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HOMOMORPHIC CRYTOGRAPHY DEVELOPMENT USING SCHEMES

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ABSTRACT

This paper presents the study of homomorphic cryptography. . In this paper a study of various papers and articles is done, and in this paper we explain the schemes of homomorphic cryptography.The main part of this paper covers the privacy or security of data communication by using schemes

Keywords: Homomorphic, RSA,Pailler, Gentry, Complexity Cipher

I. INTRODUCTION

From earlier study ,we know that public key cryptography is discovered by diffie and Hellman in [12]in 1976.Privacy of digital data has become necessary especially when internet has become an indispensable part of private and work lives .To achieve confidentiality application such as online banking, electronic voting, virtual network etc. are homomorphic and homomorphic schemes.

Homomorphic cryptosystem were introduced by Rivest ,Adleman,Detrouzons in 1978[31].

Fully homomorphic cryptosystems or privacy homomorphisms were introduced by Rivest, Adleman, and Dertouzous in 1978 [37]. In their paper they asked for a way to allow a third, untrusted party to carry out extensive computation on encrypted data, without having to decrypt first. Unfortunately, shortly after its publication, major security flaws were found in the original proposed schemes of Rivest et al.The search for fully homomorphic cryptosystems began.

Over the years a lot of either additively (Paillier [35] 1999, Goldwasser-Micali [23]1984, Naccache-Stern [34] 1998) or multiplicatively (El Gamal [14] 1984, RSA [37]1978) homomorphic schemes have been introduced to the world. The demand for a fully homomorphic cryptosystem rose again in 1991 when Feigenbaum et al. [15]asked: "Is there an encryption function Enc() such that both Enc(x+y) and Enc(x_y)are easy to compute from Enc(x) and Enc(y)?" and was answered in 2009. Craig Gentry published his fully homomorphic cryptosystem [19] in the summer of 2009.

Although not yet useful for practical applications, it ended the long search for the in 1978 emerged question about the existence of privacy homomorphism

II. OBJECTIVE

The main objective of homomorphic cryptography is to ensure privacy of data in communication and storage processes, such as the ability to delegate computations to untrusted parties. If a user could take a problem explained in one algebraic system and encode it into a problem in a various algebraic system in a way that decoding back to the original algebraic system is hard, then the user could encode expensive computations and

send them to the untrusted party. This untrusted party then performs the corresponding computation in the second algebraic system, returning the result to the
user. Upon receiving the result, the user can decode it into a solution in the original algebraic system, while the untrusted party learns nothing of which computation was actually performed

III BRIEF OF HOMOMORPHIC ENCRYPTION

The security requirements for data and algorithms has become very necessary in the last few years. Due to the excessive growth of technology, a great variety of attacks on digital goods and technical devices has increased or increasing day by day.Some possibilities exists for storing and reading data securely i.e Secure data encryption. The problem becomes more complex when asking for the possibility to compute (publicly) with encrypted data or to modify functions in such a way that they are still executable while our privacy is ensured. That is where homomorphic cryptosystems can be used. Even in 1978 this was a highly important matter, it is even more important nowadays. However the patial homomorphic properties of schemes like RSA, Paillier, ElGamal, etc. have been acknowledged ever since, it was not before 2009 when a young IBM researcher published the first working fully homomorphic cryptosystem, based on lattices

IV. SCHEMES OF HOMOMORPHIC CRYTOGRAPHY

The development of homomorphic cryptography is based on three schemes. They are as follows-
RSA-i.e Multiplicatively homomorphic schemes
Paillier-i. e Additively homomorphic schemes
Gentry-i.e Algebrically homomorphic schemes

4.1 RSA

It is based on multiplicative. It is also called multiplicatively Schemes In 1978, Rivest, Shamir, and Adleman published their public-key cryptosystem, which only uses elementary ideas from number theory, in their paper "A Method for Obtaining Digital signatures and Public-Key Cryptosystems" [37]. It was one of the first homomorphic cryptosystem. The RSA cryptosystem is the most widely used public-key cryptosystem. It may be used to provide both secrecy and digital signatures and its security is based on the intractability of the integer factorization

4.2 Paillier

It is based on the Additive.It is also called Additively Schemes.As we observe from earlier study that RSA scheme has a multiplicative homomorphic property. This means it is possible to perform multiplications with the encryptions of messageswithout losing or tampering with their underlying information. This is possible since the operation "multiplication" in the ciphertext space (Zn; _) can be compared with the operation "multiplication" in the plaintext space (Zn; _).
The Paillier scheme is known to be additively homomorphic. What might seem confusing at first is the fact that the two group operations are different, namely the product of two ciphertexts will decrypt to the sum of their plaintexts.In comparison to that, the product of two RSA ciphertexts decrypt to the productof their plaintexts. Hence the Paillier scheme is additivly homomorphic and RSA multiplicatively.

4.3 Gentry

It is based on the Algebric equations.It is also called Algebrically homomorphic enPascal Paillier introduced his cryptosystem in the 1999 published paper "Public-Key
Cryptosystems Based on Composite Degree Residuosity Classes" [35]. The proposed technique is based on composite residuosity classes, whose computation is believed to be computationally difficult. It is a probabilistic asymmetric algorithm for public key cryptography and inherits additive homomorphic properties. In the decades before Gentry discovered his novel method to gain homomorphic encryption, many researchers worldwide tried to find more powerful and therefore more complex schemes to achieve the fully homomorphic property. Gentry uses a method which no other researcher tried before. Instead of directly creating a superior scheme, he would build one from a "somewhat" homomorphic scheme, if its decryption circuit is sufficiently simple. He realized that he could build a fully homomorphic scheme from any scheme that is boot strappable, i.e., could homomorphically compute a slightly augmented version of its own decryption circuit

V. DECRYPTION COMPLEXITY

The aim of this initial construction of a somewhat homomorphic encryption scheme was to obtain a scheme that is bootstrappable. Up to now we do not know what bootstrappability even means and why it is a necessary prerequisite. Informally speaking a scheme is bootstrappable if it can homomorphically evaluate its own decryption circuit. Unfortunately this is not the case in this initial scheme [20]. In order to obtain a scheme that can be transformed into a fully homomorphic encryption scheme it is crucial to lower the complexity of the decryption circuit

VI. CONCLUSION

From the above study we conclude that homomorphic encryption works on the privacy of data communication.we make our communication secure by applying schemes.we can make our data encrypt by algebriically,additively and multiplicatively.It make our online processes confidential

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IMPROVED ACCURACY FOR FACIAL FEATURE POINT DETECTION AND FACIAL EXPRESSION RECOGNITION

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ABSTRACT

In this paper algorithm to detects human facial features like the mouth, nose and eyes in a full frontal face image is proposed. The new algorithm is proposed in order to detect automatically face features (eyes, mouth and nose) and extract their corresponding geometrical point. This project presents and implements a facial feature point extraction and recognition method of facial expression and emotion from still images. There are two steps to recognize the facial emotion. Detecting facial feature point with ROI, and verifying the facial of characteristic with Gabor. .In this paper a new algorithm based on a set of images to facial feature point and facial expression recognition has been proposed. This process calls for four stages pre-processing, edge detection, feature extraction, face detection.

Keywords: Morphological operation (OPENING AND CLOSING), ROI, Gabor Filter, Feature point Detection, Facial expression and recognition

I. INTRODUCTION

Face detection is a very challenging field that target methods make effective human computer interaction. Therefore, facial expressions are the most important information for emotions perception in face to face communication. For classifying facial expressions into different categories, it is necessary to extract important facial features which contribute in identifying proper and peculiar manifestations.

Recognition and classification of human facial expression of computer is an important issue to develop automatic facial expression recognition system in vision community. An automatic method to recognize facial expressions in images or video For face portion segmentation basic image processing operation like morphological dilation, erosion, reconstruction techniques with disk structuring element are used. Six permanent Facial features like eyebrows (left and right), eye (left and right), mouth and nose are extracted using facial geometry, edge projection analysis and distance measure and feature vector is formed considering height and width of left eye, height and width of left eyebrow, height and width of right eye, height and width of right eyebrow, height and width of nose and height and width of mouth along with distance between left eye and eyebrow, distance between right eye and eyebrow and distance between nose and mouth. Experiments are run out on JAFFE facial expression database and any sample human face images.

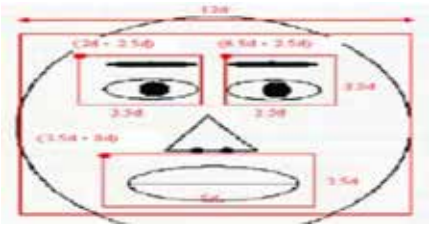

Fig 1 Geometric face model

Fig. 1 Few samples of facial expressions of person

II. RELEATED WORK

Face detection determines the locations and sizes of faces in an input image. They are easily located in cluttered scenes by infants and adults alike; however automatic human face detection by computers is a real challenging task because face patterns can have significantly variable image appearances. For example, human faces vary from genders, ages, hair styles and races, etc. In addition, the variations of scales, shapes and poses of faces in images also hinder the success of automatic face detection systems. To stand for the geometrical relations of those three areas. Based on the face model, three initial rectangles can be quickly located from the face detected by the previous step. Since geometric relations between the optics and the mouth vary a slight bit from person to person, we have to refine these three initial rectangles to fit their correct parts. It uses the information of the horizontal and the vertical edges of the regions enclosed by the three initial rectangles to refine the locations and sizes of the rectangles. Illustrates three refined rectangles. While there are 30 feature points uniformly spread in each of the upper rectangles, 24 feature points are uniformly spread in the mouth rectangle.

Segmentation is very important to image retrieval process. The shape feature and the layout feature both depend on good segmentation technique. Image segmentation algorithms are generally based on one of the two basic properties of intensity values: zIn Region based segmentation the objective is to partition an image into regions. This report explains the algorithms for finding Region of Interest from the facial images and extraction of features from the respective Region of Interest. In the proposed techniques, the different ROI's from the facial data are taken as Lips and Eyes of the human facial image. These are detected from the face with the help of skin color and the knowledge based methods in concern with the human face data.

Recognizing someone from facial features makes human recognition a more automated operation. Basically the extraction of facial feature points, (eyes, nose, mouth) plays an important role in many applications, such as face recognition, face detection model based image coding, expression recognition, facial animation and head pose determination. Facial recognition can be used mostly for police work purposes. For example, public safety, suspected terrorists, and missing children. Facial feature extraction has some problems which must be believed and be solved. Some problems of facial feature extraction are given as follow: Small variations of face size and orientation can be effected the result. As the input image comes from the webcam in the room condition the captured image has different brightness, shadows and clearness which can be failed the process. Sometimes facial features may be covered with other things, such as a hat, a glass, hand or hairs. Human faces have a change of emotions by many different expressions, only this arrangement can detect the corner of the features in

the case of neutral, sad, happy and surprise. Most facial feature extraction methods are sensitive to various non-ideals such as variations in illumination, noise, orientation, time-consuming and color space used. In the next section we briefly describe the related work also comparing the techniques.

III. SYSTEM ARCHITECTURE DESIGN

The given input image is load and converted to gray level for processing. It is transformed to Histogram equcation.Then using morphological operation where closing and opening process of image is carried out. Using segmentation, the region of interest(ROI) points are calculated and extracted. For each parts are of the image do segmentation process. Fig 3 Represent below,

- First, To extract the feature points are eye, lip, and nose extraction.
- Second, Facial expression detection is happy, sad, anger, and etc
- Third, Facial expression recognition

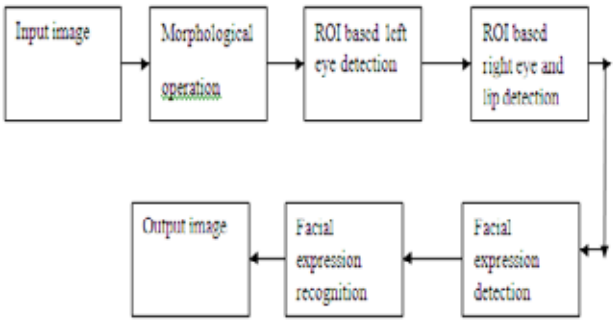

Fig 3 Block Diagram

3.1 Dataflow Diagram

The Skin Color Segmentation algorithm is applied to the loaded image to find the skin color for the detection of faces from the image given to the system.

1. pixels are considered as the width and height of the face present .
2. To check the possibility to have a face in the given image, the height and width of the face area must follow the following criteria.

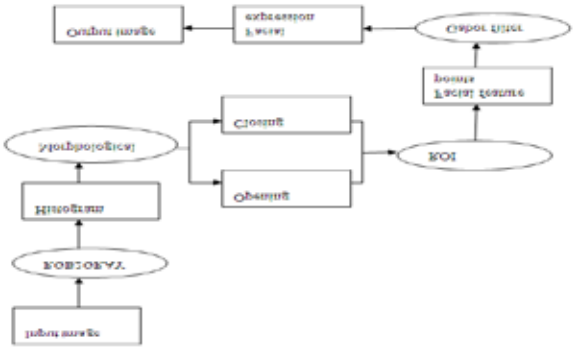

Fig 4 Dataflow Diagram

$$height \geq 50 \, , \; width \geq 50 \; 1 \leq \frac{height}{width} \leq 2$$

3. After Face , convert the facial image into Binary image.
4. Then cut the Face from the binary image according to skin color pixels present in the image by considering height and width.

5. To apply morphological operation is opening, closing (erosion and dilation).
6. Then find Region of Interests (ROI) from the face as Left Eye, Right Eye and Lip according to knowledge based method of face detection.
7. Then Gabor filter using to identify facial expression detection.
8. Finally facial expression is detected and recognized from the database.

IV. MODULE DESCRIPTION

- Preprocessing
- Morphological operation
- ROI based feature segmentation
- Facial expression detection.
- Facial expression recognition

4.1 Preprocessing

Pre-processing is applied on images at the lowest level of abstraction and its aim is to reduce undesired distortions and enhance the image data which is useful and important for further processing . It is usually necessary and required for improving the performance of image processing methods like image transform, segmentation, feature extraction and fault sensing. This report is focused on filtering pre-processing methods.

4.2 Morphological Operation

Morphological operations are affecting the shape, structure or shape of an aim. Applied on binary images (black & white images – Images with only 2 colors: black and blank). They are practiced in pre or post processing (filtering, diluting, and pruning) or for generating a representation or description of the physical body of objects/regions (boundaries, skeletons convex hulls).

Black pixel: in grayscale values for a 8 bits/pixel indexed image its value will be 0

White pixel: in grayscale values for a 8 bits/pixel indexed image its value will be 255.

4.3 The Dilation

It is best described in a sequence of steps:

1. If the source of the structuring element coincides with a 'white' pixel in the image, there is no change; move to the adjacent pixel.

2. If the source of the structuring element coincides with a 'black' in the image, make black all pixels from the image covered by the structuring element

Notation: $A \oplus B$

4.4 The erosion

The corrosion process is similar to dilation, but we turn pixels to 'white', not 'black'. As in front, slide the structuring element across the picture and then pursue these stairs:

1. If the source of the structuring element coincides with a 'white' pixel in the image, there is no change; move to the adjacent pixel.

