iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VII **Month of publication:** July 2020

DOI: https://doi.org/10.22214/ijraset.2020.30429

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VII July 2020- Available at www.ijraset.com

MATLAB based Disease Anatomization through Morphological Analysis and Signal Processing

Kartic Malhan[1], Ishi Gupta[2], Pankhuri Agarwal[3], Adithya Rajesh[4]

Abstract: ***Engineering models based on Signal and image processing, proved to be very useful in medical image and signal analysis. Through this research, we are proposing a MATLAB based software which incorporates large data set library, used to observe and analyze medical images and body signal reports to predict diseases, there remedies and to ultimately give a medical report. This software can diagnose multiple categories of disease at a time, not limited to few categories of disease. This proposed software allows any laptop owning person to easily work on three areas, namely: (i) Automated disease Diagnosis using medical images (ii) automated disease detection using body signal's reports (like ECG, ENG, EMG, etc.) (iii) to generate a medical report of diseased person as a reference for medical practitioner. This software allows us to have a portable/ immediate/emergency doctor at any time, any place under less medical facility conditions. This software can also be used as reference for medical practitioner. To analyze the input images at multiple scales/dimensions and abnormal points simultaneously, we go through comparison between the captured image and the images in data library based on various 2d image characteristics. To analyze input scanned signal reports at multiple peaks/waves and abnormal points simultaneously, we go through comparison between the 1-D recorded graph and data set present in system library based on various decided characteristic traits using signal processing algorithms. Through this project we demonstrate that how computer applications can be used to provide better healthcare facilities across the globe.***

Index Terms: Automated disease diagnosis, computer applications, ECG Reports, Image processing, MATLAB, Medical Images, Signal processing.

I. INTRODUCTION

Through our research we have tried to develop a novel MATLAB based "*portable doctor software*" which can be easily downloaded on the laptops, pc's and can work as our own private doctor. We have joined concepts mainly from 3 major branches: biotechnology, computer science and artificial intelligence. As per medical science our physicians/doctor generally checks our diseases and disorders by mainly observing: either our morphological/physical condition or by analyzing our body signals like ECG, EEG, EMG, etc. So we have focused on making an automated software eligible to feature out the deflection in morphological features and deflection in normal body signal reports. In order to work on both these aspects together, we have used concepts of image processing and signal processing along with various applications of python, OpenCV, Java programming and MATLAB/OCTAVES. This software has two components: image processing and signal processing. When we will open the software there will be two options available: DISEASE DECTION THROUGH IMAGE PROCESSING (DDIP) and DISEASE DETECTION THROUGH SIGNAL PROCESSING (DDSP). We have to choose one.

1) In DDIP a page will appear asking for either image to be uploaded (as .jpg file) or to be captured live via computer/laptop webcam system as real time image.

2) In DDSP a page will appear asking for uploading scanned ECG report in a fixed parameter (described in page).

After uploading the image the software will process the image (morphological image or scanned signal report image) and within few seconds system will ask user few questions related to the disease or disorder user might have. According to the answers provided by the user, the system will choose the software library (stored for each class and sub-class of diseases), for comparison and classification of disease or disorder the medical image (provided) shows. And will accordingly, provide the medical report (in a particular format) for the diseased patient. The report will be a single page consisting:

a) Name of disease identified, 2) symptoms of disease, 3) level/stage of disease, 4) precautions, 5) remedies, 6) five most preferable drugs and medicines available for curing the disease in market (data can be modified).

Image Processing and signal processing based engineering models have shown great scope in medical diagnosis and treatment procedures, after machine learning applications came into existence [T. Acharya et al.(2005)].

IN DDIP: firstly input image is acquired then image pre-processing is done for fitting the image in the parameters and dimensions set in the software for a particular image. Then feature extraction is carried out. Next, clustering is performed by using clustering algorithm and finally comparison and classification is performed [M. Bhange et al. (2015)].

