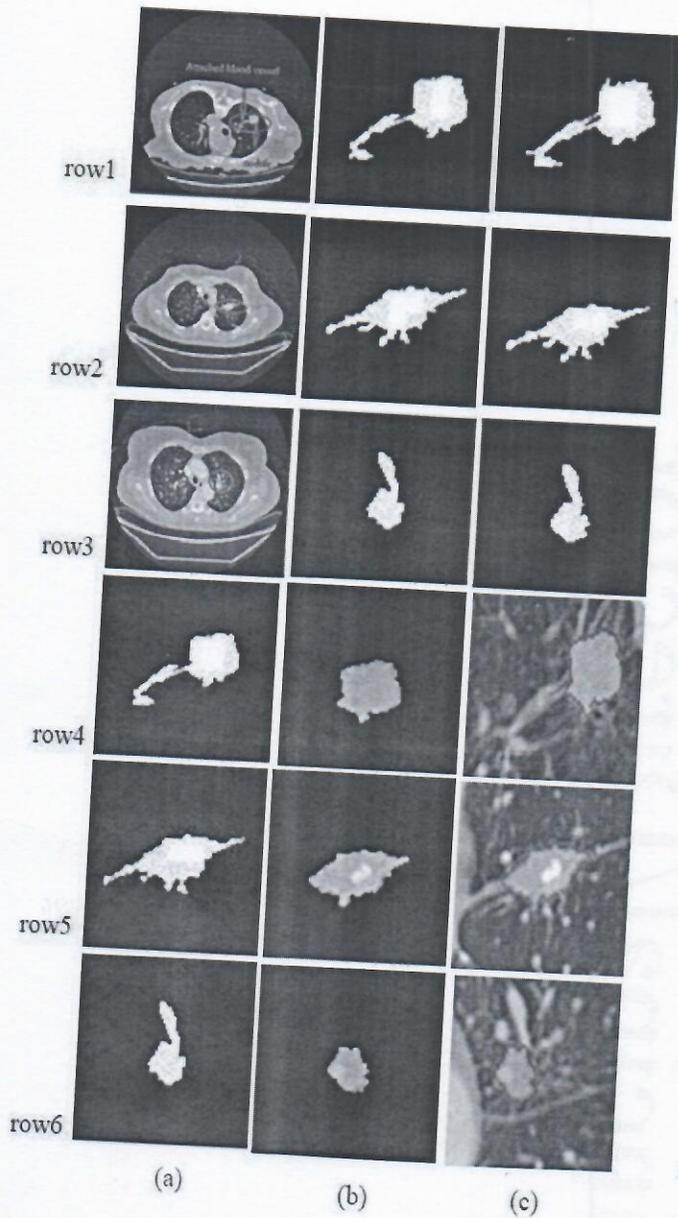


Fig. 5. (a)-row1, row2, row3 original CT lung image ii (b) and (c)-row1, row2, row3 JVN segmentation by RG and FCM methods respectively, (a) and (b)-row4, row5, row6 JVN segmentation by ACM and proposed method. iii (c) - row4, row5, row6 Ground truth of nodules of CT images (a) - row1, row2, row3.

B. Quantitative Analysis

To evaluate the segmentation results of JVN, we considered three quantitative metrics Time complexity, Pixel accuracy and Intersection over Union (cross-ratio). In the analysis process S represents segmented image and G represents reference image.

i. Pixel accuracy (PA).

PA is ratio of total number of correctly identified pixels to total pixels in given image. Eq. 5 conveys that higher pixel accuracy indicates better overlapped the results and gold standard.

$$PA = \frac{\sum_{i=0} S_{i1}}{\sum_{i=0} \sum_{j=0} G_{j1}} \quad (5)$$

Figure 6 shows the obtained pixel accuracy for our method and other considered methods for comparison. This indicates proposed method has higher pixel accuracy in lung parenchyma segmentation with JVNs. Figure - 14 clearly indicates that region growing and FCM methods had resulted in lower pixel accuracy values, whereas ACM method's pixel accuracy is better, but still lower as compared with proposed method.

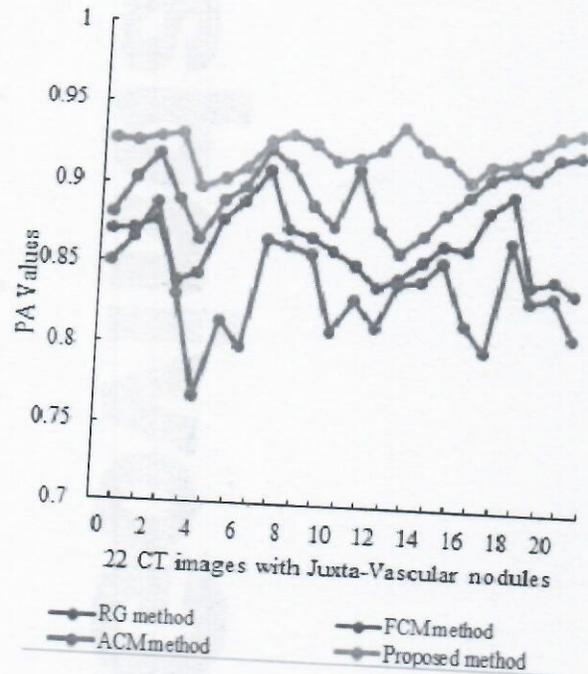


Fig. 6. Comparison of PA values of RG, FCM, ACM and proposed method

ii. Intersection over Union (IoU)

IoU or Jaccard index is similarity (intersection) to diversity (union) ratio of reference images and images to be segmented to detect objects (in our case Juxta-Vascular nodules). It is given as Eq 6.

$$IoU = \frac{Area(G \cap S)}{Area(G \cup S)} \quad (6)$$

Where, G is ground truth of Juxta -Vascular nodule in image
 S is segmented part of nodule.

Higher the IoU value represents the better nodules segmentation results.

From Figure 7 it is clear that IoU values for proposed method are higher than all other three methods and segmented nodules part by our method is very close to ground truth.

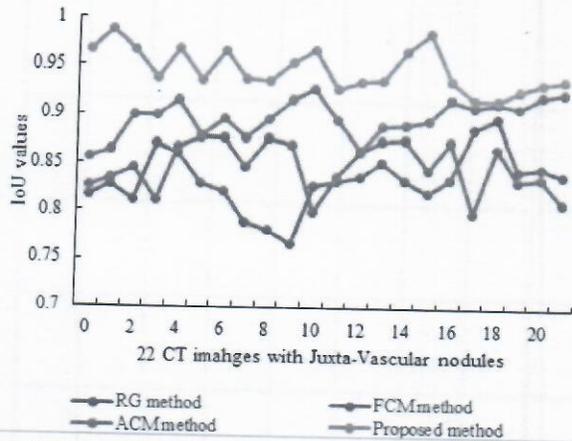


Fig. 7. Comparison of IoU values of RG, FCM, ACM and proposed method

iii. Time complexity

Quantitative metrics time complexity was calculated for all the four algorithms. Lowest, average, and longest time for the segmentation of 22 CT images was computed and compared. Figure shows the comparison of time complexity for all four methods.

As in Figure 8, time complexity of proposed method was lowest. Whereas Region growing and FCM had longest processing time. The average processing time of proposed method is also very less compared to other three methods.

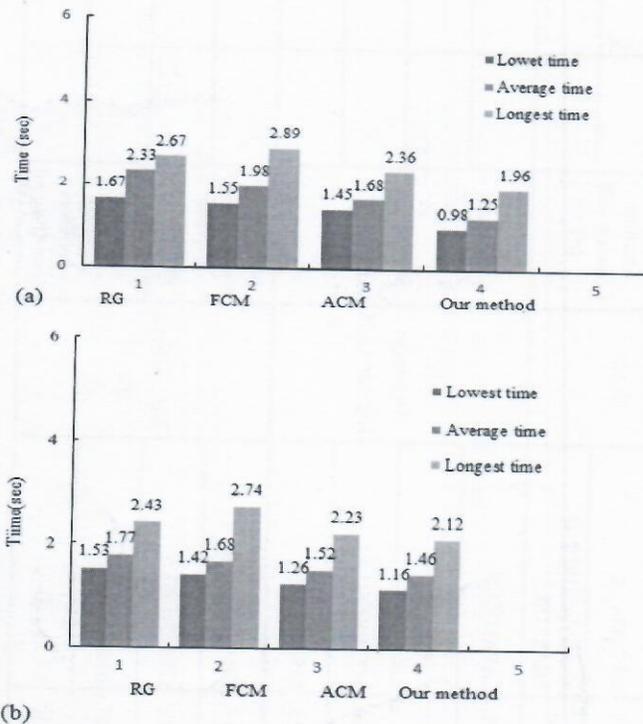


Fig. 8. Time complexity of all four methods (a) processing time for 15 images (b) processing time for 22 images

Result comparison for all four methods are given in Table IV

TABLE IV. JUXTA-VASCULAR NODULE SEGMENTATION RESULT FOR FOUR METHODS

Methods	PA	IoU	Time Complexity
RG [18]	.87	.817	2.67
FCM [17]	.85	.826	2.87
ACM [19]	.881	.856	2.36
Proposed Method	.927	.967	1.96

Experimental results for Juxta-Vascular Nodules segmentation have shown that RG and FCM were resulted in inefficient segmentation of nodules. ACM resulted were satisfied for certain extension. Compared to all the methods, proposed method's results were satisfactorily better with less computational time.

V. CONCLUSION

Juxta-Vascular Nodules segmentation by traditional segmentation methods results in inaccurate inclusion of nodule with over segmentation and edge leakage. CAD system with a new methodology has presented in this paper for accurate segmentation of all types of different size JVN's from CT scan images. In this work two algorithms vascular nodule segmentation algorithm and vessel removal algorithm are proposed for the segmentation of different size JVN's. Sixty CT scan images with Juxta-Vascular Nodules and GGO nodules from LIDC database were taken to evaluate the performance of method. Experimental results has shown that proposed methodology provides satisfactory performance with 96.3% of lung parenchyma segmentation, 95.8 % of JVN's segmentation and 94.35 of GGO nodules segmentation.

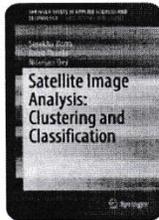
Compared with existing methods region based ACM, FCM and RG our method has advantageous as no user interaction, less computational time, improved sensitivity, accurate segmentation of JVN's and better performance.