2. If the source of the structuring element coincides with a 'black' pixel in the image, and at least one of the 'black' pixels in the structuring element falls over a blank pixel in the image, and so modify the 'black' pixel in

the image (corresponding to the spot on which the essence of the structuring element falls) from 'black' to a 'white'

. **Notation**: A Θ B

4.5 ROI Based Feature Segmentation

Image segmentation is the process of partitioning a digital picture into multiple segments (sets of picture elements, also recognized as super pixels). The goal of partitioning is to simplify and/or alter the representation of an image into something that is more meaningful and more comfortable to break down. Image segmentation is typically applied to locate objects and boundaries (lines, bends, etc.) in images. More precisely, image segmentation is the procedure of assigning a label to every pixel in an image such that pixels with the same label share certain visual features.

In Region based segmentation the objective is to partition an image into parts. This report explains the algorithms for finding Region of Interest from the facial images and extraction of features from the respective Region of Interest. In the proposed techniques, the different ROI's from the facial data are taken as Lips and Eyes of human facial image an facial data.

4.6 Facial Expression Detection

The facial expression presented in the image sequence. The movements of facial points (eyebrows, eyes, and mouth) have a substantial relation to the information about the facial construction. Consequently, many approaches greatly depend on the tracking of permanent facial features (eyebrows, eyes, lip, and creases that have become permanent with age) and/or transient facial features (facial wrinkles and wrinkles that are not present at a neutral state).

4.7 Facial Expression Recognition

A facial recognition system represents a data processor-driven application for automatically authenticating a person from a digital picture or a picture sequence. It performs the recognition by comparing selected facial characteristics in the input image with a face database. Any recognition process is divided into two main operations:

1. Face identification
2. Face verification.

Facial identification consists in putting the input face image to one mortal of a known group, while face verification consists in validating or rejecting the previously detected person identity..

V. IMPLEMENTATION AND RESULT

The images are resized to 256 x 256. Once an input image is submitted to the system the images are pre-processing using filtering technique. Afterward that the Feature Extraction using color and luminance is performed for segmented images. From the extracted features to identify facial expression and facial expression recognition images.

- Preprocessing
- Morphological operation
- ROI based feature segmentation

5.1 Preprocessing

Noise Reduction: Filtering is used for blurring and noise reduction**.**

Mean filter : Reducing the amount of intensity variation between one pixel and the next pixel. It is often used to reduce noise in images.

Histogram: Histogram is a graphical representation of distributed data and it also represents the tabulated frequencies.

5.2 Morphological Operation

The two principal morphological operations are dilation and erosion. Dilation allows objects to expand, thus potentially filling in small holes and connecting disjoint objects. Erosion shrinks objects by etching away (eroding) their limits..

5.3 ROI Based Feature Segmentation

In Region based segmentation the objective is to partition an image into parts. This report explains the algorithms for finding Region of Interest from the facial images and extraction of features from the respective Region of Interest. These are detected from the face with the help of skin color and the knowledge based methods in concern with the human face data.

5.4 Feature Extraction

Feature extraction is a special form of rejection. Transforming the input data into the set of features is called feature extraction. There may be a number of Features of an image, including point, edge, line region and corner point

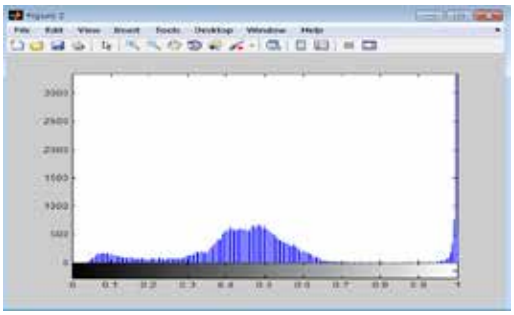

Figure 6.1 Histrogram

Figure 6.2 Morphological Operation

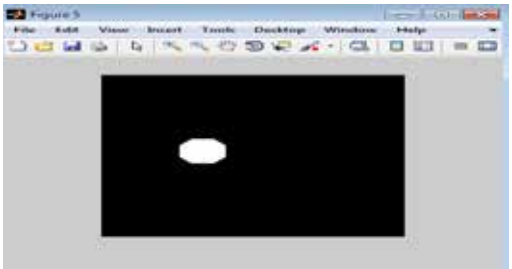

Figure 6.3 ROI

Build 6.4 To Detect Left Eye

VI. CONCLUSION

In this report the proposed an accurate and high speed facial detection system. The feature-based detections to find skin-color fast and selected candidate blocks carefully. It used lighting compensation to improve the performance of the morphological based scheme, and reduce the computation of feature-based scheme.. To ROI to measure the pixel points (X, Y) distance is different for every image posing different emotions. Due to the proposed method has simple structure, it is suitable to be implemented into achieving very high performance and low power system.

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2D FIR FILTER BASED EDGE DETECTION OF ANGIOGRAM IMAGES

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ABSTRACT

The main objective is to detect the edges as well as to enhance the image, such that the medical images can be displayed more clearly. Image enhancement is the process of adjusting digital images so that the results are more suitable for display or further analysis. The proposed algorithm involves the removal of noise using median filter. 2D FIR filter is used to detect the edge of the given input image. It computes the result using a two-dimensional correlation. It improves the results of the detection process.The resultant image will be used for further interpretation for medical analysis. Image Edge detection significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image

I. INTRODUCTION

The blood vessels are the part of the circulatory system that transports blood throughout the body. There are three major types of blood vessels: The arteries, which carry the blood away from the heart, the capillaries, which enable the actual exchange of water and chemicals between the blood and the tissues, and the veins, which carry blood from the capillaries back toward the heart. Without the vasculature to carry blood to and from tissues, they would die in the absence of nutrition and waste removal.

Blood vessels do not actively engage in the transport of blood (they have no appreciable peristalsis) but arteries and veins to a degree-can regulate their inner diameter by contraction of the muscular layer. This changes the blood flow to downstream organs, and is determined by the autonomic nervous system. Blood vessel permeability is increased in inflammation. Damage due to trauma or spontaneously, may lead to hemorrhage due to mechanical damage to the vessel endothelium. In contrast, occlusion of the blood vessel by atherosclerotic plaque, by an embellished blood clot or a foreign body leads to downstream ischemia (insufficient blood supply) and possibly necrosis.

Digital image processing allows one to enhance image features of interest while attenuating detail irrelevant to a given application and then extract useful information about the scene from the enhanced image. Images are produced by a variety of physical devices, including still and video cameras, X-ray devices electron microscopes, radar, and ultrasound purposes , including entertainment, medical ,business (e.g. documents), industrial, military, civil (e.gtraffic),security and scientific. The goal in each case is for an observer, human or machine, to extract useful information about the scene being imaged. Often the raw image is not directly suitable for this purpose and must be processed in some way. Such processing called image enhancement**;** Processing by an observer to extract information is called image analysis. Enhancement and analysis are distinguished by their output, images vs. scene information and by the challenges faced and methods employed. Image enhancement has been done by chemical, optical and electronic means, while analysis has been done mostly by humans and electronically.

II. RELATED WORK

Computer-assisted detection and segmentation of blood vessels in angiography are crucial for endovascular treatments and embolization. In this article, I give an overview of the image segmentation methods using the features developed recently at our laboratory. Our current research directions are also highlighted.

Segmentation of blood vessels is one of the essential medical computing tools for clinical assessment of vascular diseases. It is a process of partitioning an angiogram into nonoverlapping vascular and background regions. Based on the partitioning results, surfaces of vasculatures can be extracted, modeled, manipulated, measured and visualized. These are very useful and play important roles for the endovascular treatments of vascular diseases. Vascular diseases are one of the major sources of morbidity and mortality worldwide. Therefore, developing reliable and robust image segmentation methods for angiography has been a priority in our group and other research groups. It is challenging to perform image segmentation in angiography.

The success of the approach depends on the definition of a comprehensive set of goals for the computation of edge points. These goals must be precise enough to delimit the desired behavior of the detector while making minimal assumptions about the form of the solution.

We define detection and localization criteria for a class of edges, and present mathematical forms for these criteria as functional on the operator impulse response. A third criterion is then added to ensure that the detector has only one response to- a single edge. We use the criteria in numerical optimization to derive detectors for several common image features, including step edges. On specializing the analysis to step edges, we find that there is a natural uncertainty principle between detection and localization performance, which are the two main goals. With this principle we derive a single operator shape which is optimal at any scale. The optimal detector has a simple approximate implementation in which edges are marked at maxima in gradient magnitude of a Gaussian-smoothed image. We extend this simple detector using operators of several widths to cope with different signal-to-noise ratios in the image. We present a general method, called feature synthesis, for the fine-to-coarse integration of information from operators at different scales. Finally we show that step edge detector performance improves considerably as the operator point spread function isextended along the edge. This detection scheme uses several elongated operators at each point, and the directional operator outputs are integrated with the gradient maximum detector.

Coronary heart disease has been one of the main threats to human health. Coronary angiography is taken as the gold standard; for the assessment of coronary artery disease. However, sometimes, the images are difficult to visually interpret because of the crossing and overlapping of vessels in the angiogram. Vessel extraction from X-ray angiograms has been a challenging problem for several years. There are several problems in the extraction of vessels, including: weak contrast between the coronary arteries and the background, unknown and easily deformable shape of the vessel tree, and strong overlapping shadows of the bones. In this article we investigate the coronary vessel extraction and enhancement techniques, and present capabilities of the most important algorithms concerning coronary vessel segmentation.

III. SYSTEM ARCHITE CTURE DESIGN

Image enhancement is among the simplest and most appealing areas of digital image processing. Basically, the idea behind enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interesting an image. A familiar example of enhancement is when we increase the contrast of an image

because “it looks better.” It is important to keep in mind that enhancement is a very subjective area of image processing Segmentation procedures partition an image into its constituent parts or objects. In general, autonomous segmentation is one of the most difficult tasks in digital image processing. A rugged segmentation procedure brings the process a long way toward successful solution of imaging problems that require objects to be identified individually.

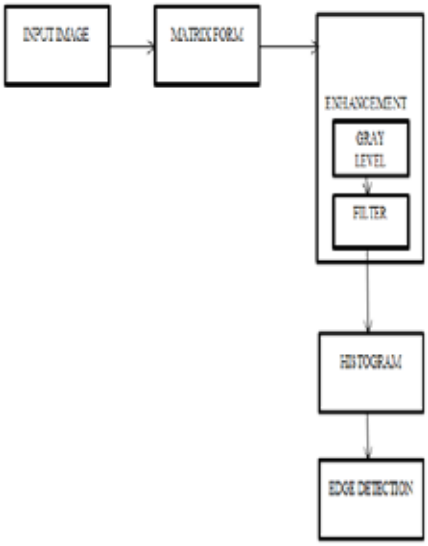


Fig 3.1 Architecture Diagram For Edge Detection

- First ,To remove noise by using median filter.
- Second,take histogram of the image.
- Third,Edge detection of the image.

Medical imaging is the technique and process used to create images of the human body (or parts and function thereof) for clinical purposes (medical procedures seeking to reveal, diagnose, or examine disease) or medical science (including the study of normal anatomy and physiology). Although imaging of removed organs and tissues can be performed for medical reasons, such procedures are not usually referred to as medical imaging, but rather are a part of pathology. As a field of scientific investigation, medical imaging constitutes a sub-discipline of biomedical engineering, medical physics or medicine depending on the context: Research and development in the area of instrumentation, image acquisition (e.g. radiography), modeling and quantification are usually the preserve of biomedical engineering, medical physics, and computer science; Research into the application and interpretation of medical images is usually the preserve of radiology and the medical sub-discipline relevant to medical condition or area of medical science (neuroscience, cardiology, psychiatry, psychology, etc.) under investigation

3.1.1 Median Filter

In signal processing, it is often desirable to be able to perform some kind of noise reduction on an image or signal. The median filter is a nonlinear digital filtering technique, often used to remove noise. Such noise reduction is a typical pre-processing step to improve the results of later processing (for example, edge detection on an image). Median filtering is very widely used in digital image processing because, under certain conditions, it preserves edges while removing noise. The main idea of the median filter is to run through the signal entry by

entry, replacing each entry with the median of neighboring entries. The pattern of neighbors is called the "window", which slides, entry by entry, over the entire signal. For 1D signals, the most obvious window is just the first few preceding and following entries, whereas for 2D (or higher-dimensional) signals such as images, more complex window patterns are possible (such as "box" or "cross" patterns). Note that if the window has an odd number of entries, then the median is simple to define: it is just the middle value after all the entries in the window are sorted numerically.

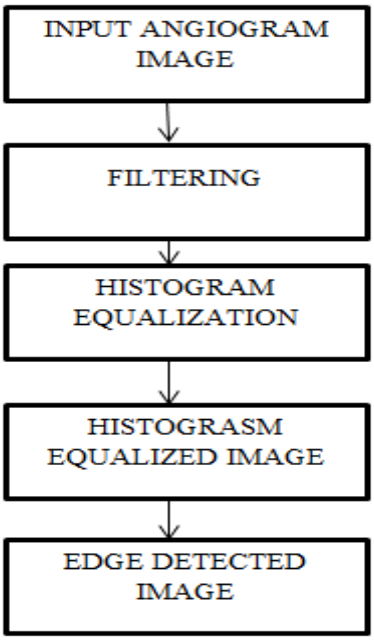


Fig: 4.2 Data Flow Diagram

Angiogram image is given as input for pre-processing. This pre-processing include noise removal and gray scale conversion. Noise is removed by using median filter. Histogram equalization is used for edge detection. Normalized histogram is find for edge detection. 2D FIR filter is used to find the edges of the angiogram image. Segmentation is a process of partitioning a given image into several non-overlapping regions. It is a process of partitioning an angiogram into several non-overlapping regions. Thus it is used to extract the vascular and background regions. Threshold methodis used for the segmentation of our study

IV.MODULE DESCRIPTION

The following modules are present in the project

- Noise reduction
- Image enhancement
- Histogram equalization
- Edge detection

4.1 Noise Reduction

The converted image will be of low resolution. So we need to normalize the image in order to avoid parameter variation. In this study we have used Median Filter to reduce the noise of the image.

Median computation

>>B=medfilt2(A); à 1

The above command will computer the median for each and every pixel and normalized matrix will be stored in the variable B

4.2 Histogram Equalization

Whenever an image is converted from one format to another some of the degradation occurs at the output. Hence, the output image has to undergo a process called image enhancement which consists of a collection of techniques that seek to improve the visual appearance of an image. Fuzzy Inference System is used to enhance the image for our study.

Image enhancementis among the simplest and most appealing areas of digital image processing. Basically, the idea behind enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interesting an image. A familiar example of enhancement is when we increase the contrast of an image because “it looks better

4.3 Edge Detection

Edge Detection is done to segment the blood vessels from the angiogram images. Edge detection algorithms are followed by linking and boundary detection procedures. Edge Detection is an important task and in literature, Morphological filterhave been used for the Edge Detection of the blood vessel

V. TECHNIQUES USED

Some of the techniques which are used in this project are segmentation and edge detection.Image segmentation is the process of assigning a label to every pixel in an image.Region boundaries and edges are closely related, since there is often a sharp adjustment in intensity at the region boundaries

5.1 Segmentation

In computer vision, segmentation refers to the process of partitioning a digital image into multiple segments (sets of pixels, also known as super pixels).The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc) in image. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain visual characteristics.