©IJRASET: All Rights are Reserved

The images are captured by digital camera, so image size is very large. Due to large size of image, further processing may take more time so all images are resized to 300*300 PX. Morphological knowledge of human body helps us extracting image components for diagnosis. These extracted image components are useful for comparison and classification processes to facilitate diagnosis. Support Vector Machine (SVM) algorithm is used for training the system to analyze image for multiple characteristics. Support vector machine help us to systematically monitor each variation in medical image and help us to compare image with multiple parameters at a time.SVM help us to differentiate images into upper plane and lower plane by applying linear separated hyper planes. SVM can work with higher dimensions and can even manage our non-linear data. These dimensions helps us to specify boundaries of each class storing images. Training with SVM works slowly but proved to be highly accurate [M. Bhange et al. (2015)]. Using the deep convolutional neural network algorithms, we trained a model on images of diseased patient with the goal of classifying presence of Disease, on images that the model had not seen before [H. C. Shin *et al.(2016)*]. According to recent advancements deep convolutional neural network is capable of classifying images of multiple categories with high accuracy rates. Due to recent developments, in deep convolutional Neural networks has lowered the error rate from 16.4% to 3.57% [H. C. Shin *et al.(2016)*]. Training large neural networks can be very time-consuming, the trained models can classify images very quickly, which makes them also suitable for consumer applications on laptops/pc [H. C. Shin *et al.(2016)*]. We have used different algorithms to solve prediction problems in classifying any image into appropriate category from categories. Our overall accuracy varied from 86.25% in case of *AlexNet* to 99.05% in case of *GoogLeNet* along with transfer learning, hence proved to be highly promising in solving prediction problems [H. C. Shin *et al.(2016)*].

So we have created two data libraries: “original dataset” and “secondary dataset” which are further divided into various major classes and sub-classes to avail easy and facilitated selection of class out of thousands of classes in the library. There is basically two level of comparison and classification firstly, with library1 (original dataset) consisting of full size images of various diseases and secondary, with library2 (secondary dataset) consisting segmented images of various diseases. Hence giving better outputs and precise predictions.

A. Challenges in Medical Image and Signal Processing

There are a number of specific challenges in medical image and signal processing. They are;

1) To enhance the quality of image (by managing 3parameters of the image: sharpness, contrast and noise) [R. Shekhar et al.(2013)].
2) Automated and accurate segmentation of diseased portions of specific part of body shown in image [K. Parvati et al.(2008)].
3) Automated and accurate classification/registration and mapping of multidimensional images [R. Ijaz et al. (2017)].
4) Classification of image traits/features, characterization and proper comparison of medical images [S. D. Khirade and A. B. Patil(2015)].
5) Least error measurements of image features and proper interpretation of the Measurements [S. Sindhu Priya and B. Ramamurthy(2018)].
6) To develop an integrated system for the clinical sector, and to facilitate medical practitioner.

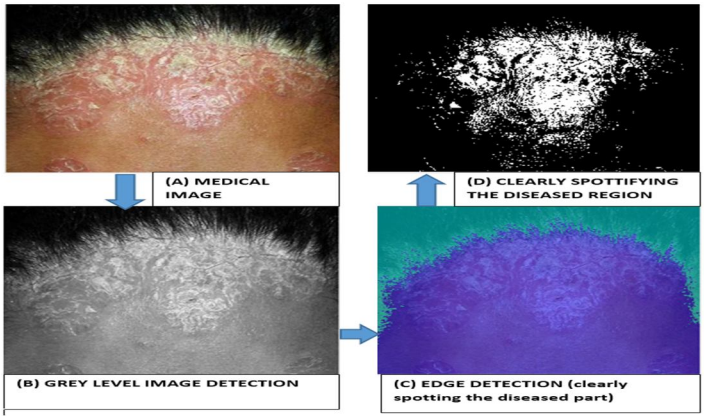


Fig. 1. Shows stages of disease detection of patient of herpes; (A) Is the original image of herpes patient (medical image);(B) Shows the grey level image detection to customize the differentiated features of any image so that the deflections can be calculated;(C)Shows the detection of edge of diseased portion on basis of differentiating features used;(D)It completely detects the diseased portion by eliminating other portions of image.

©IJRASET: All Rights are Reserved

We have noted that when applied algorithms for normal guessing for prediction on a set with 15 labels, we obtained accuracy of only 55%. *Here through this research paper we have tried to overcome all these challenges and tried to develop an integrated, automatic portable doctor software to achieve the same.* Image recognition offers a cost effective and trusted technology for disease detection. New deep learning models offer the pathways to achieve defined architecture for developing this technology to be easily deployed on electronic devices.