ACKNOWLEDGMENT

I thank my research guide Dr Girijamma H A, Professor, Department of CSE, R N S Institute of Technology, Bangalore, India for supporting me to complete this research article. I would like thank public LIDC database from which images are taken to carry a reach work.

REFERENCES

- [1] D. M. Campos, A. Simões, I. Ramos, and A. Campilho, "Feature-Based Supervised Lung Nodule Segmentation," no. Ci, pp. 23–26, 2014.
- [2] Farag, H. E. A. El Munim, J. H. Graham, and A. a Farag, "A novel approach for lung nodules segmentation in chest CT using level sets," *IEEE Trans. Image Process.*, vol. 22, no. 12, pp. 5202–13, 2013.
- [3] Mansoor A, Bagci U, Xu Z, Foster B, Olivier KN, Elinoff JM, Suffredini AF, Udupa JK, Mollura DJ, "A generic approach to pathological lung segmentation," *IEEE Transl. Med Imaging*, vol. 33, pp. 2293-310, Dec 2014.
- [4] Y. Lee, T. Hara, H. Fujita, S. Itoh, and T. Ishigaki, "Automated detection of pulmonary nodules in helical CT images based on an improved template matching technique," *IEEE Transl. Med Imaging*, 2001, pp. 595–604.
- [5] K. Suzuki and K. Doi, "How can a massive training artificial neural network (MTANN) be trained with a small number of cases in the distinction between nodules and vessels in thoracic CT?" *Acad. Radiol.* 12, 1333–1341 (2005).
- [6] K. Suzuki, Z. H. Shi, and J. Zhang, "Supervised enhancement of lung nodules by use of a massive-training artificial neural network (MTANN) in computer-aided diagnosis (CAD)," *Proc. ICPR*, 680–683 (2008).
- [7] K. Suzuki and K. Doi, "Characteristics of a massive training artificial neural network in the distinction between lung nodules and vessels in CT images," *Proc. CARS* 1268, 923–928 (2004).
- [8] K. Suzuki, F. Li, S. Sone, and K. Doi, "Computer-aided diagnostic scheme for distinction between benign and malignant nodules in thoracic low-dose CT by use of massive training artificial neural network," *IEEE Trans. Med. Imaging* 24, 1138–1150 (2005).
- [9] J. T. Pu, B. Zheng, J. K. Leader, X. H. Wang, and D. Gur, "An automated CT based lung nodule detection scheme using geometric analysis of signed distance field," *Med. Phys.* 35, 3453–3461 (2008).
- [10] Q. Li, F. Li, and K. Doi, "Computerized detection of lung nodules in thin section CT images by use of selective enhancement filters and an automated rule-based classifier," *Acad. Radiol.* 15, 165–175 (2008).
- [11] S. Diciotti, G. Picozzi, M. Falchini, M. Mascali, N. Villari, and G. Valli, "3-D segmentation algorithm of small lung nodules in spiral CT images," *IEEE Trans. Inf. Technol. Biomed.*, vol. 12, no. 1, pp. 7–19, 2008.
- [12] Y. Gu, V. Kumar, L. O. Hall, D. B. Goldgof, C. Y. Li, R. Korn, C. Bendtsen, E. R. Velazquez, A. Dekker, H. Aerts, P. Lambin, X. Li, J. Tian, R. A. Gatenby, and R. J. Gillies, "Automated delineation of lung tumors from CT images using a single click ensemble segmentation approach," *Pattern Recognit.*, vol. 46, no. 3, pp. 692–702, 2013.
- [13] Q. Wang, E. Song, R. Jin, P. Han, X. Wang, Y. Zhou, and J. Zeng, "Segmentation of lung nodules in computed tomography images using dynamic programming and multidirection fusion techniques," *Acad. Radiol.*, vol. 16, no. 6, pp. 678–688, 2009.
- [14] T. Kubota, A. K. Jerebko, M. Dewan, M. Salganicoff, and A. Krishnan, "Segmentation of pulmonary nodules of various densities with morphological approaches and convexity models," *Med. Image Anal.*, vol. 15, no. 1, pp. 133–154, 2011.
- [15] T. Messay, R. C. Hardie, and S. K. Rogers, "A new computationally efficient CAD system for pulmonary nodule detection in CT imagery," *Med. Image Anal.*, vol. 14, no. 3, pp. 390–406, 2010.
- [16] B. Golosio, G. L. Masala, A. Piccioli, P. Oliva, M. Carpinelli, R. Cataldo, P. Cerello, F. De Carlo, F. Falaschi, M. E. Fantacci, G. Gargano, P. Kasae, and M. Torsello, "A novel multithreshold method for nodule detection in lung CT," *Med. Phys.*, vol. 36, no. 8, pp. 3607–3618, 2009.
- [17] Liu, Hui; Zhang, Cai-Ming; Su, Zhi-Yuan; Wang, Kai; Deng, Kai, "Research on a Pulmonary Nodule Segmentation Method Combining Fast Self-Adaptive FCM and Classification," *Computational & Mathematical Methods in Medicine*. 4/7/2015, Vol. 2015, pp 1-14..
- [18] Zhao, J. Ji, G. Han, X. Qiang, Y. Liao, X., "An automated pulmonary parenchyma segmentation method based on an improved region growing algorithm in PET-CT imaging", *Front. Comput. Sci.* 2016, Vol. 10, pp 189–200.
- [19] Ezhil E. Nithila, S.S. Kumar, "Segmentation of lung nodule in CT data using active contour model and Fuzzy C-mean clustering", *Alexandria Engineering Journal* vol 55, Issue 3, September 2016, pp 2583-2588
- [20] <https://wiki.cancerimagingarchive.net/display/Public/LIDC-IDRI>

[Home](#) > [Book](#)

Satellite Image Analysis: Clustering and Classification

| Book | © 2019

Overview

Authors: [Surekha Borra](#), [Rohit Thanki](#), [Nilanjan Dey](#)

Provides insights into pre-processing techniques for satellite image analysis
Explores intelligent solutions, methods, and models for satellite image analysis
Discusses the standards, challenges, recommendations, and the future of satellite image analysis

 **Part of the book series:** [SpringerBriefs in Applied Sciences and Technology \(BRIEFSAPPLSCIENCES\)](#)

↳ **Part of the book sub series:** [SpringerBriefs in Computational Intelligence \(BRIEFSINTELL\)](#)

conferences at the national and international level. He currently serves as a reviewer for journals published by the Institute of Electrical and Electronics Engineers (IEEE), Elsevier, Taylor & Francis, Springer, and IGI Global.

Nilanjan Dey is an Assistant Professor at the Department of Information Technology, Techno India College of Technology, Kolkata, India. He was an honorary Visiting Scientist at Global Biomedical Technologies Inc., CA, USA and an associated Member of the University of Reading, London, UK. He has authored or edited more than 40 books with Elsevier, Wiley, CRC Press and Springer etc., and published more than 300 research articles. He is Editor-in-Chief of the International Journal of Ambient Computing and Intelligence, IGI Global, USA. He is the Series Co-Editor of Springer Tracts in Nature-inspired Computing; Advances in Ubiquitous Sensing Applications for Healthcare; and Intelligent Signal Processing and Data Analysis; as well as an Associated Editor for IEEE Access. His main research interests include medical imaging, machine learning, data mining etc. Recently, he was selected as one of the top 10 most published and cited academics in the field of Computer Science in India during the period of consideration 2015-17.

Bibliographic Information

Book Title	Authors	Series Title
Satellite Image Analysis: Clustering and Classification	Surekha Borra, Rohit Thanki, Nilanjan Dey	<u>SpringerBriefs in Applied Sciences and Technology</u>
DOI	Publisher	eBook Packages
https://doi.org/10.1007/978-981-13-6424-2	Springer Singapore	<u>Engineering, Engineering (RO)</u>
Copyright Information	Softcover ISBN	eBook ISBN
The Editor(s) (if applicable) and The Author(s), under	978-981-13-6423-5 Published: 21 February 2019	978-981-13-6424-2 Published: 08 February 2019

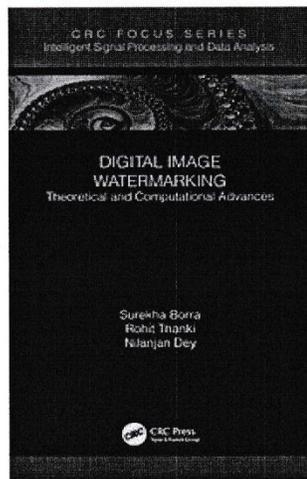
 **Free standard shipping on all orders**



Search by keywords, subject, or ISBN 

APRIL SAVERS • 20% Off All Books & eBooks • Shop Now >

SAVE £11.40



 **PREVIEW BOOK**

1st Edition

Digital Image Watermarking Theoretical and Computational Advances

By Surekha Borra, Rohit Thanki, Nilanjan Dey

Copyright 2019

Hardback

£56.99

GBP **£45.59**

1 

[ADD TO CART](#)[PURCHASE LOCALLY](#)[ADD TO WISH LIST](#)

ISBN 9781138390638

174 Pages 21 B/W Illustrations

Published December 11, 2018 by CRC Press

 Free Shipping (14-21 Business Days)
[shipping options](#)

Description

- The Book presents an overview of newly developed watermarking techniques in various independent and hybrid domains
- Covers the basics of digital watermarking, its types, domain in which it is implemented and the application of machine learning algorithms onto digital watermarking
- Reviews hardware implementation of watermarking
- Discusses optimization problems and solutions in watermarking with a special focus on bio-inspired algorithms
- Includes a case study along with its MATLAB code and simulation results

Table of Contents

Author(s)

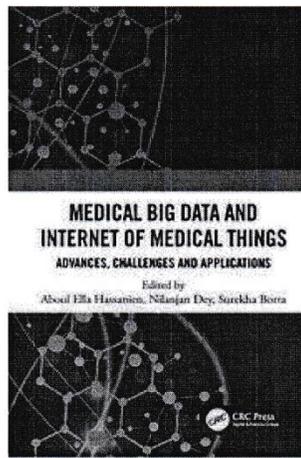
 **Free standard shipping on all orders**