The result of image segmentation is a set of segments that collectively cover the entire image or a set of contours extracted from the image. Each of the pixels in a region is similar with respect to some characteristics or computed property, such as color, intensity or texture. Adjacent regions are significantly different with respect to the same characteristics.

5.1.1 Application

Some of the practical applications of image segmentation are:

- Medical imaging
- Locate tumors and other pathologies
- Measure tissue volumes
- Computer-guided surgery

- Diagnosis
- Treatment planning
- Study of anatomical structure
- Locate objects in satellite images (roads, forests, etc)
- Face recognition
- Fingerprint recognition
- Traffic control systems
- Brake light detection

Several general-purpose algorithms and techniques have been developed for image segmentation. Since there is no general solution to the image segmentation problem, these techniques often have to be combined with domain knowledge in order to effectively solve an image segmentation problem for a problem domain

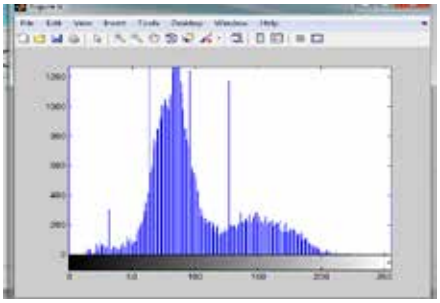
5.2 Edge Detection

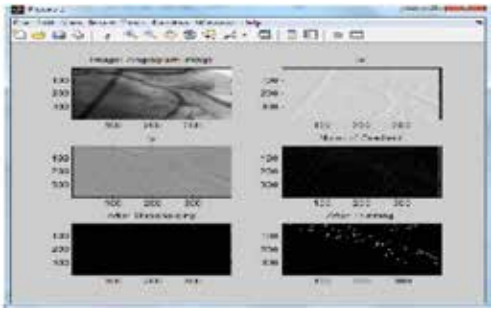
Edge detection is a well-developed field on its own within image processing. Region boundaries and edges are closely related, since there is often a sharp adjustment in intensity at the region boundaries. Edge detection techniques have therefore been used as the base of another segmentation technique.

The edges identified by edge detection are often disconnected. To segment an object from an image however, one needs closed region boundaries

VI. RESULT

This is the histogram of the angiogram image. The histogram is getting after noise removal.





This image shows the edge detected output after getting histogram.

VII. CONCLUSION

Thus the edges of the angiogram image are detected by using median and 2D FIR filter. The edges segmented are accurate and clear as compared to the canny edge detection and the steps involved to obtain the edges of the blood vessel are simple and easy to implement. The results provide that the algorithm is effective and efficient in detecting the edges.

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SIMILARITY AND ASSOCIATION KNOWLEDGE BASED RETRIVAL FOR CBR

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ABSTRACT

Data stream classification has been a widely studied research problem in recent years.The dynamic and evolving nature of data streams requires efficient and effective techniques that are significantly different from static data classification techniques. Two of the most challenging and well studied characteristics of data streams are its infinite length and concept-drift. Data stream classification poses many challenges to the data mining community. In this report, we address four such major challenges, namely, infinite length, concept-drift, concept-evolution, and feature-evolution.Since a data stream is theoretically infinite in duration, it is impractical to store and utilize all the historical data for training.Concept-drift is a usual phenomenon in data flows, which occurs as a result of changes in the underlying concepts.Concept-evolution comes about as a aftermath of new classes evolving in the current. Feature-evolution is a frequently occurring process in many streams, such as text streams, in which new features (i.e., words or phrases) appear as the stream progresses.

I. INTRODUCTION

The single model classification techniques apply some form of incremental learning to address the infinite length problem, and strive to adapt themselves to the most recent concept to address the concept-drift problem. Ensemble classification techniques maintain a fixed-sized ensemble of models, and use ensemble voting to classify unlabeled instances. These techniques address the infinite length problem by applying a hybrid batch-incremental technique.

Here the data stream is divided into equal sized chunks and a classification model is trained from each chunk. This model replaces one of the existing models in the ensemble, keeping the ensemble size constant. The concept-drift problem is addressed by continuously updating the ensemble with newer models, and striving to keep the ensemble consistent with the current concept. DXMiner also applies an ensemble classification technique. First, a decision boundary is built during training. Second, test points falling outside the decision boundary are declared as filtered outliers, or F-outliers. Finally, the F-outliers are analyzed to see if there is enough cohesion among themselves (i.e., among the F-outliers) and separation from the training instances.

we propose an improved technique to reduce both false alarm rate and increase detection rate. Our framework also allows for methods to distinguish among two or more novel classes.

We claim three major contributions in novel class detection for data streams . First, we propose a flexible decision boundary for outlier detection by allowing a slack space outside the decision boundary.

This space is controlled by a threshold, and the threshold is adapted continuously to reduce the risk of false alarms and missed novel classes. Second, we use a probabilistic approach to detect novel class instances using the discrete Gini Coefficient. With this approach, we are able to distinguish different causes for the appearance of the outliers, namely, noise, concept-drift, or concept-evolves.

II. RELATED WORK

The author Charu C. Aggarwal stated that in recent years, the proliferation of VOIP data has created a number of applications in which it is desirable to perform quick online classification and recognition of massive voice streams. Typically such applications are encountered in real time intelligence and surveillance. In many cases, the data streams can be in compressed format, and the rate of data processing can often run at the rate of Gigabits per second.

The authors Charu C. Aggarwal, Senior Member, IEEE, Jiawei Han, Senior Member, IEEE, Jianyong Wang, Member, IEEE, and Philip S. Yu, Fellow, IEEE , Current models of the classification problem do not effectively handle bursts of particular classes coming in at different times. In fact, the current model of the classification problem simply concentrates on methods for one-pass classification modeling of very large data sets. Their example for data stream classification views the data stream classification problem from the point of persuasion of a dynamic approach in which simultaneous training and test streams are applied for dynamic sorting of information sets.This model reflects real life situations effectively, since it is desirable to classify test streams in real time over an evolving training and test current.

The authors, Albert Bifet, Geoff Holmes, Bernhard Pfahringer, Richard Kirkby RicardGavaldà stated that advanced analysis of data streams is quickly becoming a key field of data mining research as the number of applications demanding such processing increases.Online mining when such data streams evolve over time, that is when concepts drift or change altogether, is becoming one of the core subjects.When taking on non-stationary concepts, ensembles of classes have various advantages over single classifier methods: they are easy to scale and parallelize, they can adjust to change quickly by pruning under-doing components of the supporting players, and they therefore usually also generate more accurate concept descriptions.

III. SYSTEM ARCHITECTURE DESIGN

Design is the process of applying various techniques and principles for the purpose of designing a device. A process on a system is sufficient detail to permit its physical realization. It is a process through which requirements are translated in representation of the software.

From a project management point of view, software design is conducted in two steps. First one preliminary design that is concerned with the transformations of requirements into data and second step is software architecture detail design focus on refinement to architectural representation that lead to detail data structure and algorithmic representation of the software.

After detailed discussion with the user, the objectives requirements of data involved were identified. After performing necessary details of the document, output format and the frequency of reports are finalized with the user.

After analyzing the system flow, the file structure and logic of the programs are arrived and then the modification is verified. Design is concerned with identifying software component that specifying relationship among components. It specifies the software structure and provides the model for the implementation phase.

Techniques in the second category address the feature-evolution problem on top of the infinite length and concept-drift problems. It proposes a feature selection technique for data streams having dynamic feature space . Their technique consists of an incremental feature ranking method and an incremental learning algorithm.

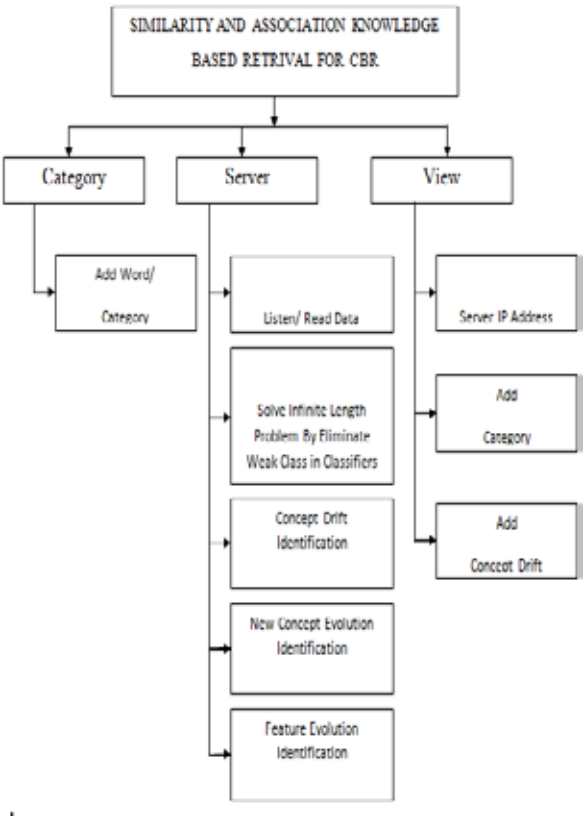


Fig 3.1Architecture Diagram

Techniques in the third category deal with the concept-evolution problem in addition to addressing the infinite length and concept-drift problems. An unsupervised novel concept detection technique for data streams is proposed, but it is not applicable to multi-class classification.

Our previous works Mine Class and DX Miner address the concept-evolution problem on a multiclass classification framework. They can detect the arrival of a novel class automatically, without being trained with any labeled instances of that class. However, they do not address the feature-evolution problem.

On the other hand, DX Miner addresses the more general case where features can evolve dynamically. Its effectiveness is shown analytically and demonstrated empirically on a number of real data streams.

IV. MODULE DESCRIPTION

The following modules are present in the project

- Solving Infinite Length Problem Module
- Concept Drift Identification Module
- Concept Evolution Identification Module
- Feature Evolution Identification Module

4.1 Solving Infinite Length Problem Module

When the data arrived is more and the classes formed out of them increases the problem is termed as infinite length problem. This is to be avoided. Each incoming instance in the data stream is first examined by an outlier detection module to check whether it is an outlier. If it is not an outlier, then it is classified as an existing class using majority voting among the classifiers in the ensemble. If it is an outlier, it is temporarily stored in a buffer.

When there are more new classes formed, then the classes with less content are discarded so that the number of classes is maintained within a given limit and this avoids the infinite problem.

4.2 Concept Drift Identification Module

The words and the category to which it belongs are added in the 'category' table. A client application is developed in which the text content is sent to the server application which updates the incoming message. The words are extracted and the words fell in the given category are identified and counted.

If there are more words in the category and the word count reduced in the successive incoming messages, then the concept is found to be reduced and when the number of words reduced to zero, the concept is said to be drifted. The number of observation time count is set so that when the number of word count is zero for that given number of time, then the concept is said to be drifted.

4.3 Concept Evolution Identification Module

During the concept evolution phase, the novel class detection module is invoked. If a novel class is found, the instances of the novel class are tagged accordingly. Otherwise, the instances in the buffer are considered as an existing class and classified normally using the ensemble of models. The words occurred frequently but not matched with any of the category available, and then the word is considered to be fallen in new class.

4.5 Feature Evolution Identification Module

In this module, along with concept evolution, feature evolution is identified. The repeated patterns are identified in the received messages and if it is found that more number of received messages contains the patterns, then it is said that feature evolution occurs.

V. INPUT DESIGN

- All the files from the disk should be acquired by data.
- It is suitable to more available data clearance and made available.
- The menu of design should be understandable and it is in the right format.

VI. DATABASE DESIGN

- Data Integration
- Data Integrity
- Data Independence

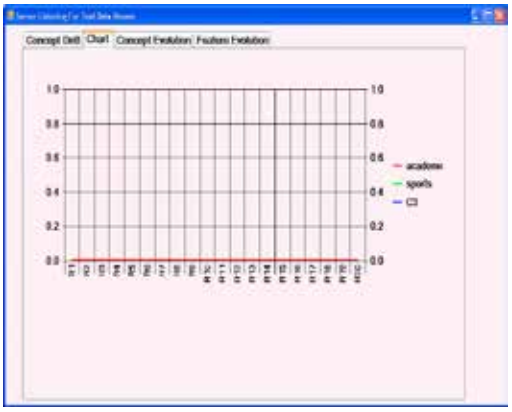
VII. OUTPUT DESIGN

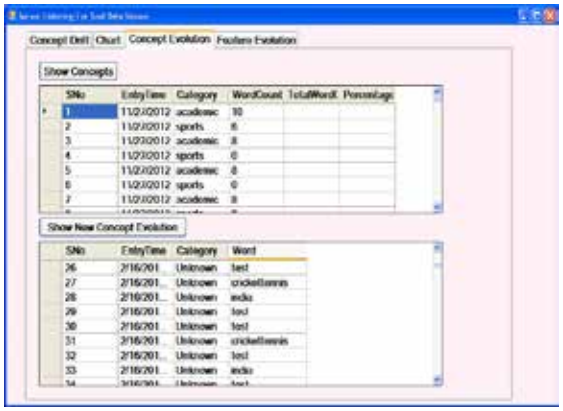
- Output design generally refers to the results and information that are generated by the system for many end-users**.**

§ The output is designed in such a way that it is attractive, convenient and informative.

VIII. RESULT

The project proposes a classification and novel class detection technique for concept-drifting data streams that addresses four major challenges, namely, infinite length, and concept-drift, concept-evolution, and feature evolution. The existing novel class detection techniques for data streams either do not address the feature-evolution problem or suffer from high false alarm rate and false detection rates in many scenarios





IX. CONCLUSION

Through this project, the drift detection issue is covered; Decision boundary for outlier detection is changing as the new data arrives; Uses any approach is used and so models with less importance are eliminated and space is provided for new models. The project considers the feature space conversion technique to address feature-evolution problem. Then, it identifies two key mechanisms of the novel class detection technique, namely, outlier detection, and identifying novel class instances

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SURVING SELF LOADING VIDEO COMPOSITION

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ABSTRACT

In the present or recent times people want to collect their memorable moments with the help of digital devices like camera. Digital videos becoming grown and found anywhere. So camera plays a vital role in our day to day life. However editing and organizing videos remains difficult for people by different reasons. Also searching takes more time. So people need a better solution for video edition and video organization in an efficient way. This paper presents various techniques used for video edition and composition for grouping the required portion of the video which has taken from different places at different time. Video storage helps to secure videos keep on by users. So, proper administration control will be there to maintain a recognized users record and its personal information to keep is as privacy one.

I. INTRODUCTION

In this modern world, people would like to recollect their memorable moments with the help of digital devices like camera. So camera plays a vital role in our day to day life. The image resolution varies according to the capacity of the camera. When people want to collect their videos which are taken in different places at different time, they find difficult to search and edit it. Searching the required image from the collection of video would need more time. So people need a better solution for video editing and organizing the videos. Image processing is a technique used to process the image. Normally the image is in the form of the pixels or it is said to be in matrix format i.e. group of pixels from an image. This image processing technique analyses the image as one by one pixel and performs the matching operation or else extract the useful information from the image. Image processing accepts image or video as input and produces an image or video as an output with better quality and efficiency. It is helpful for the engineers and scientist who works on feature detection, noise reduction, image segmentation, frame splitting etc., Image processing normally refers to digital image processing but sometimes it includes

analog and optical images too. Image processing includes five groups: Visualization, Image Sharpening and Restoration, Image Retrieval, Measurement of pattern and Image Recognition. Visualization is used to observe the objects that are not visibe.