Search by keywords, subject, or ISBN 

APRIL SAVERS • 20% Off All Books & eBooks • Shop Now »

SAVE £26.00



COMING SOON

 [PREVIEW BOOK](#)

1st Edition

Medical Big Data and Internet of Medical Things Advances, Challenges and Applications

Edited By Aboul Hassanien, Nilanjan Dey, Surekha Borra

Copyright 2019

Hardback

£130.00

GBP £104.00

1

 **ADD TO CART****PURCHASE LOCALLY****ADD TO WISH LIST**

ISBN 9781138492479

356 Pages 100 B/W Illustrations

Published October 4, 2018 by CRC Press

Request Inspection Copy. Free Shipping (14-21 Business Days)[shipping options](#)

Description

Big data and the Internet of Things (IoT) play a vital role in prediction systems used in biological and medical applications, particularly for resolving issues related to disease biology at different scales. Modelling and integrating medical big data with the IoT helps in building effective prediction systems for automatic recommendations of diagnosis and treatment. The ability to mine, process, analyse, characterize, classify and cluster a variety and wide volume of medical data is a challenging task. There is a great demand for the design and development of methods dealing with capturing and automatically analysing medical data from imaging systems and IoT sensors. Addressing analytical and legal issues, and research on integration of big data analytics with respect to clinical practice and clinical utility, architectures and clustering techniques for IoT data processing, effective frameworks for removal of misclassified instances, practicality of big data analytics, methodological and technical issues, potential of Hadoop in managing healthcare data is the need of the hour. This book integrates different aspects used in the field of healthcare such as big data, IoT, soft computing, machine



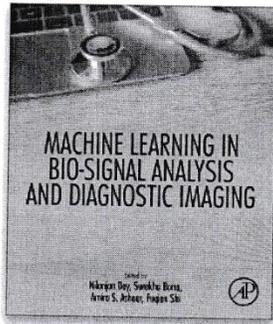
ELSEVIER

Q US

Save up to 30% on Elsevier print and eBooks with free shipping. No promo code needed. Offer details >

Home > Books > Life sciences >

Machine Learning in Bio-Signal Analysis and Diagnostic Imaging



Machine Learning in Bio-Signal Analysis and Diagnostic Imaging

1st Edition - November 30, 2018

Editors: Nilanjan Dey, Surekha Borra, Amira S. Ashour, Fuqian Shi

Language: English

Paperback ISBN: 9780128160862

eBook ISBN: 9780128160879

Machine Learning in Bio-Signal Analysis and Diagnostic Imaging presents original research on the advanced analysis and classification techniques of biomedical signals and images th... Read more ↓

Purchase options

LIMITED OFFER

Save 50% on book bundles

Immediately download your ebook while waiting for your print delivery. No promo code is needed.

Offer details >

Sign in Basket

My Account My Purchases Advanced Search Browse Collections Rare Books Art & Collectibles Textbooks Sellers Start Selling Help CLOSE Search AbeBooks

Items related to Novel Techniques for Multi-Resolution Imaging: Improving...

Lowest Price Novel Techniques for Multi-Resolution Imaging: Improving... Prabhakaran Prof P., Joy.

Prabhakaran, Prof P. Joy Novel Techniques for Multi-Resolution Imaging: Improving multi-media systems where consum... ISBN 13: 9786139460021

Novel Techniques for Multi-Resolution Imaging: Improving multi-media systems where consumption resolutions and distribution bandwidths vary drastically - Softcover

Prabhakaran, Prof P. Joy

View all 2 copies

of Novel Techniques for Multi-Resolution Imaging: Improving ... from US\$ 27.04



Softcover

ISBN 10: 6139460026 /

ISBN 13: 9786139460021

Publisher: LAP LAMBERT Academic Publishing, 2019

View all copies of this ISBN edition:

3 New from US\$ 45.67

2 Used from US\$ 27.04

View all formats and editions of this title:

Softcover (2) from US\$ 27.04

Hardcover (0)

First Edition (0)

Signed Copy (0)

Synopsis

About this edition

Efficient image zooming or interpolation algorithms that have low complexity and high quality is an important goal for multi-media distribution. This is because content is consumed with different sizes and sent over networks with different bandwidths. This book discusses four approaches for image zooming and multi-resolution image representation. It also presents a few new tools that can be used in the image/video compression pipeline and demonstrates a novel usage of dictionary coding for...+ More

Buy New

Learn more about this copy

US\$ 45.67

Convert currency

Shipping: US\$ 24.93

From Germany to U.S.A.

Destination, rates & speeds

Add to Basket

Buy Used

Condition: Fine

140 Seiten 34144088/1 Altersfreigabe...

Learn more about this copy

US\$ 27.04

Convert Currency

Shipping: US\$ 48.79

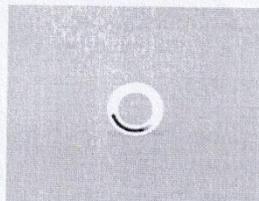
From Germany to U.S.A.

Destination, rates & speeds

Add to Basket

30 Day Return Policy

Top Search Results from the AbeBooks Marketplace



[Home](#) > [Handbook of Multimedia Information Security: Techniques and Applications](#) > Chapter

Security of Biometric and Biomedical Images Using Sparse Domain Based Watermarking Technique

| Chapter | First Online: 20 July 2019

| pp 209–232 | [Cite this chapter](#)



Handbook of Multimedia Information Security: Techniques and Applications

[Rohit Thanki](#), [Surekha Borra](#) & [Deven Trivedi](#)

 1255 Accesses  1 [Citations](#)

Abstract

The biomedical images and biometric images is composed of vital wellbeing data, critical unique identity and conduct data of human. Hence, pictures identified with these two data types must be kept secret and must be secured over transmission medium. In this chapter, a new sparse domain image watermarking is proposed, performance examined and correlated with the existing watermarking systems. The proposed technique utilizes the sparsity property of Discrete Wavelet Transform (DWT) and Compressive Sensing (CS) hypothesis

Multimedia Information Security: Techniques and Applications. Springer, Cham.

https://doi.org/10.1007/978-3-030-15887-3_9

[.RIS](#) [.ENW](#) [.BIB](#)

DOI

https://doi.org/10.1007/978-3-030-15887-3_9

Published

20 July 2019

Publisher Name

Springer, Cham

Print ISBN

978-3-030-15886-6

Online ISBN

978-3-030-15887-3

eBook Packages

[Computer Science](#)

[Computer Science \(R0\)](#)

Publish with us

[Policies and ethics](#)

Chapter 9

Security of Biometric and Biomedical Images Using Sparse Domain Based Watermarking Technique



Rohit Thanki, Surekha Borra, and Deven Trivedi

9.1 Introduction

The rise in the utilization of human related pictures over online networking poses genuine difficulties to the picture security. The watermarking system can be utilized for different applications, for example, copyright assurance, ownership identification, and secure correspondence [1–3]. The human related images are isolated into two kinds: biometric images and biomedical images. The biometric images reflect the conduct and/or physical attributes of human and hence are utilized as unique ID in different organizations. On the other hand, the biomedical images speak about wellbeing related data. Along these lines, the security of such images is vital when it is transmitted over a correspondence channel.

The many watermarking techniques in spatial and transform domain are proposed for the security of images [1–4] in the literature. Many researchers proposed transform domain techniques to result higher robustness and security. Hybrid watermarking techniques are also proposed by combining various image transforms [1, 2, 5]. In these techniques, cover image is converted into its transform coefficients before being modified by watermark image to get modified coefficients. In this chapter, compressive sensing (CS) theory is combined with sparsity property of DWT to propose a secure method for watermarking of human related images. The proposed technique is tested and analyzed using different kind of biomedical images and biometric images. The performance of the technique is further verified

R. Thanki (✉)

C. U. Shah University, Wadhwan City, Gujarat, India

S. Borra

K. S. Institute of Technology, Bangalore, Karnataka, India

D. Trivedi

G. H. Patel College of Engineering and Technology, Vallabh Vidyanagar, Gujarat, India

© Springer Nature Switzerland AG 2019

A. K. Singh, A. Mohan (eds.), *Handbook of Multimedia Information Security: Techniques and Applications*, https://doi.org/10.1007/978-3-030-15887-3_9



Machine Learning in Bio-Signal Analysis and Diagnostic Imaging

2019, Pages 273-292

Chapter 11 - Application of Machine Learning Algorithms for Classification and Security of Diagnostic Images

Rohit Thanki ^{*}, Surekha Borra [†]

Show more

Outline Share Cite

<https://doi.org/10.1016/B978-0-12-816086-2.00011-4>

Get rights and content

Abstract

As of late, different sorts of diagnostic images have been produced everywhere in clinics, diagnostic centers, and well-being stations. Accordingly, diagnostic images are effortlessly put away, transmitted and appropriated between different stations and hence arises the issue of legitimate administration of patient information at every point of the framework. Additionally, these pictures are exchanged from one hospital to other for better treatments and diagnosis, which are effectively controlled or replicated by assailant. Hence, the security of medical images is the need of the hour. This chapter is focused on classification and security of diagnostic images using machine learning. These methods are likewise enhanced to provide security of medical images in telemedicine applications.

Recommended articles

References (0)

Cited by (17)

Crashworthy optimization of skeleton-filled FRP tubes based on back propagation neural network

2023, Heliyon

Show abstract

A review on emerging artificial intelligence (AI) techniques for air pollution forecasting: Fundamentals, application and performance

2021, Journal of Cleaner Production

Citation Excerpt :

...Support Vector Machines (SVM) or maximum margin classifiers are a set of popular supervised learning algorithms that analyze data for various classification, numerical prediction, density estimation and pattern recognition problems (Roy et al., 2015). Algorithmically, SVM seeks for an N-dimensional hyperplane with wide margins, to separate the data into predefined classes or labels (Thanki et al., 2019). As shown in Fig. 5, the data points closest to the hyperplane are called support vectors, and lying at the halfway of the margin is the optimal separating hyperplane that maximizes the distance of separation (margin) for the training data points (Morio et al., 2015)....