II. RELATED WORK

A literature survey, or literature review, is a proof essay of sorts. It is a study and review of relevant literature materials in relation to a topic a person have chosen. A literature review is a text written by someone to consider the critical points of current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources, and as such, do not report any new or original experimental work. Also, a literature review can be interpreted as a review of an abstract accomplishment.

Video editing is a quite complicated one for users and professional's .When users want to edit their videos they need software and it takes some time for editing. By using software there is some problem in frames splitting. So in video editing with intelligent interaction technique Ahanger et al (l998).It has proposed an intelligent interaction technique called silver interface. This helps users to solve their problems and to provide an efficient edited video.

The user collects the videos and arranged them in tree shaped udder and then edits the video by rearranging the branches of the tree. Silver interface provides different formats for editing and it calculates and manipulates the audio and video separately. This silver interface helps us to edit the video. Even though it is useful for editing it has some disadvantages. Sometimes it fails to show the former position to the user after some change is performed in size of the video. Because of this problem people need a better solution for editing.

It have proposed a special technique called drag and drop interface for arranging the still images from videos Barnes et al(2010). This is mainly useful to media field. So that, users can relate the moving objects with graphical objects on the screen and organize the video to create a still image. It consists of several preprocessing techniques like particle tracking, particle grouping etc., to convert the video to still images and still images to video Bhat et al (2004). There are several limitations in s project. One is it takes some time for preprocessing. If the video length is large it takes more time to preprocess it and it runs slowly according to the length of the project. Another drawback is moving a video back and forth along a single path is difficult. So we need a best solution to resolve this problem.

Matching the scene is based on surf features. Surf algorithm has several advantages when compared to sift algorithm. Scene matching algorithm plays an important role in realizing the operational purpose of cruise missiles. Cutting (2002) have proposed a coarse to fine partial matching to realize the surf feature points. First the surf feature points are extracted from the base image and the real time image and the matching of surf key point is performed to find a match location of the images. After finding the surf key points coarse to fine partial matching is done to match the images.

Coarse match is based on bidirectional nearest neighbor method and fine matching is based on RANSAC method and dominant line direction method. RANSAC method stands for random sample consensus and it is used to estimate the parameters and to eliminate the outliers. The main disadvantages of this project are sometimes it may produce wrong matching.

SURF algorithm plays an important role in image matching. When we want to add a quality to an image which is taken at different places at different time we need an algorithm called SURF algorithm. Surf is the accelerated version of SIFT algorithm and is mainly used for object recognition and object tracking Chiu et al (2004). SURF is three times faster than SIFT algorithm. Yuan et al has proposed the SIFT algorithm for image matching with the use of the KD-tree. KD-tree is a useful data structure for organizing points in a k dimensional space. First the feature points are extracted from the image by using SURF algorithm and the KD-tree algorithm is used to improve the efficiency and compared the SIFT algorithm with surf algorithm. But there is a problem with this project. i.e. we have to convert the input image into a gray image to avoid some problems in matching. Also making color images with matching efficiency is another major problem. These problems are referred from the Table 2.1.

It have proposed the process of capturing, editing and composing the video segments. These segments are composed using algebraic operations like union, intersection and concatenation. Apart from this technique many evaluation techniques are used to measure the performanceAhanger et al (1998). A literature review is a text

written by someone to consider the critical points of current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic.

Literature reviews are secondary sources, and as such, do not report any new or original experimental work. Evaluation and analysis of the automatic analysis technique consists of temporal ordering thematic composition, thematic nearness composition and time limited composition. These are used to demonstrate the viability of automatically composing new video. The main aim of the project is to edit the video and to improve the quality of the video. The figure shows a composition and customization of video segments. These metrics are used to compare the quality of the newly composed video with the original video. The edition of the video is based on the customer needs Taylor et al (1995).

The main disadvantage is sometimes it may analyze a wrong value to the quality of the video. Because of these wrong values people find difficult to edit and compose the video. And these composition techniques fail to produce the seamless transition to video. Even though these techniques present an automated way for video edition sometimes it needs user help to organize the edition part.

III.SYSTEM ARCHITECTURE

The objective of this concept is to automatically compose descriptive long take video with content consistent shots retrieved from a video pool that convert into a single shot video which must be efficient.

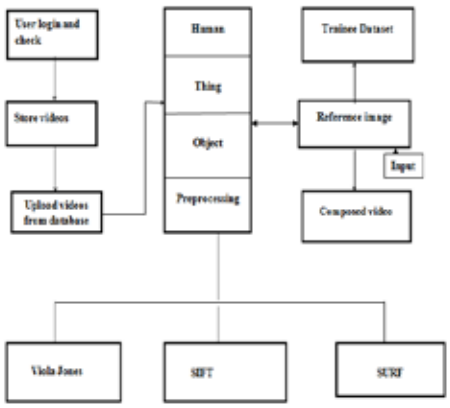

Figure 3.1 System Architecture

Initially a login page is created for the users to store the videos. After the storage, uploading the videos as an input then preprocessing technique will get started. In preprocessing the human and nonhuman objects are separated using the algorithm viola Jones, SIFT and SURF algorithm. Viola Jones is used for face detection and SIFT is used to describe and detect local features in images and SRUF algorithm is used for scene matching and to speed up the process. After preprocessing, a reference image is given as an input and using SURF algorithm it match the faces with the faces in the trainee dataset and then it automatically it compose the video which contain single person videos alone.

3.1 Algorithms

In this project three algorithms are used. They are

- SIFT
- SURF
- VIOLA JONES

3.1.1 Sift Algorithm

Scale-invariant feature transform (or SIFT) is an algorithm in computer vision to detect and describe local features in images. The algorithm was published by David Lowe in 1999. Applications include object recognition, robotic mapping and navigation, image stitching, 3D modeling, gesture recognition, video tracking, individual identification of wildlife and match moving [9].

For any object in an image, interesting points on the object can be extracted to provide a "feature description" of the object. This description, extracted from a training image, can then be used to identify the object when attempting to locate the object in a test image containing many other objects. To perform reliable recognition, it is important that the features extracted from the training image be detectable even under changes in image scale, noise and illumination. Such points usually lie in high-contrast regions of the image, such as object edges.

Another important characteristic of these features is that the relative positions between them in the original scene shouldn't change from one image to another. For example, if only the four corners of a door were used as features, they would work regardless of the door's position; but if points in the frame were also used, the recognition would fail if the door is opened or closed. Similarly, features located in articulated or flexible objects would typically not work if any change in their internal geometry happens between two images in the set being processed. However, in practice SIFT detects and uses a much larger number of features from the images, which reduces the contribution of the errors caused by these local variations in the average error of all feature matching errors.

SIFT descriptors robust to local affine distortion are then obtained by considering pixels around a radius of the key location, blurring and resampling of local image orientation planes [10].

Indexing consists of storing SIFT keys and identifying matching keys from the new image. Lowe used a modification of the k-d tree algorithm called the Best-bin-first search method that can identify the nearest neighbors with high probability using only a limited amount of computation. The BBF algorithm uses a modified search ordering for the k-d tree algorithm so that the bins in feature space are searched in the order of their closest distance from the query location. This search order requires the use of a heap-based priority queue for efficient determination of the search order. The best candidate match for each key point is found by identifying its nearest neighbor in the database of the key points from training images. The nearest neighbors are defined as the key points with minimum Euclidean distance from the given descriptor vector. The probability that a match is correct can be determined by taking the ratio of distance from the closest neighbor to the distance of the second closest.

Lowe rejected all matches in which the distance ratio is greater than 0.8, which eliminates 90% of the false matches while discarding less than 5% of the correct matches. To further improve the efficiency of the best-bin-first algorithm search was cut off after checking the first 200 nearest neighbor candidates. For a database of 100,000 key points, this provides a speedup over exact nearest neighbor search by about 2 orders of magnitude, yet results in less than a 5% loss in the number of correct matches.

Outlier can now be removed by checking for agreement between each image feature and the model, given the parameter solution. Given the linear least squares solution, each match is required to agree within half the error range that was used for the parameters in the Hough transform bins. As outliers are discarded, the linear least squares solution is re-solved with the remaining points, and the process iterated. If fewer than 3 points remain after discarding outliers, then the match is rejected. In addition, a top-down matching phase is used to add any

further matches that agree with the projected model position, which may have been missed from the Hough transform bin due to the similarity transform approximation or other errors [11].

The final decision to accept or reject a model hypothesis is based on a detailed probabilistic model. This method first computes the expected number of false matches to the model pose, given the projected size of the model, the number of features within the region, and the accuracy of the fit. A Bayesian probability analysis then gives the probability that the object is present based on the actual number of matching features found. A model is accepted if the final probability for a correct interpretation is greater than 0.98. Lowe's SIFT based object recognition gives excellent results except under wide illumination variations and under non-rigid transformations.

3.1.2 Surf Algorithm

SURF (Speeded Up Robust Features) is a robust local feature detector, first presented by Herbert Bay et al. In 2006, that can be used in computer vision tasks like object recognition or 3D reconstruction. It is partly inspired by the SIFT descriptor. The standard version of SURF is several times faster than SIFT and claimed by its authors to be more robust against different image transformations than SIFT. SURF is based on sums of 2D Haar wavelet responses and makes an efficient use of integral images.

It uses an integer approximation to the determinant of Hessian blob detector, which can be computed extremely quickly with an integral image (3 integer operations). For features, it uses the sum of the Haar wavelet response around the point of interest. Again, these can be computed with the aid of the integral image. When we want to detect SURF features, we can use the syntax

POINTS = detectSURFFeatures(I)

POINTS = detectSURFFeatures (I, Name, value)

POINTS=detectSURFFeatures(I) returns a SURF Points object, POINTS containing information about SURF features detected in the 2-D grayscale input image I. The detectSURFFeatures function implements the Speeded-Up Robust Features (SURF) algorithm to find blob features.

POINTS = detectSURFFeatures (I, Name, Value) Additional control for the algorithm requires specification of parameters and corresponding values. An additional option is specified by one or more Name,Value pair arguments.

The task of finding point correspondences between two images of the same scene or object is an integral part of many machine vision or computer vision systems. The algorithm aims to find salient regions in images which can be found under a variety of image transformations. This allows it to form the basis of many vision based tasks; object recognition, video surveillance, medical imaging, augmented reality and image retrieval..

Feature detection is the process where we automatically examine an image to extract features that are unique to the objects in the image, in such a manner that we are able to detect an object based on its features in different images. This detection should ideally be possible when the image shows the object with different transformations, mainly scale and rotation, or when parts of the object are occluded. The processes can be divided into 3 overall steps.

- **Detection**Automatically identifies interesting features, interest points this must be done robustly. The same feature should always be detected regardless of viewpoint.
- **Description** Each interest point should have a unique description that does not depend on the features scale and rotation.

- **Matching** Given and input image, determine which objects it contains, and possibly a transformation of the object, based on predetermined interest points.

In order to detect feature points in a scale invariant manner SIFT uses a cascading filtering approach, Where the Difference of Gaussians, DoG, is calculated on progressively downscaled images. In general the technique to achieve scale invariance is to examine the image at different scales, scale space, using Gaussian kernels. Both SIFT and SURF divides the scale space into levels and octaves. An octave corresponds to a doubling of, and the octave is divided into uniformly spaced levels to detect the features of the object.

3.1.3 Viola Jones Algorithm

The Viola–Jones object detection framework is the first object detection framework to provide competitive object detection rates in real-time proposed in 2001 by Paul Viola and Michael Jones. Although it can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection.

The basic principle of the Viola-Jones algorithm is to scan a sub-window capable of detecting faces across a given input image. The standard image processing approach would be to rescale the input image to different sizes and then run the fixed size detector through these images. This approach turns out to be rather time consuming due to the calculation of the different size images [12]. Contrary to the standard approach Viola-Jones rescale the detector instead of the input image and run the detector many times through the image – each time with a different size. At first one might suspect both approaches to be equally time consuming, but Viola-Jones has devised a scale invariant detector that requires the same number of calculations whatever the size. This detector is constructed using a so-called integral image and some simple rectangular features reminiscent of Haar wavelets.

The first step of the Viola-Jones face detection algorithm is to turn the input image into an integral image. This is done by making each pixel equal to the entire sum of all pixels above and to the left of the concerned pixel.

This allows for the calculation of the sum of all pixels inside any given rectangle using only four values. These values are the pixels in the integral image that coincide with the corners of the rectangle in the input image.

AdaBoost is a machine learning boosting algorithm capable of constructing a strong classifier through a weighted combination of weak classifiers. (A weak classifier classifies correctly in only a little bit more than half the cases.) To match this terminology to the presented theory each feature is considered to be a potential weak classifier. Since only a small amount of the possible 160.000 feature values is expected to be potential weak classifiers the AdaBoost algorithm is modified to select only the best features.

An important part of the modified AdaBoost algorithm is the determination of the best feature, polarity and threshold. There seems to be no smart solution to this problem and Viola-Jones suggests a simple brute force method. This means that the determination of each new weak classifier involves evaluating each feature on all the training examples in order to find the best performing feature. This is expected to be the most time consuming part of the training procedure. The best performing feature is chosen based on the weighted error it produces. This weighted error is a function of the weights belonging to the training examples.

The basic principle of the Viola-Jones face detection algorithm is to scan the detector many times through the same image – each time with a new size. Even if an image should contain one or more faces it is obvious that an excessive large amount of the evaluated sub-windows would still be negative (non-faces). This realization leads to a different formulation of the problem: Instead of finding faces, the algorithm should discard non-faces. The thought behind this statement is that it is faster to discard a non-face than to find a face. With this in mind a

detector consisting of only one (strong) classifier suddenly seems inefficient since the evaluation time is constant no matter the input. Hence the need for a cascaded classifier arises. The cascaded classifier is composed of stages each containing a strong classifier. The job of each stage is to determine whether a given sub-window is definitely not a face or maybe a face. When a sub-window is classified to be a non-face by a given stage it is immediately discarded. Conversely a sub-window classified as a maybe-face is passed on to the next stage in the cascade. It follows that the more stages a given sub-window passes, the higher the chance the sub-window actually contains a face.

In the first algorithm two detections are merged if they have equal size and they overlap with 25 % or more. In the second algorithm two detections are merged if their centers coincide. As long as the detector is not yet done this merging affects the performance figures in a negative direction since the amount of visible true positives is more heavily reduced than the amount of visible false positives.

3.2 Methodology

The steps in this project are

- User Authentication & Video Storage
- Pre- Processing
- Categorization Based on Transition Clues
- Video Composition based on Reference image

3.2.1 User Authentication & Video Storage

Video Storage helps to secure videos keep on by users. So, proper administration control will be there to maintain a recognized users record and its information to keep is as privacy one.

3.2.2 Pre- Processing

First Our Input short videos are converted into frames. . Then we eliminate some frames like information less frames (Mean of Input frame<15). After we resize the each frame. Then all frames are merged into a single video for video categorization.

3.2.3 Categorization Based on Transition Clues

Videos are categorized by using transition clues like human, object. Then we are taking human clue for first categorization by using Viola-Jones algorithm, if faces are not detected in frames that frames are separated into another process for object matching. Viola- Jones algorithm are specially used for face detection and before using this algorithm some training had to made for easy face detection. So separation of human and non human is comes under the preprocessing technique.