Show abstract

Application of Machine Learning Algorithms for Classification and Security of Diagnostic Images

Rohit Thanki*, Surekha Borra†

*C. U. Shah University, Wadhwan, India, †K. S. Institute of Technology, Bengaluru, India

1 Introduction

Medical science is a very important subject which is related to analysis and solution of health information of human. In modern medical science, advances in medical imaging play an important role in the treatment of many diseases. These medical images are known as diagnostic images and are divided into various types such as X-ray, computed tomography (CT), positron emission tomography (PET), magnetic resonance imaging (MRI), and ultrasonography (US) [1–5]. Due to high usage of diagnostic images in treatments, lot and lots of images of patients are available at system storage of hospitals which creates data management and security issues. The diagnostic data when transferred over open transmission network can easily be manipulated by attackers, which further leads to serious issues related to wrong treatment and diagnosis. Hence, it is very important to deal with these two problems which are related to diagnostic imaging in medical science.

Machine learning (ML) provides various algorithms that can help solve above two problems which are related to medical science [6]. The ML techniques determine predicated value from desired input data by means of different classification and pattern recognition algorithms. These techniques also automate many engineering problems with high accuracy and efficiency [7] which otherwise involve time-consuming process. ML is now being used for the classification of diagnostic images for better extraction of images from the large database. Often, watermarking techniques are used for providing security of the diagnostic images [8–16]. Recently, ML is combined with watermarking to improve the performance of conventional watermarking techniques for the security of diagnostic images [7].

This chapter is ordered such that Section 2 presents review of machine learning. Section 3 provides a review on various ML approaches for classification of diagnostic images. Section 4

 View PDF View abstract ▾

Book chapter ○ Abstract only

Chapter 12 - Robotics in Healthcare: An Internet of Medical Robotic Things (IoMRT) Perspective

Sitaramanjaneya Reddy Guntur, Rajani Reddy Gorrepati and Vijaya R. Dirisala

Pages 293-318

 View PDF View abstract ▾

Book chapter ○ Full text access

Index

Pages 319-327

 View PDF

About the book

Description

Machine Learning in Bio-Signal Analysis and Diagnostic Imaging presents original research on the advanced analysis and classification techniques of biomedical signals and images that cover both supervised and unsupervised machine learning models, standards, algorithms, and their applications, along with the difficulties and challenges faced by healthcare professionals in analyzing biomedical signals and diagnostic images. These intelligent recommender systems are

Show more ▾

Key Features

- Examines a variety of machine learning techniques applied to bio-signal analysis and diagnostic imaging
- Discusses various methods of using intelligent systems based on machine learning, soft computing, computer vision, artificial intelligence and data mining
- Covers the most recent research on machine learning in imaging analysis and includes applications to a number of domains

Show more ▾

Details

ISBN

978-0-12-816086-2

Language

English

Published

2019

Copyright

Copyright © 2019 Elsevier Inc. All rights reserved.

Imprint

Academic Press

DOI

[Home](#) > [Proceedings of International Ethical Hacking Conference 2018](#) > Conference paper

Real-Time Facial Recognition Using Deep Learning and Local Binary Patterns

| Conference paper | First Online: 05 October 2018

| pp 331–347 | [Cite this conference paper](#)



Proceedings of International Ethical Hacking Conference 2018

[B. Venkata Kranthi](#)  & [Borra Surekha](#)

 Part of the book series: [Advances in Intelligent Systems and Computing \(\(AISC, volume 811\)\)](#)

 902 Accesses  2 Citations

Abstract

Today, surveillance is everywhere where the operators continuously observe the video captured by the camera to identify the human/object for public safety. Automated systems are being developed for real-time facial recognition as it is highly difficult for the operators to track and identify in highly crowded areas. The feature selection process is generally used

© 2019 Springer Nature Singapore Pte Ltd.

About this paper

Cite this paper

Venkata Kranthi, B., Surekha, B. (2019). Real-Time Facial Recognition Using Deep Learning and Local Binary Patterns. In: Chakraborty, M., Chakrabarti, S., Balas, V., Mandal, J. (eds) Proceedings of International Ethical Hacking Conference 2018. Advances in Intelligent Systems and Computing, vol 811. Springer, Singapore. https://doi.org/10.1007/978-981-13-1544-2_27

[.RIS](#) [.ENW](#) [.BIB](#)

DOI	Published	Publisher Name
https://doi.org/10.1007/978-981-13-1544-2_27	05 October 2018	Springer, Singapore

Print ISBN	Online ISBN	eBook Packages
978-981-13-1543-5	978-981-13-1544-2	Engineering Engineering (RO)

Publish with us

[Policies and ethics](#)

Real-Time Facial Recognition Using Deep Learning and Local Binary Patterns



B. Venkata Kranthi and Surekha Borra

Abstract Today, surveillance is everywhere where the operators continuously observe the video captured by the camera to identify the human/object for public safety. Automated systems are being developed for real-time facial recognition as it is highly difficult for the operators to track and identify in highly crowded areas. The feature selection process is generally used to represent faces, and a machine learning-based approach is used to classify the faces in face recognition. A variety of poses, expressions and illumination conditions make the manual feature selection process error-prone and computationally complex. This paper proposes a less computationally complex real-time face recognition algorithm and system based on local binary patterns and convolutional neural networks (CNNs). A modified version of LUNET is used instead for face recognition. The recognition accuracy of the proposed method is tested on two publicly available datasets. A new database covering most of the challenges like illumination and oriental variations, facial expressions, facial details (goggles, beard and turban) and age factor is also developed. The proposed architecture proved accurate up to 97.5% in offline mode and an average accuracy of 96% in the real-time recognition process. In the real-time process, frame reading and frame processing are done in two separate threads to improve the frame rate from 28 to 38 FPS.

Keywords Face recognition · Deep learning · Real-time system · Face detection LBP · Computer vision

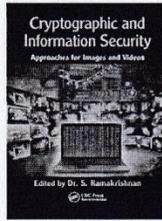
B. Venkata Kranthi (✉)
ECE Department, GITAM University-Bangalore Campus, Bangalore, India
e-mail: bvkranthi1@gmail.com

S. Borra
ECE Department, K. S. Institute of Technology, Kanakapura Road, Bangalore, India
e-mail: borrasurekha@gmail.com

© Springer Nature Singapore Pte Ltd. 2019
M. Chakraborty et al. (eds.), *Proceedings of International Ethical Hacking Conference 2018*, Advances in Intelligent Systems and Computing 811,
https://doi.org/10.1007/978-981-13-1544-2_27

< Cryptographic and Information Security Approaches for Images and Videos (<https://www.taylorfrancis.com/books/mono/10.1201/9780429435461/cryptographic-information-security-approaches-images-videos?refId=ebc713e9-560b-4ae4-8093-026fa0e12003&context=ubx>) Show Path

Chapter



✓ FULL ACCESS

Watermarking Techniques for Copyright Protection of Texts in Document Files

By [Surekha Borra](#) ([/search?contributorName=Surekha Borra&contributorRole=author&redirectFromPDP=true&context=ubx](#)), [Rohit Thanki](#) ([/search?contributorName=Rohit Thanki&contributorRole=author&redirectFromPDP=true&context=ubx](#)), [Nilanjan Dey](#) ([/search?contributorName=Nilanjan Dey&contributorRole=author&redirectFromPDP=true&context=ubx](#))

Book [Cryptographic and Information Security Approaches for Images and Videos](#) (<https://www.taylorfrancis.com/books/mono/10.1201/9780429435461/cryptographic-information-security-approaches-images-videos?refId=ebc713e9-560b-4ae4-8093-026fa0e12003&context=ubx>)

Edition	1st Edition
First Published	2019
Imprint	CRC Press
Pages	29
eBook ISBN	9780429435461

Share

ABSTRACT

< [Previous Chapter](#) (chapters/edit/10.1201/9780429435461-11/medical-image-encryption-padmapriya-praveenkumar-amirtharajan-rengarajan?context=ubx)
Next Chapter > ([chapters/edit/10.1201/9780429435461-13/vlsi-implementation-video-watermarking-secure-hevc-coding-standard-amit-joshi?context=ubx](#))



(<https://www.taylorfrancis.com>)

Policies

Chapter 12

Watermarking Techniques for Copyright Protection of Texts in Document Files

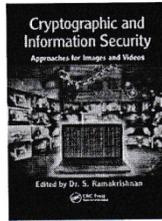
Surekha Borra, Rohit Thanki, and Nilanjan Dey

Contents

12.1	Introduction.....	324
12.2	Document Watermarking.....	327
12.2.1	Image Based Approach.....	329
12.2.1.1	Line, Word or Character Shifting.....	329
12.2.1.2	Fixed Partitioning of the Image into Blocks.....	329
12.2.1.3	Boundary Modifications.....	330
12.2.1.4	Modification of Character Features.....	330
12.2.1.5	Modification of Run-Length Patterns.....	331
12.2.1.6	Modification of Halftone Images.....	331
12.2.2	Content Based Approach.....	331
12.2.3	Syntactic Based Approach.....	331
12.2.4	Semantic Based Approach.....	332
12.2.5	Structure Based Approach.....	332
12.2.6	Zero Watermarking Based Approach.....	332
12.3	Attacks on Document Watermarking.....	333
12.3.1	Collusion Attacks.....	333

< Cryptographic and Information Security Approaches for Images and Videos (<https://www.taylorfrancis.com/books/mono/10.1201/9780429435461/cryptographic-information-security-approaches-images-videos?refId=7cb7f416-a26d-4761-ba07-13ef72b2222b&context=ubx>) Show Path

Chapter



✓ FULL ACCESS

Compressive Sensing in Color Image Security

By [Rohit Thanki](#) ([/search?contributorName=Rohit Thanki&contributorRole=author&redirectFromPDP=true&context=ubx](#)), [Surekha Borra](#) ([/search?contributorName=Surekha Borra&contributorRole=author&redirectFromPDP=true&context=ubx](#)), [Komal Borisagar](#) ([/search?contributorName=Komal Borisagar&contributorRole=author&redirectFromPDP=true&context=ubx](#)), [Nilanjan Dey](#) ([/search?contributorName=Nilanjan Dey&contributorRole=author&redirectFromPDP=true&context=ubx](#))

Book [Cryptographic and Information Security Approaches for Images and Videos](#) (<https://www.taylorfrancis.com/books/mono/10.1201/9780429435461/cryptographic-information-security-approaches-images-videos?refId=7cb7f416-a26d-4761-ba07-13ef72b2222b&context=ubx>)

Edition	1st Edition
First Published	2019
Imprint	CRC Press
Pages	34
eBook ISBN	9780429435461