3.2.4 Video Composition Based on Reference Image

Object & sequence matching process are done by using SIFT algorithm (Scale-invariant feature transform). Related Object frames and related sequence frames are categorized into a separate folder respectively. Also surf algorithm is used for speed and good quality. SURF stands for speed up robust features. The standard version of SURF is several times faster than SIFT and claimed by its authors to be more robust against different image transformations than SIFT. SURF is based on sums of 2D Haar wavelet responses and makes an efficient use of integral images. . Finally categorized frames are converted into Separate videos.

IV. CONCLUSION

Automatic content based video composition describes the composition of single shot video.People may want to collect their memorable moments for their happiness and to show their wealth. So they would collect their videos and photos which are taken at different places and in different time. This process requires an efficient algorithm for video collection and composition.

By considering this problem, an innovative solution has been proposed to help people to collect their videos and to produce a single-shot video which contain the requested person videos alone. Our main aim is to automatically retrieve videos from the video pool and pre-processing is done to separate the human and the non-human objects and recognize the face of a person to produce a single shot-video. A pre-processing technique has been used to separate the required portion from video. It comprises three algorithms namely SIFT, SURF and Viola – Jones

Login page was created to provide security for the users. Then the videos would be uploaded for pre-processing. In pre-processing the human and non-human objects would be separated. Thus separation of human video and object video would have been takes place. During this stage the sift algorithm would be used for the identification of objects and viola jones for detection of human faces. Back propagation algorithm is used to learn different features in each face so that identification of the face can be done easily. Then the reference image would have been as an input image. It goes to the trainee dataset to refer whether the images are in the trainee dataset. If it is available their then detection of face will be easy else the reference image is not related to the video. Trainee dataset contain the all the photos which contained in the vide

V. FUTURE ENHANGEMENT

When users want to collect their videos, which are taken in different places at different time, find difficult to edit and organize the videos. In some projects coarse to fine partial matching is used to match the human faces. But sometimes it may produce the wrong output. Also it takes more time to detect the human face and to match it. So to avoid these problems three algorithms are proposed in this project to increase the speed of the process and for perfect matching. The main aim of the project is to collect the short videos, preprocessing it and to produce a long shot video which contains individual person videos alone. So it would be easy for users to collect their videos from many short videos. Also this can be used by any user at a time. i.e many number of users can use it at a time. User login also added to provide security for the users to keep their videos secretly.

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OPTIMAL CONDENSATION APPROACH FOR ATTAINING HIGH DATA UTILITY IN HEALTH DATA PUBLISHING

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ABSTRACT

Data Mining plays a vital role in today's information-oriented world where it has been widely applied in various organizations. The project presents a new approach for privacy preserving data mining using condensation approach. The main challenge of general research is to find a suitable method for preserving the privacy of the sensitive data. There is a need to preserve the privacy of the data and also to preserve the utility of data. We use an efficient approach called, Condensation approach which condenses the dataset into multiple groups, and generates pseudo data.The process of generating pseudo data uses analysis of the statistical behavior of the records within a group. The key difference between condensation and other methods is that the condensation approach works with pseudo-data rather than the modification of the original data, so the privacy of the original data and utility of it is preserved. Because of the use of pseudo-data, the identities of the records are even more secure from inference attacks. We use two methods called class wise condensation method and rule based approach. Class wise condensation methods is used for generating groups with no mixed classes, and also remove the anomalies from the data base for higher accuracy . Rule based uses binary search tree and certain rules to optimize the group size parameter which helps to achieve balance between privacy protection and the utility of data. This approach has the advantage that it allows for direct protection of the sensitive values of individuals.

Keywords: Data mining, Distance Based Mining, Synthetic Data , Privacy Preserving Data Mining , Condensation, Pseudo Data.

I. INTRODUCTION

1.1 Data Mining

Data mining is the process of extracting interesting patterns or knowledge from huge amount of data. Data mining is a technique that deals with the extraction of hidden predictive information from large database. It uses sophisticated algorithms for the process of sorting through large amounts of data sets and picking out relevant information. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge - driven decisions. This evolution began when business data was first stored on computers, continued with improvements in data access and more recently, generated technologies that allow users to navigate through their data in real time. Data mining technology can produce new business opportunities by providing these features in databases of sufficient size and quality, automated prediction of trends and behaviors. Data mining techniques can provide the features so automation on

existing software and hardware platforms, and can be implemented on new systems as existing platforms are upgraded and new products developed.

1.2 Privacy Preserving Data Mining

In recent years, with the explosive development in Internet, data storage and data processing technologies, privacy preservation has been one of the greater concerns in data mining. Privacy has been identified as an important issue in data mining. The challenge is to enable data miners to discover knowledge from data, while protecting data privacy. On one hand, data miners want to find interesting global patterns. On the other hand, data providers do not want to reveal the identity of individual data. This leads to the study of privacy-preserving data mining Privacy preserving in data mining is one of the major and interested area of research to develop data mining methods without increasing the risk of misuse of the data.

Domains such as marketing, weather forecasting, medical diagnosis and national security publish data for research purposes. Privacy preserving data mining has become an important problem because of large amount of personal data which is tracked by many business applications. In many cases, users are unwilling to provide personal information unless the privacy of sensitive information is guaranteed. Therefore, in order to ensure effective data collection, it is important to design methods which can mine the data with a guarantee of privacy. This has resulted in a considerable amount of focus on privacy-preserving data collection and mining methods in recent years.

1.3 Condensation Approach

A condensation based approach has been proposed for privacy-preserving data mining in the presence of variable constraints on the privacy of the data records. This technique constructs groups of non-homogeneous size from the data, such that it is guaranteed that each record lies in a group whose size is at least equal to its anonymity level. Subsequently, pseudo-data is generated from each group so as to create a pseudo data set with the same aggregate distribution as the original data.

A condensation based method for anonymization of string data, creates clusters from the different strings and then generates synthetic data which has the same aggregate properties as the individual clusters. Since each cluster contains at least *k*-records, the anonymized data is guaranteed to at least satisfy the definitions of *k*-anonymity.

II. LITERATURE REVIEW

The condensation approach [1] uses two methods namely, A class-wise condensation Method: Selecting an appropriate group size and avoids generating groups with mixed classes. Rule based approach: It uses binary search and several rules to further optimize the setting for group size parameter.

A new and flexible approach [2] for privacy preserving data mining which does not require new problem-specific algorithms has been proposed , it maps the original data set into a new anonymized data set. This anonymized data closely matches the characteristics of the original data including the correlations among the different dimensions.

The privacy of all records was treated homogeneously [3]. It was therefore inefficient to design a system with a uniform privacy requirement over all records. This paper discusses a new framework for privacy preserving data mining, in which the privacy of all records is not the same, but can vary considerably thus performing heterogeneous condensation. The heterogeneous condensation is capable of handling both static and dynamic data sets.

A new method [4] for privacy preserving mining of string data with the use of simple Template-based models. The template-based model turns out to be effective in practice, and preserves important statistical characteristics of the

strings. This work has greater application to health domains, since most DNA and biological data are coded as strings.

A new framework [5] for privacy preserving data mining of multidimensional data based on condensation technique. This approach uses a methodology which condenses the data into multiple groups. It maps the original data set into a new anonymized data set. These anonymized data closely match the characteristics of the original data including the correlations among the different dimensions. The condensation technique regenerates multidimensional data records

III. PROBLEM DEFINITION

Computing the utility and degree of privacy protection often requires two steps in condensation approach:

i) The privacy preserving technique being considered needs to be applied to the original data set to generate a pseudo data set.

ii) The data mining algorithm need to be executed on the pseudo data set to generate mining results.

These two steps are time consuming and need to repeat these steps for every parameter setting. This is clearly inefficient in practice.

Condensation approach uses a methodology which condenses the data into multiple groups. This technique generates pseudo-data by analyzing the behavior of the records within a group.

Definition: A pseudo-data set D′ generated from the original data set D is said to be k-indistinguishable, if every record X in D′ can be mapped to at least k records M(X) in D. The record X is generated from M(X) using a randomized algorithm which treats all records in M(X) symmetrically. Therefore, X is equally related to all records in M(X).

The approach can be applied to either static data sets, or more dynamic data sets in which data points are added incrementally. Our method shares a number of similarities to the k-anonymity model, but with a number of functional differences which work to the advantage of the method:

i) It works with pseudo-data rather than with modifications of the original data, this helps in better preservation of privacy.

ii) It can be effectively used in situations with dynamic data updates such as the data stream problem. Since the data stream problem has achieved greater prominence in recent years, the extensions of our work to the data stream case is very helpful in a variety of real applications.

IV. DESIGN PROCESS

4.1 System Architecture

The figure 1 clearly outlines every module in the project. The module broadly classifies various sub topics within each of the modules. The input and output of the software form the boundaries in the given figure.

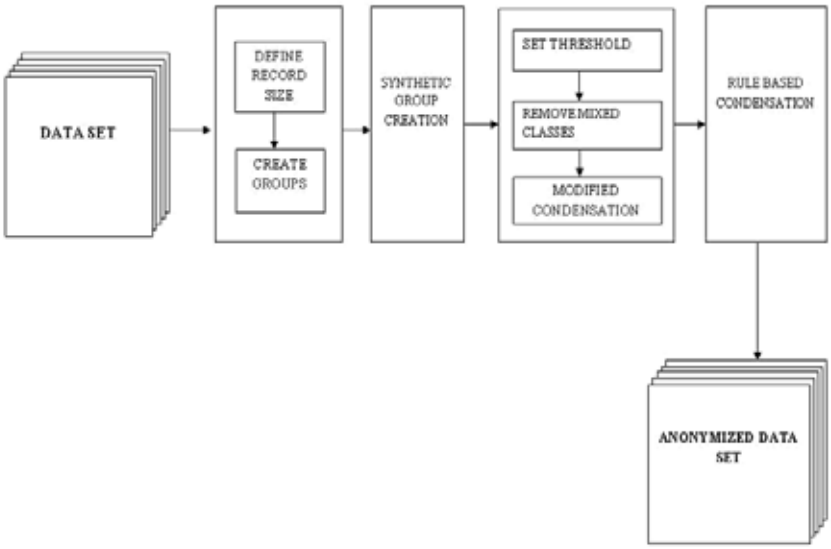


Fig 1 System Architecture

4.2 Module Description

The modules in my proposed work are,

1. Group Creation
2. Generating Synthetic Data
3. Class-wise Condensation
4. Rule-based condensation.

4.2.1 Creating Groups

Group generation requires defining a record size, which means how much records each group must contain. Once the group size is given, k means clustering algorithm should be done. Initial seeds are selected as random as centroid (n/k) .the distance of each records to the centroids are grouped together as one group , so on the groups are created. We have n records $\mathbf{x}_1$, $\mathbf{x}_2$, $\mathbf{x}_n$ all from the same class, and we know that they fall into k compact clusters, k < n.

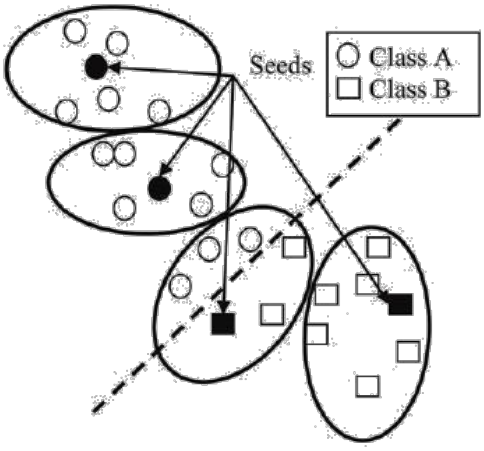


Fig 2: Creating Groups

4.2.2 Generating Synthetic Data

Once the groups are generated, the mean and co variance for all records in each group must be computed. The Principle Component Analysis (PCA) transform is applied to all the records in the group to generate synthetic data.

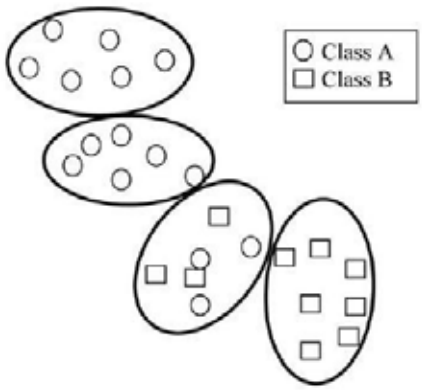


Fig 3: Creating Synthetic Groups

4.2.3 Class Wise Condensation

Certain threshold values are set depending upon th size of the data. Class wise condensation mainly deals with the process of separating the mixed classes in each group. Group size is calculated be GCD (s/t).Compute mean and co variance matrix for all records in each group once the classes are separated. Principal Component Analysis (PCA) is applied for all records in each group. Synthetic data points with the same mean and co variance, apply reverse PCA Transform to get synthetic groups are also generated for the class wise condensation.

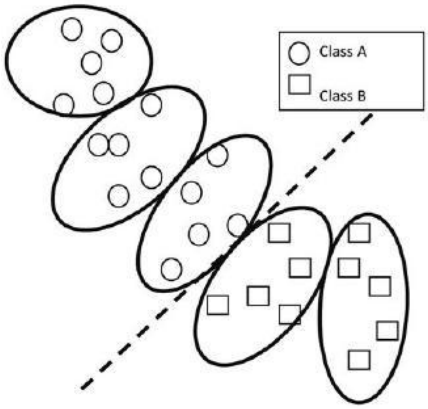
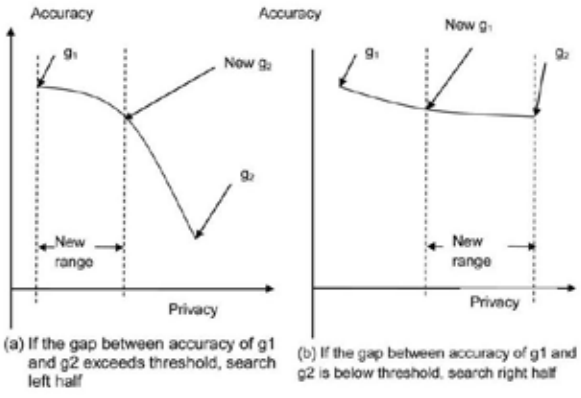


Fig 4: Class Wise Condensation

4.2.4 Rule Based Condensation

Rule based condensation approach is based on binary search to quickly narrow down the range of optimal group size. In this approach we can reduce the group size and increase the utility, so that less distortion takes place and the same way privacy will get reduced. The group size can be increased to increase the privacy but the utility will be less. This approach is for optimizing the group size parameter.



V. MODEL AND ALGORITHM

5.1 Algorithm : Modified Condensation Method

Input

Original data , group size *k*

Output

Perturbed data

Step 1: Divide original data to groups

1-1 Run k-means clustering.

1-2 Select initial seeds as centroid (n/k).

1-3 Determine the distance of each records to the centroid (n/k). 1-4 Group the objects based on minimum distance to the centroid.

Step 2: Generate synthetic data

2-1 for each group(C_i).

2-2 Compute mean and co variance matrix for all records in (C_i). 2-3 Apply PCA transform to get synthetic groups.

2-4 Generate synthetic data| C_i | points with mean= 0 after PCA transform. 2-5 Apply reverse PCA and add mean of each dimension to synthetic data 2-6 End for

5.2 Algorithm: Class Wise Condensation

Input

Original data, threshold *t*, an optional group size

Output

Perturbed data

Step1

If the group size is not provided, calculate an appropriate group size. 1-1 Find the number of classes and size of each class.

1-2 Divide the size of each class by *t*, and round it to the largest previous integer.

Step 2 Run modified condensation method on records on each class, with group size g*t.

5.3 Algorithm: Rule Based Approach Input

Minimal group size threshold *t*, Perturbed data

Output

Optimal group size g* and sanitized data set

Step1

1-1 Compute accuracy and privacy for g_1=t and g_2 = min(| C_i |,...,| C_m |) 1-2 while g_1<g_2 do

1-3 compute g_3 = round(geometric mean of g_1 and g_2) 1-4 compute accuracy and privacy for g_3

1-5 if |accuracy at g_1 – accuracy at g_2| > accuracy at g_1 * minimum threshold ta then 1-6 g_2= g_3

1-7 else

1-8 g_1=g_3

1-9 end if

1-10 end while Return g* = g_3

VI. CONCLUSION

In condensation approach synthetic data is to be generated which retains the overall characteristics of data, but does not maintain one-to-one mapping it retains the privacy of the underlying records. The use of this pseudo-data no longer necessitates the redesign of data mining algorithms, since they have the same format as the original data. Then we optimize the group size using the class wise condensation method and rule base condensation method. This approach has the capability of preserving the statistical behavior of the original strings while retaining a high level of privacy. The proposed method provides better tradeoff between accuracy and data utility.

Since our method re-generates multi-dimensional data records, existing data mining algorithms do not need to be modified to be used with the condensation technique .This is a clear advantage over techniques such as the perturbation method discussed in which a new data mining algorithm needs to be developed for each problem. Unlike other methods which perturb each dimension separately, this technique is designed to preserve the inter-attribute correlations of the data. As substantiated by the empirical tests, the condensation technique is able to preserve the inter-attribute correlations of the data quite effectively. At the same time, we illustrated the effectiveness of the system on the classification problem. In many cases, the condensed data provided higher classification accuracy than the original data because of the removal of anomalies from the database.

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EEG RECORDING HELP IN DIAGNOSIS OF NOCTURNAL FRONTAL LOBE EPILEPSY (NFLE)

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ABSTRACT

Nocturnal Frontal Lobe Epilepsy is the most distinct syndrome in the sleep related disturbances. NFLE seizures are more dominant in males rather than females (7:3).This paper contains an overview of NFLE, which is a sleeping disorder and the diagnosis of NFLE through Electroencephalography (EEG) in which electrical activity of the brain is recorded.. These recording are done using EEG machine. In this we have discussed about sleep and its types e.g.-bruxism, insomnia, NFLE, narcolepsy. This can be caused by abnormalities such as tumours, stroke, infection etc.

Key words: EEG Signals, Stages of Sleep, Sleep Disorders, Causes of Nocturnal Seizures, Diagnosis of NFLE.

I. INTRODUCTION

Sleep is a naturally recurring state characterized by altered consciousness, relatively restrictive to action and prohibiting of nearly all voluntary muscles. It is distinguished from wakefulness by a decreased ability to react to stimuli. Sleeping is associated with a state of muscle relaxation and limited perception of environmental stimuli.

During sleep, most systems are in a heightened anabolic state, giving special significance to the growth and rejuvenation of the immune, nervous, skeletal and muscular systems. Sleep in non-human animals is observed in mammals, birds, reptiles, amphibians, and fish, and in some form in insects.

Sleep is sometimes thought to help conserve energy, though this theory is not fully adequate as it only decreases metabolism by about 5–10%.

II. EEG SIGNALS

Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain. In clinical contexts, EEG refers to the recording of the brain's spontaneous electrical activity over a short period of time, usually 20–40 minutes, as recorded from multiple electrodes placed on the scalp.

EEG is most often used to diagnose epilepsy, which causes abnormalities in EEG readings. It is also used to diagnose sleep disorders, coma and brain death etc. It may be noted that awake and alert signal frequency is very high as compared to deep sleep EEG frequency. Rhythmical potentials are generated by brain. These potentials originate from individual neurons of the brain. The neuron has potential of -70mV with respect to the exterior. The waveforms pattern is complex and is termed as electro-encephalogram (EEG).

An electroencephalogram (EEG) is a test that records electrical activity in the brain. Brain cells create tiny electrical impulses for communicating with each other. The EEG picks up these impulses through tiny wires (electrodes) placed on your scalp. The impulses are amplified and digitally recorded by a computer. The recordings look like wavy lines (sometimes called brain waves). An EEG may be done when you are awake, asleep, or both.

The signal of EEG are taken from electrodes either from scalp or directly from cerebral cortex. The frequency varies from 0.5Hz-50Hz.

The basic frequency of EEG is classified into 5 bands for analysis purpose:

1) Delta- 0.1Hz-4Hz

2) Theta- 4Hz-8Hz

3) Alpha- 8Hz-13Hz

4) Beta- 13Hz-22Hz

5) Gamma- 25Hz-100Hz

Table-1 Classification of EEG waves and their Frequencies

Waveform	Frequency	Occurrence
Delta	0.1Hz-4Hz	Premature babies, sleeping adults
Theta	4Hz-8Hz	Children and sleeping adults
Alpha	8Hz-13Hz	Normal
Beta	13Hz-22Hz	Normal
Gamma	25Hz-100Hz	Abnormal

EEG is used for examination of epilepsy, brain damage, brain tumors and other organic brain injuries. There is occasional use of EEG for determination of level of consciousness i.e. depth of anaesthesia.

III. STAGES OF SLEEP

NREM Stage 1

This is a stage of sleep that usually occurs between sleep and wakefulness, and sometimes occurs between periods of deeper sleep and periods of REM. The muscles are active, and the eyes roll slowly, opening and closing moderately.

NREM Stage 2

In this stage, theta activity is observed and sleepers become gradually harder to awaken; the alpha waves of the previous stage are interrupted by abrupt activity called sleep spindles.

NREM Stage 3

Formerly divided into stages 3 and 4, this stage is called slow-wave sleep (SWS). SWS consists of delta activity, high amplitude waves at less than 3.5 Hz. The sleeper is less responsive to the environment.

3.1 Rem

The sleeper now enters Rapid Eye Movement (REM) where most muscles are paralyzed. REM sleep is turned on by acetylcholine secretion and is inhibited by neurons .This level is also referred to as paradoxical sleep

because the sleeper, although exhibiting EEG waves similar to a waking state, is harder to arouse than at any other sleep stage.

An adult reaches REM approximately every 90 minutes, with the latter half of sleep being more dominated by this stage. REM sleep occurs as a person returns to stage 1 from a deep sleep.

During periods of REM the EEG pattern returns to high-frequency waves that look similar to the waves produced while the person is awake.

IV. SLEEP DISORDERS

A sleep disorder is a medical disorder of the sleep patterns of a person or animal. Some sleep disorders are serious enough to interfere with normal physical, mental, social and emotional functioning.

Table 2- Normal Sleeping Hours Required by Age

Age and condition	Sleep Needs
Newborns (0–3 months)	14 to 17 hours
Infants (4–11 months)	12 to 15 hours
Toddlers (1–2 years)	11 to 14 hours
Preschoolers (3–5 years)	10 to 13 hours
School-age children (6–13 years)	9 to 11 hours
Teenagers (14–17 years)	8 to 10 hours
Adults	7 to 9 hours

Disruptions in sleep can be caused by a variety of issues, from teeth grinding (bruxism) to night terrors. When a person suffers from difficulty falling asleep and/or staying asleep with no obvious cause, it is referred to as insomnia.

Sleep disorders are broadly classified into dyssomnias, parasomnias, circadian rhythm sleep disorders involving the timing of sleep, and other disorders including ones caused by medical or psychological conditions and sleeping sickness. Epilepsy is a disorder that is characterized by uncontrolled and disorganized communication between nerve cells in the brain. When this occurs, seizures can occur. Seizures can come on at any age, in any ethnic group.

Some common sleep disorders include:

1. Sleep apnea (stops in breathing during sleep)
2. Narcolepsy and hypersomnia (excessive sleepiness at inappropriate times)
3. Ctaplexy (sudden and transient loss of muscle tone while awake)
4. Sleeping sickness (disruption of sleep cycle due to infection)
5. Other disorders include sleepwalking, night terrors and bed wetting.
6. Bruxism (Involuntarily grinding or clenching of the teeth while sleeping).
7. Delayed sleep phase disorder (DSPD): (inability to awaken and fall asleep at socially acceptable times but no problem with sleep maintenance, a disorder of circadian rhythms)
8. Hypopnea syndrome (Abnormally shallow breathing or slow respiratory rate while sleeping).
9. Insomnia disorder(Chronic difficulty in falling asleep)
10. Narcolepsy (Excessive daytime sleepiness).

11. Night terror (sleep terror disorder, an abrupt awakening from sleep)
12. Parasomnias (Disruptive sleep-related events involving inappropriate actions during sleep; sleep walking and night-terrors).
13. Periodic limb movement disorder (PLMD) (Sudden involuntary movement of arms and/or legs during sleep)
14. Rapid eye movement sleep behavior disorder (RBD) (Acting out violent or dramatic dreams while in REM sleep, sometimes injuring bed partner or self).
15. Restless legs syndrome (RLS):(An irresistible urge to move legs)
16. Sleep paralysis (temporary paralysis of the body shortly before or after sleep).
17. Sleep talking.
18. Exploding head syndrome (Waking up in the night hearing loud noises).
19. Nocturnal frontal lobe epilepsy.

V. NOCTURNAL FRONTAL LOBE EPILEPSY

Nocturnal frontal lobe epilepsy (NFLE) is syndrome in the heterogeneous group of sleep disorders. The variable duration and intensity of the seizures distinguish three non-rapid eye movement-related subtypes:

1. Paroxysmal arousals: characterized by brief and sudden recurrent motor paroxysmal behaviour (sudden uncontrollable attack).
2. Nocturnal paroxysmal dystonia: motor attacks with complex dystonic–dyskinetic features (abnormality in performing voluntary muscle movement).
3. Episodic nocturnal wanderings.

NFLE seizures predominate in males (7**:**3). Age at onset of the nocturnal seizures varies, but centers during infancy and adolescence.

1. (13%) have personal antecedents (such as birth anoxia, febrile convulsions).
2. (14%). brain CT or MRI abnormalities.
3. (44%) ictal.
4. (51%) interictal (51%) EEGs are uninformative.
5. (25%) of the cases recurrence of the epileptic attacks.
6. (39%) of the patients present a family history.

NFLE does not show a tendency to spontaneous remission. Carbamazepine completely abolishes the seizures in ~20% of the cases and gives remarkable relief (reduction of the seizures by at least 50%) in another 48%.

5.1 Causes of Nocturnal Seizures

Nocturnal seizures are sleep-related seizures that occur at night. A person with this condition has a burst of movement that jerks the body awake. These types of seizures can happen several times a night, or they may be limited to rare occurrences.

Some other causes of these kind of seizures are:

1) **Injuries**: The damage to the skull or the brain can lead to swelling and ultimately seizures. Nocturnal seizures may happen several years after the trauma incident.
2) **Alcohol and drugs**: Alcohol and drugs can also lead to seizures. The first nocturnal seizure can occur from several hours to two days after cessation from alcohol and some drugs.

VI. DIAGNOSIS OF NFLE

People who have nocturnal seizures may notice unusual conditions upon awakening in the morning, such as a headache, having wet the bed, having bitten the tongue, a bone or joint injury, or light-headedness.

It is often also very difficult to know how long the seizure has been going. Diagnosis of NFLE was straightforward when patients displayed one or more episodes associated with clear-cut ictal epileptic frontal activity.

Patients often complained of nocturnal sleep discontinuity, with sleep disrupted by repeated arousals. A remarkable number (72%). Those attacks occurring during sleep triggered by arousals and also during wakefulness after protracted exercise. These attacks were observed in two children and lasted 3–5 min.

It can be diagnosed by three methods-

1.Brain Scan-Frontal lobe seizures can be caused by tumors, abnormal blood vessels or injuries.

2.Electroencephalogram(EEG)-An EEG shows the electrical activity in our brain by putting a series of electrodes attached to our scalp.

3.Video EEG-Video EEG is usually performed during an overnight stay. Both a video camera and an EEG monitor works together all night.

VII. CONCLUSION

EEG helps determine seizure type and epilepsy syndrome in patients with epilepsy, and thereby choice of antiepileptic medication and prediction of the course of a disease. In practice, the clinician will be reasonably certain about seizure type based on the account provided by the patient and witness. Carbamazepine completely abolishes the seizures in ~20% of the cases and gives remarkable relief in another 48%.

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EEG SIGNALS HELP IN DIAGNOSIS OF INSOMNIA

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ABSTRACT

The human brain is one of the most complex systems in the universe. Nowadays various technologies exist to record brain waves and electroencephalography (EEG) is one of them. This is one of the brain signal processing technique that allows gaining the understanding of the complex inner mechanisms of the brain and abnormal brain waves have shown to be associated with particular brain disorders.

Keywords: Electroencephalogram, Sleep Disorder, Rapid Eye Movement sleep, CAP

I. INTRODUCTION

An electroencephalogram is used to measure and record the electrical activity of human brain. Brain cells continually send messages to each other that can be picked up as small electrical impulses on scalp. The process of picking up and recording the impulses is known as an EEG.

EEG can be used to help diagnose and manage a number of different medical conditions including:

- Ø In diagnosis of Epilepsy
- Ø Dementia- symptoms that are responsible for the decline of brain function.
- Ø Coma
- Ø Brain tumour- an abnormal and uncontrollable growth of cells in the brain.
- Ø Brain abscess- a pus filled swelling in the brain that is caused by infection
- Ø In sleep disorder like insomnia and narcolepsy.

II. TYPES OF EEG

- Routine EEG: Routine EEG is used to record the brain wave for about 20-40 minutes routinely. During the diagnosis from time to time eyes are closed or open.
- Sleep EEG: Sleep EEG is carried out during asleep for testing sleep disorder.
- Ambulatory EEG: Ambulatory EEG is used for recording brain activity throughout the day and night, over a period of one or more days.
- Video telemetry: Video telemetry is also known as Video EEG that records the video of brain wave activity.

III. EEG RHYTHMS

Specific harmonic oscillations commonly called rhythms may be observed in human EEG. Rhythms are classified into five major categories depending on their frequency ranges. These are alpha (α), beta (β), gamma (γ), theta (θ), and delta (δ).

EEG signals are divided into the following frequency bands-

- Delta (δ) Frequency: 0.5 to 4 Hz ,this occur only once in every 2 or 3 seconds. These occur in deep sleep, in premature babies and in very serious organic brain diseases. These can occur strictly in the cortex independently by the activities in the lower regions of brain.
- Theta (θ) Frequency: 4 to 8 Hz , these are recorded from the parietal and temporal regions of the scalp of children. These also occur during emotional stress in some adults particularly during disappointment and frustration.
- Alpha (α) Frequency: 8 to 13 Hz ,they found in normal persons when they are awake in quite, resting state.
- Beta (β) Frequency: 13 to 30 Hz, these are recorded from the parietal and frontal regions of the scalp. These are divided into two types as: beta I which is inhibited by the cerebral activity and beta II which is excited by the mental activity, like tension.
- Gamma(γ) Frequency: The waves with frequency above 30 Hz are known as gamma waves. Amplitudes of gamma waves are low.