Share

ABSTRACT

< Previous Chapter ([chapters/edit/10.1201/9780429435461-7/security-scalable-video-coding-encryption-authentication-zhuo-wei-swee-won-lo-yongdong-wu-yanjiang-yang-zheng-yan-robert-deng?context=ubx](#))
Next Chapter > ([chapters/edit/10.1201/9780429435461-9/secure-threshold-attribute-based-signcryption-constant-number-pairings-sreenivasa-rao-nishant-doshi?context=ubx](#))

(<https://www.taylorfrancis.com>)

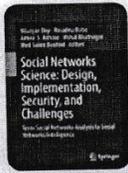
Policies

Home > [Social Networks Science: Design, Implementation, Security, and Challenges](#) > Chapter

Social Networking in Web Based Movie Recommendation System

| Chapter | First Online: 19 June 2018

| pp 25–45 | [Cite this chapter](#)



[Social Networks Science: Design, Implementation, Security, and Challenges](#)

Nabanita Das, [Surekha Borra](#) , [Nilanjan Dey](#) & [Samarjeet Borah](#)

 856 Accesses  7 Citations

Abstract

Movie Recommendations Systems are a common practice by most of the online stores today. The web based movie recommendation systems makes predictions about the responses of the users based on their search history or known preferences. Recommendation of items is usually done based on the properties or content of the item or collaboration of the user's ratings, and by using intelligent algorithms that include classification or clustering techniques. Accurate prediction of what the customer may likely to buy or the user my visit is of utmost important, as it benefits both the service providers and customers. This chapter

Research Lab Sciences and Technologies of Image and Telecommunication, Sfax

University, Sfax, Tunisia

Med Salim Bouhleb

Rights and permissions

[Reprints and permissions](#)

Copyright information

© 2018 Springer International Publishing AG, part of Springer Nature

About this chapter

Cite this chapter

Das, N., Borra, S., Dey, N., Borah, S. (2018). Social Networking in Web Based Movie Recommendation System. In: Dey, N., Babo, R., Ashour, A., Bhatnagar, V., Bouhleb, M. (eds) Social Networks Science: Design, Implementation, Security, and Challenges . Springer, Cham. https://doi.org/10.1007/978-3-319-90059-9_2

[.RIS](#) [.ENW](#) [.BIB](#)

DOI	Published	Publisher Name
https://doi.org/10.1007/978-3-319-90059-9_2	19 June 2018	Springer, Cham
Print ISBN	Online ISBN	eBook Packages
978-3-319-90058-2	978-3-319-90059-9	Computer Science
		Computer Science (R0)

Publish with us

Chapter 2

Social Networking in Web Based Movie Recommendation System



Nabanita Das, Surekha Borra, Nilanjan Dey and Samarjeet Borah

Abstract Movie Recommendations Systems are a common practice by most of the online stores today. The web based movie recommendation systems makes predictions about the responses of the users based on their search history or known preferences. Recommendation of items is usually done based on the properties or content of the item or collaboration of the user's ratings, and by using intelligent algorithms that include classification or clustering techniques. Accurate prediction of what the customer may likely to buy or the user my visit is of utmost important, as it benefits both the service providers and customers. This chapter provides the evolution, fundamental concepts, classification, traditional and novel models, requirements, similarity measures, evaluation approaches, issues, challenges, impacts due to social networking, and future of movie recommendation systems.

Keywords Recommendation systems · Content based filtering
Collaborative based filtering · Deep learning · Social networks · Web

2.1 Introduction

With the rapid growth in the Internet and related technologies, online movie stores are gaining lot of interest. The online movie stores display movies without biasing towards the popularity and sales figures. Further there is no shelf space limitation as

N. Das
Bengal Institute of Technology, Kolkata, India
e-mail: nabanita.das2008@gmail.com

S. Borra (✉)
K. S. Institute of Technology, Bangalore, India
e-mail: borrasurekha@gmail.com

N. Dey
Techno India College of Technology, Kolkata, India
e-mail: neelanjandey@gmail.com

S. Borah
Sikkim Manipal Institute of Technology, Majitar, Sikkim, India
e-mail: samarjeet.b@smit.smu.edu.in

© Springer International Publishing AG, part of Springer Nature 2018
N. Dey et al. (eds.), *Social Networks Science: Design, Implementation, Security, and Challenges*, https://doi.org/10.1007/978-3-319-90059-9_2



Power-Cognizant Proactive Routing Protocol for Amending Energy in Ad-hoc Networks

B. Devika^(✉) and P. N. Sudha

KSIT, Bengaluru, India
{devikabgowda, pnsudha}@gmail.com

Abstract. The execution of an Ad hoc Wireless Network is controlled by a key factor “power”, as it is the essential resource of any communication system. Utilizing such power effectively and efficiently is the most important Task. Power has to be optimized according to the requirement. In an ad hoc network, nodes exchange information with each other by forming a multi-hop wireless network & sustaining connectivity in a localized fashion. Optimizing power in such a network is a significant challenge ad hoc routing protocols are power hungry as they expend a substantially large amount of battery power contained in the nodes. Hence routing in an ad hoc network is eminently power restricted. Research has been done choosing the appropriate routing protocol at the network layer and power aware protocol at MAC layer. In this paper, a proactive routing protocol has been implemented which is power aware. FSR is the routing protocol chosen and MAC 802.11 standards have been used in combination of a routing protocol to optimize power. The simulation is executed using NS-2 and the power consumption has reduced.

Keywords: Ad hoc networks · Fisheye state · Manet · Mac · Power cognizant

1 Introduction

Wireless communication is the quickly expanding & most vital technological areas in the communication field. Our lives are unimaginable without Wireless communication like TV, Radio, Mobile, Radar, GPS, Wifi, Bluetooth, RFID etc. In Latin ad hoc means “for this purpose”. Ad hoc networks are group of self-organizing nodes or terminals that exchange information with each other by combining a multi-hop wireless network and sustaining connectivity in a suburbanized manner in an infrastructure less environment. Several classifications of Ad hoc networks are MANET, VANET, FANET, WSN etc. Ad hoc network operate with IEEE 802-11 standards. Initially ad hoc networks were designed for military and disaster recovery applications, due to their fast deployment feature without the existence of any infrastructure. But with rapid growth of mobile communication, MANETs are regarded as important contemplate in the future inception of system technologies [1].

Various power optimization techniques are existent in Ad hoc networks. Optimization of power is of at most importance in Ad hoc networks as their structure is autonomous and non-existence of central governing body. Various layers are affected while optimizing power in ad hoc network like physical, network & MAC layer [2].



International Conference on Data Science, Machine learning & Applications

29-30th March 2019, Hyderabad

International Conference on Data Science, Machine Learning & Applications (ICDSMLA) is being organized with an aim of providing a platform for presenting high quality research works, organizing plenary talks by the internationally renowned experts, knowledge sharing and showcasing machine learning products by eminent researchers, scientists and practitioners from academia, industry and Government bodies.

Recent rapid advancement in the field of AI and ML have provided a further impetus and accelerated interest to the Computer and Medical Science fraternity. From the industry point of view, AI and ML have emerged as one of the niche skills which have opened the doors of automation and innovation. These have helped in performing the activities with the minimum manual invention and are leading the industry towards the world of possibilities and thus embracing starting of a new revolution which are based on these key concepts.

Keeping Data Science and Machine Learning as a pivotal point, the emphasis of the conference would be on various multidisciplinary areas focusing to the areas and interest of computational researchers. ICDSMLA will be held on March 29-30, 2019 in Hyderabad, the capital city of Telangana state in India. The venue is CMR Institute of Technology which is an UGC autonomous engineering institute affiliated to Jawaharlal Nehru Technological University, Hyderabad.

Lecture Notes in Electrical Engineering 601

Amit Kumar
Marcin Paprzycki
Vinit Kumar Gunjan *Editors*

ICDSMLA 2019

Proceedings of the 1st International
Conference on Data Science, Machine
Learning and Applications

 Springer

Editors

Amit Kumar
BioAxis DNA Research Centre Private Ltd
Hyderabad, Telangana, India

Marcin Paprzycki
Polish Academy of Science
Systems Research Institute
Warsaw, Poland

Vinit Kumar Gunjan
Department of Computer Science
and Engineering
CMR Institute of Technology
Hyderabad, Telangana, India

ISSN 1876-1100 ISSN 1876-1119 (electronic)
Lecture Notes in Electrical Engineering
ISBN 978-981-15-1419-7 ISBN 978-981-15-1420-3 (eBook)
<https://doi.org/10.1007/978-981-15-1420-3>

© Springer Nature Singapore Pte Ltd. 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

[Home](#) > [Proceedings of International Ethical Hacking Conference 2018](#) > Conference paper

Real-Time Facial Recognition Using Deep Learning and Local Binary Patterns

Conference paper | First Online: 05 October 2018

pp 331–347 | [Cite this conference paper](#)



[Proceedings of International Ethical Hacking Conference 2018](#)

[B. Venkata Kranthi](#)  & [Borra Surekha](#)

 Part of the book series: [Advances in Intelligent Systems and Computing \(\(AISC, volume 811\)\)](#)

 902 Accesses  2 Citations

Abstract

Today, surveillance is everywhere where the operators continuously observe the video captured by the camera to identify the human/object for public safety. Automated systems are being developed for real-time facial recognition as it is highly difficult for the operators to track and identify in highly crowded areas. The feature selection process is generally used to represent faces, and a machine learning-based approach is used to classify the faces in face recognition. A variety of poses, expressions and illumination conditions make the manual feature selection process error-prone and computationally complex. This paper proposes a less computationally complex real-time face recognition algorithm and system based on local binary patterns and convolutional neural networks (CNNs). A modified version of LENET is used instead for face recognition. The recognition

Proceedings of International Ethical Hacking
Conference 2018

Monuya Chakraborty, Satyajit Chakrabarti,
Valentina Emilia Balas, J. K. Mandal

Series Title

Advances in Intelligent Systems and
Computing

DOI

<https://doi.org/10.1007/978-981-13-1544-2>

Publisher

Springer Singapore

eBook Packages

Engineering, Engineering (R0)

Copyright Information

Springer Nature Singapore Pte Ltd. 2019

Softcover ISBN

978-981-13-1543-5

Published: 05 October 2018

eBook ISBN

978-981-13-1544-2

Published: 04 October 2018

Series ISSN

2194-5357

Series E-ISSN

2194-5365

Edition Number

1

Number of Pages

XXVI, 506

Number of Illustrations

206 b/w illustrations

Topics

Communications Engineering, Networks,
Systems and Data Security, Data Structures and
Information Theory

Publish with us

Policies and ethics

Back to top ↑

Real-Time Facial Recognition Using Deep Learning and Local Binary Patterns



B. Venkata Kranthi and Borra Surekha

Abstract Today, surveillance is everywhere where the operators continuously observe the video captured by the camera to identify the human/object for public safety. Automated systems are being developed for real-time facial recognition as it is highly difficult for the operators to track and identify in highly crowded areas. The feature selection process is generally used to represent faces, and a machine learning-based approach is used to classify the faces in face recognition. A variety of poses, expressions and illumination conditions make the manual feature selection process error-prone and computationally complex. This paper proposes a less computationally complex real-time face recognition algorithm and system based on local binary patterns and convolutional neural networks (CNNs). A modified version of LENET is used instead for face recognition. The recognition accuracy of the proposed method is tested on two publicly available datasets. A new database covering most of the challenges like illumination and oriental variations, facial expressions, facial details (goggles, beard and turban) and age factor is also developed. The proposed architecture proved accurate up to 97.5% in offline mode and an average accuracy of 96% in the real-time recognition process. In the real-time process, frame reading and frame processing are done in two separate threads to improve the frame rate from 28 to 38 FPS.