III. DIAGNOSIS OF INSOMNIA USING EEG

Insomnia ia a sleep disorder that millions of people worldwide have to live with. The person who is suffering from insomnia find difficulties to either fall asleep or stay asleep. The Electroencephalogram is one of the useful biosignals to detect the sleep disorders.

Normal sleep progresses through a series of stages. Each stage has a typical EEG profile, easy recognizable to neurologists and sleep specialists. In patients with sleep apnea, insomnia , REM behavior disorder or other sleep disorder abnormalities in the EEG can help physicians for appropriate therapies to help correct EEG abnormalities and that can help improve insomnia symptoms.

In humans, normal sleep progresses through four stages: one of them is REM (rapid eye movement) sleep, which is associated with dream experiences. The portion of REM sleep during night alters with age- in new born babies REM sleep lashs for 50% and in adults for 20%. The other three stages are called NREM sleep, since they lack the eye movement. NREM sleep is also known as “Slow Wave Sleep” because of EEG patterns associated with these stages, which are dominated by delta waves.

Electroencephalogram (EEG) reflects the electrical activity occurring at the surface of a functioning brain. Special electrodes are attached to head and hooked by wires to a computer. The computer records the brain’s electrical activity on the screen. The skin on the scalp is cleansed and about 20 electrodes are attached to specific area measured out in the correct locations. Electrodes will be connected to an EEG machine by thin leads. The machine records the brain wave activity for analysis. Then, the electrodes will be removed and scalp will be cleaned. Then, the recording will be analysed and used for the purpose of diagnosis and treatment.

IV. CYCLIC ALTERNATING PATTERN

Cyclic alternating pattern (CAP) is a periodic EEG activity of NREM sleep for recording the data up to 1 min interval. In normal REM sleep CAP does not occur. The rate time (CAP)/time (NREM) in young adults is about 23% and increase with age. CAP is composed of two phases- Phase A and Phase B where Phase A represents apparent changes in frequency or amplitude compared with the rhythm. The interval between two Phases A is the phase B.

V. CONCLUSION

The purpose of the research is to detect the different human sleep disorders through EEG signal with time frequency analysis by receiving information from the internal changes of brain state. Researchers used EEGs first to distinguish the four separate stages of NREM sleep. A modern EEG signal is the digitized version of these potentials for computer storage and analysis. EEG was primarily used by the clinicians in understanding and treatment of neuro-physiological disorders. Presently, beside clinical purposes, EEG application has extended to neuroscience, cognition, and in other research fields. EEG is a blurred and highly attenuated electric potential that results from the activities of multiple groups of neurons from multiple cerebral regions.

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DIOGNOSIS OF PERIODIC LEG MOVEMENT USING EEG SIGNALS

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ABSTRACT

Periodic limb movements of sleep (PLMS) are common neurological disorders which are usually under diagnosed. As many pediatricians and pediatric pulmonologists with interest in sleep medicine will be encountering children with Restless leg syndrome (RLS) and PLMS.

Sleep Disruption Can Lead To Symptoms of Attention – Deficit Hyperactivity Disorder (Adhd) In Children. Since Periodic Limb Movement Disorder And Restless Legs Disease Can Cause Sleep Disruption.

Keywords: EEG Signals, Recording of EEG Signals, Diagnosis of Periodic Limb Movement

I. INTRODUCTION

Now a days there are many different sleep disorders which includes:Sleep apnea , Parasomnia , Insomnia, Narcolepsy, Bruxism and many others in the background Periodic limb movement disorder (PLMD) is cyclic cramping or jerking of the legs during sleep. "Periodic" refers to the fact that the movements are repetitive and rhythmic, happening about every 20-40 seconds.

Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage variations resulting from ionic current flows within the neurons of the brain.

Magneto encephalography (MEG) is a functional neural imaging technique for mapping brain activity by recording magnetic fields produced by electrical currents happening naturally in the brain, using very sensitive magnetometers.

Sleep problems including snoring, sleep apnea, insomnia, sleep scarcity, and restless legs syndrome, are common. Good sleep is necessary for best possible health and can affect hormone levels, mood and weight.

In sleep apnea, breathing is disrupted commonly during sleep because of the way the brain functions.Narcolepsy is a neurological disorder that affects the control of sleep and wakefulness.

Periodic limb movement disorder (PLMD) is a sleep disorder categorized by rhythmic movements of the limbs during sleep.

Periodic limb movement disorder (PLMD) is repetitive cramping or jerking of the legs during sleep. It is the only movement disorder that occurs only during sleep, and it is sometimes called periodic leg (or limb) movements during sleep. "Periodic" refers to the fact that the actions are repetitive and rhythmic, happening about every 20-40 seconds.

PLMD may occur with other sleep disorders. It is often linked with restless legs syndrome, but they are not the same thing. Restless legs syndrome is a condition linking strange feelings in the legs (and sometimes arms) while awake and an irresistible urge to move the limbs to ease the sensations.

Polysomnography (sleep lab testing) is the only way to prove that you have PLMD. As you sleep in the lab, your leg movements can be recognized.

Benzodiazepines: These drugs suppress muscle contractions. They are also sedatives and help you sleep through the movements. Clonazepam (Klonopin), in particular, has been shown to reduce the total number of periodic limb movements per hour. It is probably the most widely used drug to treat PLMD.

III. EEG SIGNALS

The electroencephalogram (EEG) is a proof of the oscillations of brain electric potentials recorded from possibly 20 to 256 electrodes attached to the human scalp.

The recorded signals are transmitted to an EEG system composed of amplifiers, filters, and paper chart or computer monitor.

EEG provides a suitable window on the mind, edifying synaptic action that is moderately to strongly related with brain state. A few EEG channels and corresponding amplitude spectrum in a subject awake and calm with eyes closed. Most EEG signals originate in the brain's outer layer (the cerebral contex), believed largely responsible for our individual thoughts, emotions and behavior.

MEG (magneto encephalography) are the only widely available technologies with sufficient chronological resolution to follow these fast dynamic changes. EEG and MEG spatial resolutions are poor relative to modern brain structural imaging methods like Computer tomography (CT), positron emitted tomography (PET).

III. RECORDING OF EEG SIGNALS

Voltage traces of EEG signals recorded from each electrode pair oscillate with mixtures of component waveforms.

EEG frequency ranges are categorized as delta (1 to 4 Hz), theta (4 to 8 Hz), alpha (8 to 13 Hz) and beta (greater than 13 Hz). Very high frequencies (typically 30 to 40 Hz) are referred to as gamma activity. These distinctive labels correspond roughly to frequency bands that often dominate particular human brain states. For example, delta activity with frequencies lower than about 1 or 2 Hz is dominant during deep sleep and in many coma and anesthesia states. Alpha, often mixed with low amplitude delta, theta and beta is typically predominant in awake-resting states and in alpha coma. Different combinations of these rhythms may be associated with behavioral or cognitive state, brain location.

IV. DIAGNOSIS OF PERIODIC LEG MOVEMENT

Patient undergo a full-night video-polysomnographic study, which was carried out after a night of adaptation in a standard sound-attenuated (noise level to a maximum of 30 dB nHL) sleep laboratory room.Patient were not allowed caffeinated beverages the afternoon preceding the recording and were allowed to sleep in until their spontaneous awakening in the morning. Lights-out time was based on individual habitual bed time and ranged between 2130 and 2330. The following signals were recorded: EEG (at least 3 channels, 1 frontal, 1 central and 1 occipital, referred to the contralateral earlobe); electrooculogram (electrodes placed 1 cm above the right outer cantus and 1 cm below the left outer cantus and referred electrocardiogram (1 derivation). Electromyogram signals, in particular, were digitally band-pass filtered at 10 to 100 Hz, with a to A1); electromyogram (EMG) of the submentalis muscle, EMG of the right and left tibialis anterior muscles (bipolar derivations with 2 electrodes

placed 3 cm apart on the belly of the anterior tibialis muscle of each leg, impedance was kept less than 10 KΩ; and notch filter at 50 Hz.

V. CONCLUSION

RLS and PLMS are common neurologic disorders and increase in occurrence with age. These disruptions can be disabling conditions, causing sleep disturbance at night and too much sleepiness during the day time. Polysomnography and the suggested immobilization test are used to support the clinical diagnosis of RLS and PLMS. Although levodopa alleviates symptoms, rebound and growth occur frequently, limiting the long-term usefulness of this agent. The direct dopamine receptor agonists such as pergolide, pramipexole, ropinirole, and cabergoline have largely replaced levodopa as the most effective treatment for RLS and PLMS.RLS is a clinical diagnosis. Consider a sleep study for evaluation of associated PLMS due to the strong association of RLS with PLMS. PLMW may be an indicator of RLS and should be scored during PSG if diagnosis of RLS is suspected. However, PLMD requires PSG for a diagnosis.

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HOMOTOPY ANALYSIS TO HEAT TRANFER OF MHD FLOW OVER A MOVING VERTICAL POROUS PLATE WITH SUCTION

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ABSTRACT

The objective of this paper is to find the analytical solutions of heat transfer of MHD boundary layer flow over a moving vertical plate in the presence of suction, Soret and Dufour effects. The governing partial differential equations are converted to a set of ordinary differential equations using suitable similarity transformations. The resulting equations are solved analytically using homotopy analysis method (HAM). The velocity and temperature profiles are plotted for various parameters. The accuracy of our results is shown by giving a comparison between our results and the results already existing in the literature.

Keywords: Suction, Boundary Layer Flow, Soret and Dufour Effects, Homotopy Analysis Method (HAM).

I. INTRODUCTION

Boundary layer flow over a vertical surface is an important type of flow occurring in a number of engineering processes. Some of the typical applications of such flows include chemical coating of plates, hot rolling, wire drawing, polymer extrusion process and many others. Das et al. [1] have studied mass transfer effects on moving isothermal vertical plate in the presence of heat flux and chemical reaction. Later, many researchers extended this work under various physical conditions. Hymavathi and Shankar [2] have discussed the flow and heat transfer characteristics of an incompressible, electrically conducting visco-elastic fluid over a stretching sheet using quasilinearization method.

Fundamental investigation on flow through porous media has been made by many researchers some of them are Ingham and Pop [3], Nield and Bejan [4] and Vafai [5]. Mondal and Chaudhury [6] have analyzed the steady two-dimensional free convection flow of a thermally stratified viscous fluid through a highly porous medium bounded by a vertical plane surface of varying temperature subject to the both viscous and Darcy dissipations. Ishak et al. [7] have analyzed the mixed convection boundary layer flow through a stable stratified porous

medium bounded by a vertical surface.

Alam and Rahman [8] have examined the mixed convection flow of a viscous incompressible fluid over an isothermal semi-infinite vertical porous flat plate embedded in a porous medium with variable suction, Soret and Dufour effects.

The aim of this paper is to study the Soret and Dufour effects on boundary layer flow over a moving vertical plate in the presence of suction. HAM [9, 10] is employed to derive the analytical solutions of dimensionless equations. The velocity and temperature profiles are plotted for various parameters such as suction parameter F_w, buoyancy parameters *Gr* and *Gc*, permeability parameter *k*, Prandtl number *Pr*, Soret number *Sr*, Dufour number *Du* and Schmidt number *Sc*. Also, the numerical values of skin friction coefficient, Nusselt number and Sherwood number are obtained for various values of these parameters and are presented through tables. The results are compared with the results available in literature and are seen in good agreement.

II. MATHEMATICAL FORMULATION

Consider heat and mass transfer in steady two dimensional boundary layer flow of an incompressible, viscous fluid over a linearly started porous vertical semi infinite plate under the influence of suction, Soret and Dufour effects. The positive x -axis is assumed along the direction of the flow. The y -axis is taken perpendicular to it. In the Boussineq's approximation, variations of all fluid properties other than the density variation with temperature are assumed to be constant. Under the above assumptions the governing equations describing the flow are

$$\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0, \tag{1}$$

$$u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=\nu\frac{\partial^2 u}{\partial y^2}-\frac{\sigma B_0^2}{\rho}u+g\,\beta_T(T-T_\infty)-\frac{\nu}{K'}u \tag{2}$$

$$u\frac{\partial T}{\partial x}+v\frac{\partial T}{\partial y}=\alpha\frac{\partial^2 T}{\partial y^2}, \tag{3}$$

The corresponding boundary conditions are

$$u=Bx,\ v=V,\ T=T_w=T_\infty+ax,\quad at\ y=0,$$
$$u\to 0,\quad T\to T_\infty,\qquad as\ y\to\infty \tag{4}$$

In the above equations, B_0 is the magnetic induction, B is a constant, u and v are the velocity components in x and y directions, T is the temperature in the boundary layer, T_w is the temperature at the wall, $T¥$ is the free stream temperature, a and b denote the stratification rate of the gradient of ambient temperature and concentration, b_T is the thermal expansion coefficients, n is the kinematics viscosity, g is the acceleration due to gravity, K' is the permeability of the porous medium, a is the thermal diffusivity, c_p is the specific heat at constant pressure, T_m is the mean fluid temperature, V is the suction velocity at the plate surface, a and b are constants. The continuity equation (1) is satisfied by the stream function $y(x, y)$ defined by

$$u=\frac{\partial \psi}{\partial y},\qquad v=-\frac{\partial \psi}{\partial x}, \tag{5}$$

Now, introducing the similarity transformation

$$\eta = y\sqrt{\frac{B}{\nu}}, \quad \psi(x,y) = x\sqrt{\nu B}\, f(\eta), \quad \theta(\eta) = \frac{T - T_\infty}{T_w - T_\infty}, \tag{6}$$

where $f(h)$ is a dimensionless stream function, $q(h)$ is a dimensionless temperature of the fluid in the boundary layer region, $f(h)$ is a dimensionless species concentration of the fluid in the boundary layer region and h is the similarity variable.

Substituting equation (7) in equations (2) to (5), we obtain

$$f''' + f f'' - f'^2 + Gr\,\theta - (M + K) f' = 0, \tag{7}$$

$$\theta'' + \Pr f \theta' - \Pr f' \theta = 0, \tag{8}$$

where $Gr = \frac{g \beta_T (T_w - T_\infty)}{x B^2}$ is the local temperature Grash of number, $K = \frac{\nu}{K' x B}$ is the permeability parameter, $\Pr = \frac{\nu}{\alpha}$ is the Prandtl number

Transformed boundary conditions in non-dimensional form are as follows

$$\begin{aligned} &f = -F_w, \quad f' = 1, \quad \theta = 1, \quad at \quad \eta = 0, \\ &f' = 0, \quad \theta = 0, \quad as \quad \eta \to \infty, \end{aligned} \tag{9}$$

Where $F_w = \frac{V}{\sqrt{B\nu}}$ is the suction parameter.

III. HOMOTOPY ANALYSIS SOLUTIONS

In this section, we employ HAM to solve the equations (8) to (10) subject to the boundary conditions (11). We choose the initial guesses f_0, q_0 and f_0 of f, q and f in the following form

$$f_0(h) = 1 - e^{-h},$$

$$q_0(h) = e^{-h},$$

The linear operators are selected as

$$L_1(f) = f''' - f',$$

$$L_2(q) = q'' - q,$$

which has the following properties

$$L_1(C_1 + C_2 e^{h} + C_3 e^{-h}) = 0,$$

$$L_2(C_4 e^{h} + C_5 e^{-h}) = 0,$$

where C_i $(i = 1 \text{ to } 5)$ are the arbitrary constants.