Keywords Face recognition · Deep learning · Real-time system · Face detection LBP · Computer vision

B. Venkata Kranthi (✉)
ECE Department, GITAM University-Bengaluru Campus, Bengaluru, India
e-mail: bvkranthi1@gmail.com

B. Surekha
ECE Department, K. S. Institute of Technology, Kanakapura Road, Bengaluru, India
e-mail: borrasurekha@gmail.com

© Springer Nature Singapore Pte Ltd. 2019
M. Chakraborty et al. (eds.), *Proceedings of International Ethical Hacking Conference 2018*, Advances in Intelligent Systems and Computing 811,
https://doi.org/10.1007/978-981-13-1544-2_27

331

borrasurekha@gmail.com

About the College

K.S. School of Engineering and Management (KSSEM) was established in 2010 by Kammavari Sangham (R) with the objective of providing quality education in Engineering and Management. KSSEM offers BE in Civil, Computer Sc, Electronics and Communication, Electrical and Electronics and Mechanical Engineering in addition to MBA. PG programs are also offered in Civil, Computer Science, Electronics and Communication and Mechanical Engineering. All the courses are affiliated to VTU, Belagavi, and approved by AICTE, New Delhi. Our students have participated in many University and State level Sports and Cultural events and have won prizes. The alumni of KSSEM have occupied chairs in good corporate and industries. KSSEM is encouraging research in every field of studies. The faculty have published about 360 research Papers in leading Journals and conference proceedings and has bagged research funds of worth than Rs. 60 lakhs within the short period of four years since its inception. The institute is recognized as research center for pursuing Ph.D under Visvesvaraya Technological University, Belagavi for the departments of Civil Engg., Computer Science Engg., Electronics and Communication Engg., Mechanical Engg., and Science & Humanities.

About the Conference

International Conference on Advances in Engineering Science and Management is to provide an international forum for the exchange of ideas among interested researchers, students, developers, academia and industries in the areas of engineering, sciences and management, also research students, encourage faculty and help industries. Students learn from their seniors, Faculty get appreciation and probable funding contact and Industries get solutions to their industrial problems. ICAEM is intended to nurture researchers, faculty, students is supported by the IEEE student branch, Institution of Engineers India and Indian Society of Technical Education.

Chief Patrons

Sri. Y. Ramachandra Naidu
President, K S Group of Institutions
Sri. K. Venkatesh Naidu
Hon. Secretary, K S Group of Institutions
Sri. D. Rukmangada
Treasurer, K S Group of Institutions
Dr. V. Balaji, CEO, KSGL.

Patrons

Dr. S. N. Sridhara, Principal/Director, KSSEM
Dr. Girish V Attimarad, Professor & Head, Dept. of ECE, KSSEM

Conference Chair

Dr. Karthik P
Professor, Dept. of ECE, KSSEM

ADVISORY COMMITTEE

Dr. Ejanul Haque, RMIT University, Melbourne, Australia.
Dr. Zailan Bin Siri, University of Malaya, Kuala Lumpur, Malaysia
Dr. Devaraju N, IPST/LSCSE, France
Dr. Younghae Do, Kyungpook National University, Daegu, Korea
Dr. S Sivasankaran, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia
Dr. Massimo Alioto, National University of Singapore.
Dr. Kim KI-Chul, School of Electrical & Computer Engg. Seoul, Korea.
Dr. Kim Tae Hyoung, School of Electrical & Electronics Engg., Singapore.
Dr. Hanho Lee, Inha University Inha.ro, Republic of Korea.
Dr. Rup Maharatra, University of Southampton, United Kingdom.
Dr. V.M. Srivastava, Howard College, UKZN, Durban, South Africa.
Dr. Benn Khajathah, University Durban, South Africa.
Dr. Harish Rao, Toronto University, Canada.
Dr. Sri Bandyopadhyay, UNSW Kensington Campus, Australia.
Dr. Sanjeevikhana, University of South Missouri, USA.
Dr. Witold, K Krajewski Institute of Technology, Poland.
Dr. Adhavan Balamuragan, Adama Science and Technology University, Adama.
Dr. Anandaraj S P, Adama Science and Technology University, Adama.
Dr. Nagendra Krishnapura, IIT Madara, India.
Dr. A.V. Babu, NIT Calicut, India.
Dr. M.S. Bhat, NITK Suratkal, India.
Dr. S K Nandy, IISc Bangalore, India.
Dr. Shovan Bhaumik, Indian Institute of Technology, Patna, India.
Dr. Venkateshwaralu K, Principal Scientist, Materials Department, NAL, Bengaluru
Dr. Chandan Kumar Sarkar, Jadavapur University, India
Dr. Karunakar A K, Professor, Manipal University, Manipal.
Dr. Sanjay Singh, Professor, Manipal University, Manipal.
Dr. Pradeep G Siddheshwar, Bangalore University, Bengaluru.

International Conference on Applied Engineering Sciences and Management 12th & 13th October 2018



K.S. Group of Institutions
K.S. School of Engineering and Management
Aim at Perfection. Achieve Excellence



**K S SCHOOL OF ENGINEERING AND
MANAGEMENT**
Affiliated to VTU Belagavi & Approved by AICTE
#15 Mallasandra, Off Kanakapura Road,
Bengaluru—560109, Karnataka, India
080—28425012/13/163
www.kssem.edu.in

Call for papers in following fields but not limited to this,

Track 1 Structures

Earthquake Engg, Structural Dynamics, Smart Materials, Non-Destructive Techniques, Building Automation, Rehabilitation, Alternate Building Materials, Special Concrete, Geo Technical, Highway and Environment

Track 2 Applied Computing & Big Data

Cloud Computing, Big-Data Analytics, Security in Computing & Comm., Computer Networks, Wireless Sensor Networks, Pattern Recognition, Soft Computing, High Performance Networks, Embedded Systems.

Track 3 Communication, Signal Processing and Electrical Systems

Optical & Data Communication, Image & Signal Processing, Network security, Multimedia Communication, VLSI Design, MEMS & Microelectronics, Antennas & its Applications., Acoustic Sensors, SONAR Imaging, Electrical Insulation and Di-Electric Phenomenon Advances in Electrical Drives, Electrical Drives and Power Electronics, Power Systems.

Track 4 Mechanical

Advances in Materials and Manufacturing, Advances in Aerospace Technology, Dynamics, Vibration & Control, Energy Engineering, Fluids Engineering, Heat Transfer & Thermal Engineering, Mechanics of solids, Structures, Fluids, Design Engg.

Track 5 Chemistry, Physics and Mathematics

Spectroscopy/Polymers, Bioinorganic & Organic Chemistry, Environmental Chemistry, Chemical Kinetics, Nattery Technology, Integral Transforms, In-Equalities / Numerical Analysis, Computational Mechanics, Differential Equations, Astrophysics/Nuclear Physics, Condensed Matter Physics, Nanostructures, Atomic and Molecular Physics, Quantum Physics, Non-Linear Optics.

Track 6 Managerial Strategies

Management Strategies, Marketing Innovations, Brick & Mortar to Click & Shop, Sales & Retail Management, Venture Capital, Customer Relationship Marketing, Social Media and its Impact on Business Operations, Digital Marketing, Enterprise Resource Planning.

Paper Submission

Authors are requested to submit the research paper based on their original work in IEEE format. An abstract of the paper not exceeding 150 words and full paper not exceeding 5 pages should be sent to the organizing secretary INDICATING the names and address of the authors. Email your full paper to icaem18@kssem.edu.in.

Paper Publications

Paper accepted for Conference & Scopus Indexed Journal will be published in :

International Journal of Pure and Applied Mathematics (IJPAM) with ISSN 1311-8080 (or) ISSN 1314-3395

Journal of Advanced Research in Dynamical and Control Systems (JARDCS) with ISSN 1943 – 023X,

International Journal of Engineering and Technology (UAE) (ISSN:2227-524X),

Advances and Applications in Mathematical Sciences (ISSN: 0974-6803)

Important Dates:

Last Date Full Paper Submission :15th July 2018

Notification of Acceptance : 15th August 2018

Early Registration : 16th August to 30th August 2018

Last Date for Registration : 15th September 2018.
And Camera Ready Paper

Conference Dates : 12th & 13th October 2018

Payment Details:

Mode of payment and account details will be intimated to the authors of accepted papers subsequently.

Registration Details

	Registration Fee Host Country	Registration Fee From Foreign
Regular Authors Conference	Rs. 1,500 only	150 USD
Full Time Students Conference	Rs. 1000 only	100 USD
Listener	Rs. 750	75 USD
Extra Page	Rs. 100/Page	10USD/Page

Optional Fee of Rs. 8,500/- for Indian Authors and 150 USD for Foreign Authors to publish your selected and presented papers will be Publication in Scopus indexed Journal

FEE includes conference Kit with Soft Copy of Proceedings and Refreshments & Lunch, Workshop for all the sessions can be attended by the registered participants.

Extra Certificate can be obtained after remitting Rs. 100 per Certificate.

Outside Participants Accommodation will be assisted to near by Hotels.

Contact Details:

Dr. Dushyanth N D, Professor, Dept. of ECE, KSSEM
Mob:+91-7337712423
Dr. Gopalakrishna M T, Professor, Dept. of CSE, KSSEM
Mob: 9620208146
Dr. Jyothi P N, Professor, Dept. of Mech, KSSEM
Mob:9663080471
Mr. Vijay Aerkal, Asso. Prof., Dept. of Civil, KSSEM
Mob: 9663590628
Mrs. Gousia Sultana, Asst. Prof., Dept. of EEE, KSSEM
Mob:8095459787
Dr. Vasudev C, Professor, Dept. of Maths, KSSEM
Mob:9448514244
Mr. Manjunatha S, Assoc. Prof., Dept. of MBA, KSSEM
Mob: 9535023428

Study and Simulation of Digital Multipliers using 180nm Technology

MAYANKA GUPTA¹
mayanka098@gmail.com

KAVYA.N¹
kavyangowda1397@gmail.com

ANUSHA.A.MURTHY¹
anushamurthy183@gmail.com

LAKSHMI.H.R²
hrl.lakshmi@gmail.com

¹B.E students, Depart. of Electronics and Communication Engineering, K.S. Institute of Technology, Bangalore, India

² Assistant Professor, Depart. of Electronics and Communication Engineering, K.S. Institute of Technology, Bangalore, India

Abstract— With the advent of VLSI and Digital Signal Processing applications, hardware implementation of various computational units is gaining importance. One such most popular arithmetic unit is the multiplier. Multiplication is needed in almost all signal processing operations like FFT, DFT, DCT etc. Implementing multipliers in software makes the multiplication process slow and time consuming. By implementing multipliers as a hardware unit, we can optimize area, power and speed as per our requirements. There are many multiplier variants available and one among them can be chosen keeping in mind the design constraints. In this paper we have compared the area, power and speed of various multipliers highlighting their working principles, pros and cons.

Keywords—multipliers, booth, array, Wallace, dadda

I. INTRODUCTION

A multiplier is a digital circuit that performs multiplication of two numbers. In the present study we have considered numbers in binary representation. It is one of the key hardware blocks in most high-performance systems and digital such as FIR filters, microprocessors and digital signal processors etc. [4]. The multiplier plays a vital role in various DSP applications such as digital filtering, digital communications and spectral analysis. Performance of computation of a DSP system is limited by its multiplication performance and since multiplication dominates the execution time of most DSP algorithms, high-speed multiplier is much desired [3]. Multiplication can be implemented using software or hardware. The software implementation is done using micro-programmed control unit. These are simple in structure but are comparatively slow. Software implementation is useful when results are predictable or are partially known. The hardware implementation is done using hardwired control unit. The control logic includes gates, flip flops, decoders, etc. These have complex structure but are faster and hence are used in high performance systems. We discuss various hardware implementations of multipliers in this paper. In section II the overview of

multiplication process is described. In section III, working principles of Array, Wallace, Dadda and Booth multipliers are described. Section IV summarizes the synthesis results and simulation waveforms. Section V concludes the paper.

II. MULTIPLICATION OPERATION

Multiplication involves three main steps:

1. **Partial product generation:** This step involves generation of partial products from multiplicand and multiplier. Figure 1 represents the partial product generation. This stage makes use of series of AND gates. The delay is negligible as all the computation is done in parallel. The inputs to the AND gate are binary operands we are using for computation starting from LSB to MSB. Each row is shifted by 1 bit towards the left. $(a_7a_6a_5a_4a_3a_2a_1a_0 * b_7b_6b_5b_4b_3b_2b_1b_0)$. The partial products form a matrix of n rows and $2n-1$ columns.

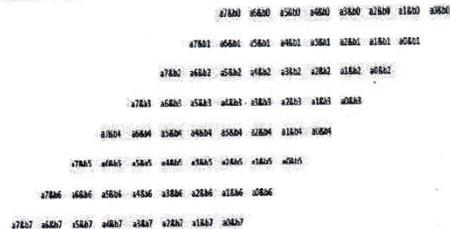


Fig 1: Partial product generation

2. **Partial product reduction:** The second stage of partial products reduction produces better performance and convenient design of the multiplier. In digital design many types of multipliers like Array multipliers, Booth multiplier, Dadda multiplier, Wallace Tree multipliers with different speeds, areas, and other configurations are used. The main aim is, to achieve partial product accumulated by successively reducing the number of bits of information in each column using full adders or half adders. By the application of the basic three-

Survey on Energy Harvesting Systems for Underwater Devices

SAHANA SALAGARE¹

Asst. Prof. Dept. of ECE
K.S. Institute of Technology
Bengaluru, India.

P.N.SUDHA²,

Prof & HOD. Dept. of ECE
K.S. Institute of Technology,
Bengaluru, India

KARTHIK P.³

Prof. Dept of ECE
K.S.School of Engg & Mgmt
Bengaluru, India.

Abstract- Underwater wireless communications play an important role in marine activities such as environmental monitoring, underwater exploration, and scientific data collection. Underwater wireless sensor node is such a device which is used in various applications like oceanographic data collection, pollution monitoring, offshore exploration, disaster prevention, assisted navigation and tactical surveillance applications. Though underwater communication provides enormous information about environmental conditions but it faces many technical issues and research challenges like large propagation delay, low bandwidth and dynamic nature of the work. Apart from all these issues energy is the main concern as the batteries used to power up the sensor nodes are difficult to recharge and replace in aquatic environment. So designing energy efficient UWSN is challenging. In this paper we present the literature survey on existing energy harvesting system for the UWSN.

Keywords - UWSN [underwater Wireless sensor node], Energy Harvesting system, UWCD[underwater communication device]

I. INTRODUCTION

With the rapid developments in technology, underwater communication has become a fast growing field, with broad applications in commercial and military water based systems. The need for underwater wireless communication exists in applications such as remote control in the off-shore oil industry, pollution monitoring in environmental systems, collection of scientific data from ocean-bottom stations, disaster detection, early warning, national security and defense (intrusion detection and underwater surveillance) as well as new resource discovery. Thus, the research on new underwater wireless communication techniques has played a most important role in the exploration of oceans and other aquatic environments. In contrast with terrestrial wireless radio communication, the communication channels in underwater wireless networks can be seriously affected by the marine environment, by noise, by limited bandwidth, power resources and by the harsh underwater ambient conditions. Hence, the underwater communication channel often exhibits severe attenuation, multipath effect, frequency dispersion and

constrained bandwidth with minimal power resources, etc. Hence the underwater communication channel are considered as most complex and harsh channels in nature. Considering all these challenges associated with underwater communication devices the energy required to power-up these devices are the main constraint since powering the batteries in aquatic environment is difficult. The UWCD (Underwater Communication Device) is active only when it has the sufficient battery power, else the device will be inactive. So designing energy efficient UWCD is challenging. However many researchers have proposed some of the energy harvesting systems to power these batteries.

This paper gives detailed survey on existing energy harvesting systems to power-up the underwater communication devices.

II Literature Survey:

“Estimation of Solar Energy Harvested for Autonomous Jellyfish Vehicles (AJVs)” In this paper, researcher analyzed the applicability of solar cells as a power source for medusa-inspired biomimetic vehicles. Since these vehicles will be operating under ocean water and may need to dive at various depths, a systematic investigation was conducted to determine the variation of output power as a function of depth and salinity levels. They modeled solar energy harvested by flexible amorphous solar cell coated jellyfish vehicles by considering the variables bell diameter, turbidity, depth, and fineness ratio. Low fineness ratio shapes were found to be better for solar energy powered vehicles. Study of three representative species, *Aurelia aurita* (AA), *Mastigias* sp., and *Cyanea capillata* indicates that harvested power was proportional to bell diameter. Optimum power can be harvested by tilting the vehicle axis to face refracted sunrays. Depending on a swimming pattern, power harvested in charging mode and in propulsion mode could vary significantly. But this model indicates that, under some circumstances, amorphous silicon solar cell may be a cost-effective way to power autonomous underwater vehicles (AUVs) operating in shallow-water conditions with large lateral travel distances [1]



Comparative Study on Mechanical Properties of Hybrid Composites using Hemp and E-Glass by Hand Layup and Vacuum Bagging Technique

K.V. Manjunath

Asst. Professor, Department of Mechanical Engineering
K.S. Institute of Technology
Bengaluru, India
manjunathkv@ksit.edu.in

Krishnamurthy. N

Professor & Head, Department of Mechanical Engineering
Vijaya Vitala Institute of Technology
Bengaluru, India

Abstract—Over the last thirty years' composite materials, plastics and ceramics have been the dominant emerging materials. The volume and number of applications of composite materials have grown steadily, penetrating and conquering new markets relentlessly. This paper deals with the hybrid composite material made up of Hemp and E-glass fibers which are fabricated by hand layup and vacuum bagging technique using Lapox L12 epoxy and K6 hardener. The properties of the hybrid composites are determined by tensile test, flexural test, hardness test and are evaluated experimentally according to ASTM standards. The result shows that the hybrid composites prepared by Hemp and E-glass with vacuum bagging technique has better tensile and flexural strength as compared to hand layup technique. The microstructure of the hybrid composite material has been analyzed using SEM.

Keywords—E-glass, Hemp, Hand layup, Vacuum bagging, Epoxy, Lapox L12.

I. INTRODUCTION

A composite material is a combination of two or more than two different materials having different properties [1]. The combination of materials having different properties would give results having superior than the properties of the individual components when used particularly [2]. Composites are made up of reinforcements and to hold reinforcements matrix material is used. Generally, the reinforcement will be in the form of fiber and matrix would be resin for fiber reinforced polymer composites [3-4].

The use of composite materials has increased and has come into light because of their higher strength and also having high stiffness value, having low density compared to the metallic parts. The composite materials allow to reduce the weight of processed part. The reinforcement agents which are fibers provide the strength and makes composite material hard [5-6].