If $p \in [0,1]$ is the embedding parameter, h_1 and h_2 are the non-zero auxiliary parameters, respectively, then we construct the following zeroth-order deformation equations as

$$(1 - p) L_1(f(h; p) - f_0(h)) = p\, h_1 N_1[f(h; p), q(h; p)], \tag{10}$$

$$(1 - p) L_2(q(h; p) - q_0(h)) = p\, h_2 N_2[f(h; p), q(h; p)], \tag{11}$$

subject to the boundary conditions

$$f(0; p) = -F_w, \; f'(0; p) = 1, \; f'(\infty; p) = 0, \tag{12}$$

$$q(0; p) = 1, \qquad q(\infty; p) = 0,$$

Based on equations (7) and (8) we define nonlinear operators as

$$N_1[f(\eta;p),\theta(\eta;p)] = \frac{\partial^3 f(\eta;p)}{\partial \eta^3} + f(\eta;p)\frac{\partial^2 f(\eta;p)}{\partial \eta^2} - \left(\frac{\partial f(\eta;p)}{\partial \eta}\right)^2 + Gr\,\theta(\eta;p) - (M+K)\frac{\partial f(\eta;p)}{\partial \eta}, \tag{13}$$

$$N_2[f(\eta;p),\theta(\eta;p)] = \frac{\partial^2 \theta(\eta;p)}{\partial \eta^2} + \Pr f(\eta;p)\frac{\partial \theta(\eta;p)}{\partial \eta} - \Pr\frac{\partial f(\eta;p)}{\partial \eta}\theta(\eta p) \tag{14}$$

When $p = 0$ it is straight forward that

$$f(\eta;0) = f_0(\eta),$$
$$\theta(\eta;0) = \theta_0(\eta), \tag{15}$$

When $P = 1$ the zeroth-order deformation equations (10) and (11) are equivalent to the original equations (7) and (8), so that we have

$$f(\eta;1) = f(\eta),$$
$$\theta(\eta;1) = \theta(\eta), \tag{16}$$

respectively. Thus, as increases from 0 to 1 then $f(\eta;p)$ and $\theta(\eta;p)$ vary from initial approximations to the exact solutions of the original nonlinear differential equations

Now expanding $f(\eta;p)$ and $\theta(\eta;p)$ in Taylor's series w.r.to p, we have

$$f(\eta) = f_0(\eta) + \sum_{m=1}^{\infty} f_m(\eta)p^m, \tag{17}$$

$$\theta(\eta) = \theta_0(\eta) + \sum_{m=1}^{\infty} \theta_m(\eta)p^m, \tag{18}$$

Where

$$f_m(\eta) = \frac{1}{m!}\frac{\partial^m f(\eta;p)}{\partial p^m}\bigg|_{p=0},$$
$$\theta_m(\eta) = \frac{1}{m!}\frac{\partial^m \theta(\eta;p)}{\partial p^m}\bigg|_{p=0}, \tag{19}$$

If the initial approximations, auxiliary linear operators and non-zero auxiliary parameters are chosen in such a way that the series (17) and (18) are convergent at $p = 1$, then

$$f(\eta) = f_0(\eta) + \sum_{m=1}^{\infty} f_m(\eta),$$
$$\theta(\eta) = \theta_0(\eta) + \sum_{m=1}^{\infty} \theta_m(\eta), \tag{20}$$

Differentiating equations (10) and (11) m times w.r.to p, setting p=0 and finally dividing with m!, we get the mth-order deformation equations as follows

$$L_1(f_m(\eta) - \chi_m f_{m-1}(\eta)) = \hbar_1 R_m^f(\eta), \tag{21}$$

$$L_2(\theta_m(\eta) - \chi_m \theta_{m-1}(\eta)) = \hbar_2 R_m^\theta(\eta) \tag{22}$$

with the following boundary conditions

$$f_m(0) = 0, \quad f_m'(0) = 0, \quad f_m'(\infty) = 0,$$
$$\theta_m(0) = 0, \quad \theta_m(\infty) = 0, \tag{23}$$

Where

$$R_m^f(\eta) = f_{m-1}''' + \sum_{i=0}^{m-1} f_{m-1-i} f_i'' - \sum_{i=0}^{m-1} f_{m-1-i}' f_i' + Gr\,\theta_{m-1} - (M+K) f_{m-1}', \tag{24}$$

$$R_m^\theta(\eta) = \theta_{m-1}'' + \Pr\sum_{i=0}^{m-1} f_{m-1-i}\theta_i' - \Pr\sum_{i=0}^{m-1} f_{m-1-i}'\theta_i, \tag{25}$$

$$\chi_m = \begin{cases} 0, & m \le 1, \\ 1, & m > 1 \end{cases} \tag{26}$$

If we let $f_m^*(\eta)$ and $\theta_m^*(\eta)$ as the special solutions of m[th] order deformation equations, then the general solution is given by

$$f_m(\eta) = f_m^*(\eta) + C_1 + C_2 e^{\eta} + C_3 e^{-\eta},$$
$$\theta_m(\eta) = \theta_m^*(\eta) + C_4 e^{\eta} + C_5 e^{-\eta}, \tag{27}$$

where the integral constants $C_i\,(i = 1\ to\ 5)$ are determined by the boundary conditions.

In this way it is easy to solve the linear homogeneous equations using MATHEMATICA one after other in the order m = 1, 2, ……

IV. CONVERGENCE OF HAM SOLUTION

Liao [11] showed that for an analytic solution obtained by HAM, its convergence and rate of approximation strongly depend upon the auxiliary parameters $h_1$and h_2 . If these parameters are chosen properly then the solution is effective. Hence the -curves are plotted at 25[th] order approximation in order to obtain the suitable ranges for $h_1$and h_2.

From Fig. 1 the admissible values of $h_1$and h_2 are $-2.0 \le h_1 \le 0.0$ and $-2.0 \le h_2 \le 0.0$

Table 1 shows the convergence of the solutions with increasing order of approximations.

V. RESULTS AND DISCUSSION

A systematic analysis is performed to study the impacts of various parameters such as magnetic parameter M, buoyancy parameter *Gr* , permeability parameter *k*, Prandtl number *Pr* , and suction parameter F_w.

The effects of Gr on velocity and temperature is illustrated in Figs. 2 and 3. From the figures, one may note that as *Gr* increases velocity increases, the temperature and decrease.

Figs. 4 and 5 are plotted to see the effect of *k* on velocity and temperature distributions. It is found that the temperature increases whereas velocity decreases with the increase of *k*.

For different values of Prandtl number *Pr*, velocity and temperature fields are shown in Figs. 6 and7. Temperature decreases as the Prandtl number *Pr* increase. Further, it is also observed that the effect of *Pr* on velocity is insignificant.

The influence of suction parameter F_w on velocity and temperature fields is shown in Figs. 8 and 9. It is noticed that velocity and temperature increase with the increase of suction parameter.

The effect of the Magnetic Parameter M on the velocity and temperature profiles is represented in Figs. 10 to 11. From these Figures, it is observed that the velocity decrease and temperature profiles increase with the increase of the magnetic parameter. It is clear that the presence of the magnetic field results in a reduction of the velocity profiles in the boundary layer region as a consequence of the induced force, the Lorentz force, caused by the magnetic field.

In Table 1, the values of surface temperature gradient $-q'(0)$ obtained using HAM and are compared with the results of Srinivasa Rao et al. [12]. This comparison shows that our solutions agree well with the existing results in the literature.

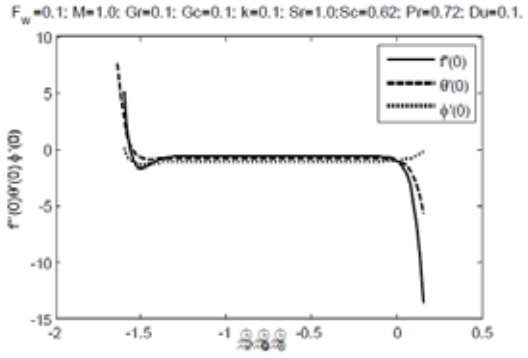

Fig. 1: $\hbar$-curves for 20th order approximations.

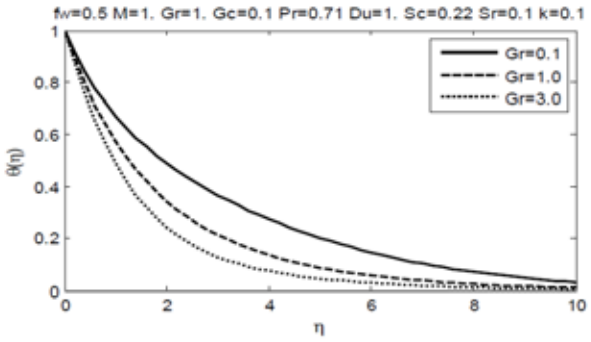

Fig. 3: Temperature profiles for different values of Gr.

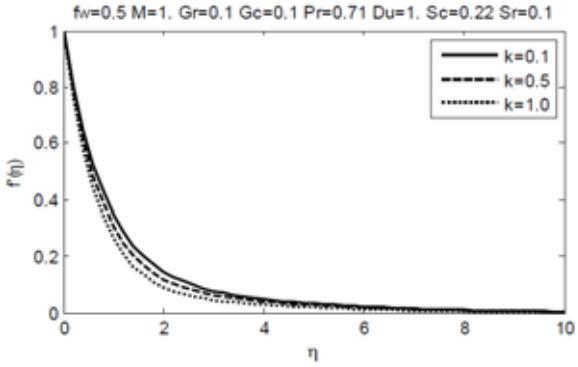

Fig. 4: Velocity profiles for different values of k.

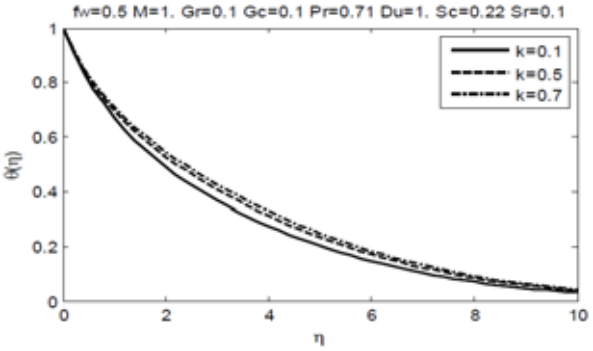

Fig. 5: Temperature profiles for different values of k.

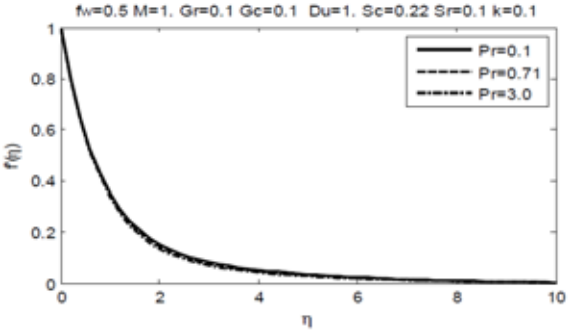

Fig. 6: Velocity profiles for different values of Pr.

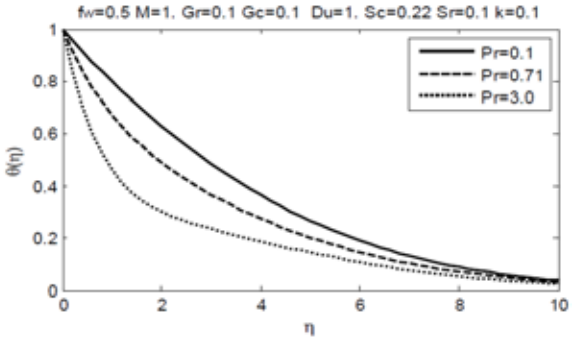

Fig. 7: Temperature profiles for different values of Pr.

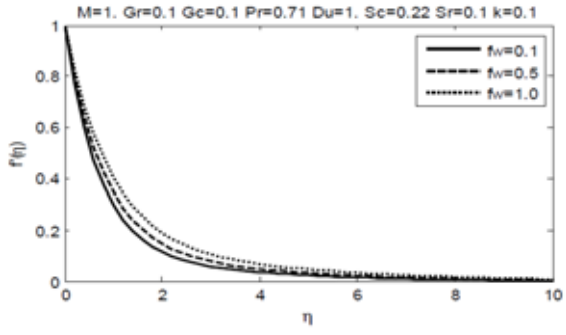

Fig. 8: Velocity profiles for different values of F_w.

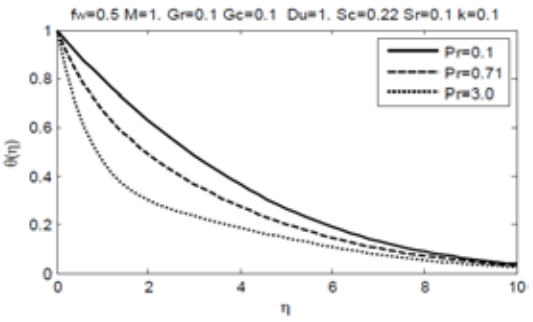

Fig. 7: Temperature profiles for different values of Pr.

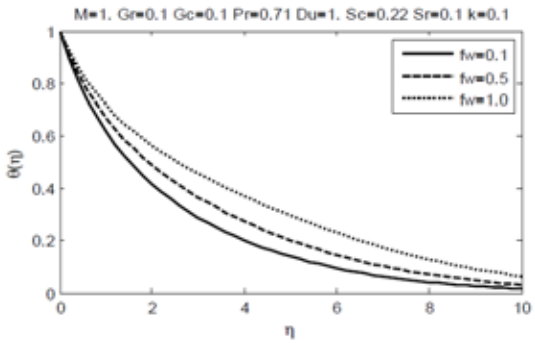

Fig. 9: Temperature profiles for different values of F_w.

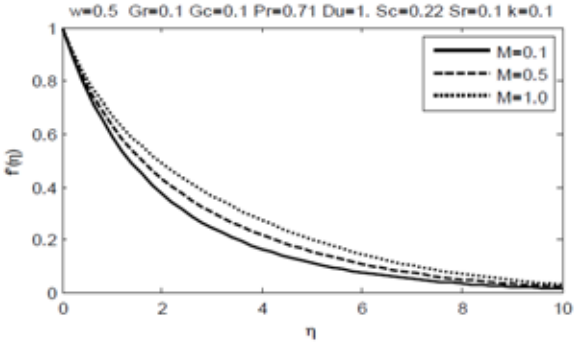

Fig. 10: Velocity profiles for different values of M.

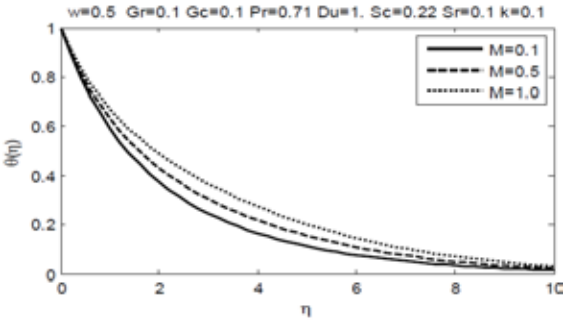

Fig. 11: Temperature profiles for different values of M.

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