Natural fiber reinforced composite materials are considered as one of the new class of engineering materials. Interest in this area is rapidly growing both in terms of their industrial applications and fundamental research as they are renewable, cheap, completely or partially recyclable, and biodegradable. [7]. Glass Fiber Reinforced Polymers (GFRP) is a fiber reinforced polymer made of a plastic matrix reinforced by fine fibers of glass. Fiber glass is a lightweight, strong, and robust material used.

E-glass is known in the industry as a general-purpose fiber for its strength and electrical resistance. [8-9] It is the most commonly used fiber, in the fiber reinforced polymer composite industry. Composite materials reinforced with natural fibers, such as flax, hemp, kenaf and jute, are gaining increasing importance in automotive, aerospace, packaging and other industrial applications [10].

This work was intended to develop hybrid composite material from different production techniques such as Hand layup technique and Vacuum bagging technique. made of a plastic matrix reinforced by fine fibers of glass. The synthetic fiber E-glass and natural fiber hemp are used to develop the hybrid composite material with epoxy resin. Different mechanical tests like tensile, flexural, hardness test and SEM analysis were conducted and results were analyzed.

II. EXPERIMENTAL DETAILS

A. Hybrid composite material fabrication

1) Hand layup technique

Hand lay-up is the oldest but still widely used fabrication technique employed in the reinforced plastics industry. A large variety of products can be fabricated with this method reaching from smallest parts to large coverings or even sports boats. It is shown in fig. 1.



Performance Analysis of Constant and Taper blade for Steam Turbine by using CFD

Murulidhar K S
Assistant Professor, Department of
Mechanical Engineering
K S Institute of Technology
Bengaluru, India
murulidharks@ksit.edu.in

Ranganath N
Assistant Professor, Department of
Mechanical Engineering
K S Institute of Technology
Bengaluru, India
ranganathn@ksit.edu.in

Dr. Puttaboregowda B
Professor, Department of Mechanical
Engineering
Ramaiah Institute of Technology
Bengaluru, India
pbgowda@msrit.edu

Gautham S
Assistant Professor, Department of
Mechanical Engineering
K S Institute of Technology
Bengaluru, India
gauthams@ksit.edu.in

Manjunatha B R
Assistant Professor, Department of
Mechanical Engineering
K S Institute of Technology
Bengaluru, India
manjunathbr@ksit.edu.in

Dr. Punith Gowda K
Associate Professor, Department of
Mechanical Engineering
East West Institute of Technology
Bengaluru, India
pgpunith@gmail.com

Abstract—The losses in the last stages of low pressure (LP) steam turbines are difficult to estimate. Two types of losses have to be considered in the last stages: aerodynamic losses due to the interaction between the fluid and the wall boundaries and thermodynamic losses occurring during the phase change. The aim of this work is to estimate the losses in blade profile through an LP steam turbine rotor. The performance of steam turbine blade is related to many factors. One of the important factors is the degradation and change in turbine blade profile after many hours of operation. This leads to increase in flow losses and hence reduction in overall turbine efficiency. The performance of turbine blade can be predicted and improved by using Computational Fluid Dynamics (CFD).

Keywords—CFD, Constant blade, Steam turbine, Taper blade.

I. INTRODUCTION

In the power generation industry gas turbines and steam turbines are widely used for generating power. These industrial machines are capable of producing power in hundreds of megawatts. The efficiency of a turbine is largely dependent on its aerodynamic performance. Hence, the design of blade profiles for nozzles and rotors are continuously improved over the decades to achieve better overall efficiency for the turbine.

Currently over 35% of electrical energy demands are generated by steam turbine. Considering the vast amount of fuel associated with this, it is importance that the steam turbines are running at their highest possible efficiencies. Any improvement in efficiency will result in a considerable amount of saving and it is anticipated that a single percentage change in steam plant efficiencies will result in an annual saving. The overall efficiency of a power plant is directly dependent on the turbine entry temperature and the back pressure, therefore it is important to realize that for a given main steam condition and back pressure, the overall plant efficiency can be improved by increasing the efficiency of the individual plant components. The steam turbine is one of the key components because it is the steam turbine that

converts the thermal energy of the steam into rotational kinetic energy, which in turn, drives the generator shaft. It is therefore very important to keep the steam flow energy losses at a low level as possible. Research work aimed at reducing the aerodynamics and wetness losses and hence improving the steam turbine efficiency has attracted great deals of attention in recent years. Although the majority of the research work is directly relevant to steam turbine manufacturers, the tools developed can also be used by steam turbine operator to predict and improve the steam turbine efficiency.

The key in reducing the flow energy losses is the understanding of the steam flow behavior inside the steam turbine. Considerable experimental work has been performed in studying the flow. In parallel with this, due to the limitation of experimental measurement and to aid in interpreting experimental results, Computational Fluid Dynamics (CFD) analysis is used. In CFD, the relevant fluid flow governing equations are solved numerically using digital computer and applied to flow inside the turbine blade rows.

A. Problem statement

Steam turbine cascade analysis is usually conducted with the compliment of steam; instead air is being use as the analysis medium. Current setup for cascade analysis involves 2types of blade vanes used in the high-pressure stage of a Rateau steam turbine. These blades have a 2-D cross-section without twist and are used in multiple stages keeping similar blade profiles. The purpose of the nozzles is to accelerate and guide the flow into the next stage of rotors. Since a steam turbine can spend a considerable amount of time operating at off-design conditions, the mass flow in the turbine and the rotors' speed varies. Hence, the flow entering each stage of nozzles and rotors is inclined at an incident angle. Current analysis blades are made with taper & constant cross section. In both cases Taper & constant blade profiles flow path will be analyzed in CFD software & also report shall be compared with analytically for constant section profile.



Evaluation of tensile and hardness characteristics of Aluminium 2024 alloy based Metal Matrix Composites

N.Sreesudha

Asst. Professor, Department of Mechanical Engineering
K.S. Institute of Technology
Bengaluru, India

N.Krishnamurthy

Professor & Head, Department of Mechanical Engineering
K.S. Institute of Technology
Bengaluru, India

Abstract—In this present investigation efforts are made to study the tensile strength and hardness of heat treated Al2024 composites SiC particulates reinforced. The vortex method of stir casting was employed, in which the reinforcements were introduced into the vortex created by the molten metal by means of mechanical stirrer. Castings were machined to the ASTM standards on a highly sophisticated lathe. The degree of improvement of tensile strength and hardness characteristics of MMCs is strongly dependent on the kind of reinforcement. An improved tensile strength and hardness characteristic occurs on reinforced compared to Unreinforced MMCs alloys.

Keywords—SiC particulates, Al 2024 alloy composite, tensile strength and hardness.

I. INTRODUCTION

During the past few years, the global economy has been exerting an increasing demand for novel processes, new products and innovative technologies to resolve sustainability issues [1] Materials design has shifted emphasis to pursue light weight, environment friendliness, low cost, quality and performance [2-4]. Modern composite materials constitute a significant proportion of the engineered materials. Though many desirable mechanical properties are generally obtained with the fiber reinforcement, these composites exhibit anisotropic behavior and are not easily producible by conventional techniques [5]. The need for advanced engineering materials in the areas of aerospace and automotive industries had led to a rapid development of metal matrix composites (MMC) [8]. Metal-matrix composites (MMCs) have been attracting growing interest [6-8]. Metal Matrix Composites (MMCs) reinforced with ceramic particulate offer significant performance advantages over pure metals and alloys [9].

Metal Matrix Composites are fabricated with help of introducing ceramic/ reinforcement particles in the matrix of any metal. In common words these particles increase the properties like abrasive, hardness, wear resistance, stiffness, strength to weight ratio and many thermal properties [10]. For applications in the automotive, transportation, construction, and leisure industries, affordable cost is also an essential factor. Apart from the emerging economical processing techniques that combine quality and ease of operations [11].

The cost-effective processing of composite materials is, therefore, an essential element for expanding their applications. The increasing demand for lightweight and high performance materials is likely to increase the need for Aluminum matrix composites [12]. Therefore, Aluminium-matrix composites have been used in aircraft, automobile and other transport vehicles successfully such as engine piston, brake drums and electronic packaging and so forth, and further application is expected with development of low-cost processing methods [13].

The availability of a wide variety of reinforcing materials and the development of new processing techniques like ultrasonic assisted casting, powder metallurgy, high energy ball milling, friction stir casting is recently being used for the production of Aluminum matrix composites [14]. Based on the stated potential benefits of MMCs, this paper discusses the effect of different weight percentages of reinforcement materials on the mechanical behavior of the Aluminium based MMCs.

The main objective of this work is to develop Al (2024)/ silicon carbide particulate metal matrix composites. Where different weight percentages of silicon carbide is used as reinforcement material & Al 2024 is used as matrix material. Specimens are prepared by using liquid route metallurgy technique. Improvement of mechanical properties is done by heat treatment process. Test specimens are prepared to evaluate tensile and hardness characteristics.

II. EXPERIMENTAL DETAILS

Following steps are carried out in our experimental work:

1. Material selection
2. Composite preparation
3. Heat treatment
4. Micro structural studies
5. Testing

A. Material selection

The Al 2024 alloy (matrix material), SiC 30-40 μm size particles (reinforcement) are used for fabrication of MMCs. The chemical composition of Al2024 is given in the Table 1.

A Review on Person Identification using Deep Neural Network

Dileep J

*Department of TCE
K.S. Institute of Technology,
Bangalore, India
dileep1721991@gmail.com*

Dr. Manjunath Ramachandra

*Department of ECE
AMC Engineering College
Bangalore, India
manju_r_99@yahoo.com*

Dr. Supriya V G

*Department of ECE
Mahaveer Institute of Science and
Technology, Hyderabad, India
supriyavg2007@yahoo.co.in*

Abstract— With the development of shrewd tool and social media, the information bulk on Internet has grown with high velocity. As a critical component of image processing, person identification has come to be one of the international famous research fields. In current years, the dominant ability with feature learning and transfer learning of Neural Network has obtained mounting interest in the network, as a consequence making a series of essential breakthroughs in person identification. So it is an enormous survey that how to relate neural network to individual identification for better efficiency in feature extractors and classifiers. First the paper brought the simple idea of person identification by means of neural network. Finally, it combed the contemporary studies, achievements and intelligence of people identification, summarizing the critical development and discussing the destiny directions.

Keywords— Deep Neural Network, feature extraction, Classifiers, Region of Interest (ROI)