Using a dataset (libraries) of disease images taken from different sources, we applied transfer learning to train a deep convolutional neural network to identify the disease. This model achieved an overall accuracy of more than 90%.Our results shows that the transfer learning approach for image recognition offers a fast, effective, and easily deployable strategy for digital disease detection [A. Ramcharan et al.(2017)].

II. LITERATURE SURVEY

A. *Image Processing*

The authors R. Shekhar *et al.*, provided an approach for "Medical image processing," in *Handbook of Signal Processing Systems.*The purpose of the research work was to analyse the medical images and to feature out all its characteristics using image processing techniques [R. Shekhar et al.(2013)].The authors A. Ramcharan *et al.*, worked on "Deep learning for image-based cassava disease detection".The purpose of the research was to easily and automatically detect plant diseases using electronic gadgets [A. Ramcharan et al.(2017)].].The authors K. Parvati *et al.*, provided an approach for "Image segmentation using gray-scale morphology and marker-controlled watershed transformation".The purpose of this research was to develop an easy way to accurately detect all features of any image. And for that they have proposed Image segmentation using gray-scale morphology and marker-controlled watershed transformation method which can enhance the accuracy of image detection [K. Parvati et al.(2008)]. The authors S. Sindhu Priya and B. Ramamurthy,provided an approach for "Lung cancer detection using image processing techniques".Through this research the researchers tried to find out lung cancer in any patient by using simple image processing techniques [S. Sindhu Priya and B. Ramamurthy (2018)].

B. *Signal Processing*

The authors M. K. Islam *et al.*, provided an approach for "Study and Analysis of ECG Signal Using MATLAB &LABVIEW as Effective Tools".In this research they have made an electronic device to measure the ECG and have tried to analyse it using to softwares which are MATLAB &LABVIEW [M. K. Islam et al.(2012)]. The authors P. Sasikala and D. R.S.D., provided an approach for "Robust R Peak and QRS detection in Electrocardiogram using Wavelet Transform". Through this research they have tried to detect the different parts of ECG signal automatically using signal processing techniques [P. Sasikala and D. R.S.D(2010)].The authors F. Sadikoglu et al., provided an approach for "Electromyogram (EMG) signal detection, classification of EMG signals and diagnosis of neuropathy muscle disease,".

Through this research they have tried to provide an automatic system which can not only detect the EMG signals but can also classify and diagnose the signals [F. Sadikoglu et al.(2017)].The authors M. Mahmud et al.,proposed "SigMate: A Matlab-based automated tool for extracellular neuronal signal processing and analysis".through this research they provided an idea that what algorithm can be used to automatically analyse body signals [M. Mahmud et al.(2012)]. Many researchers have provided many approaches through there researches with respect to signal processing and image processing.

But they worked either on image processing or on signal processing but we have provided the software with can simultaneously work on both. All the researches have shown detection for only 2 or 3 diseases but we are doing it for n no. of diseases as the system chooses the concerned library on the basis of answers provided by user(according to their conditions). As for handling such a big software we need a huge library and hence we are providing two libraries(which can be modified) along with that an open library is also provided where the doctor can make his own collection of data regarding different diseases which he wants as prescription and medicines.

We are providing a medical report showing all the content as mentioned and it is also capable of giving five most preferred drugs/medicines available for the disease in market.For DDSP part we have two fixed libraries but some part of it is modifiable according to the needs of the time. We are for ECGsignal analysis we are providing a systems by which we have to scan medical ECG report in particular dimensions(specified in software's HELP option) and the system will analyse it and provide us the medical report after asking few questions.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VII July 2020- Available at www.ijraset.com

III. PROPOSED FRAMEWORK (METHOD & APPROACH)

A. DDIP (Image Processing)

The study has been made to detect disease through face and any body part. We have given the samples of mainly three diseases namely Herpes, Psoriasis and Dermatitis in this paper for DDIP, to explain that how this software can differentiate and detect these diseases which looks similar, which can't be easily detected generally (herpes detection using image processing is shown in Fig. 2.) It is done on holding the basic integrity or by taking few characteristics into consideration which are: wound texture, cluster formation, area/malignance, intensity, saturation level, contrast/RGB value. Along with detection of disease, a medical report can be predicted containing information about disease (a patient may have), its symptoms, causes, precautions, and along with that various basic prescription of these diseases and the 10 most common medicines/ drugs available in market for treatment of this disease can be predicted (they can be confirmed with high accuracy). By using the developed algorithms of artificial intelligence the disease detection can be processed.

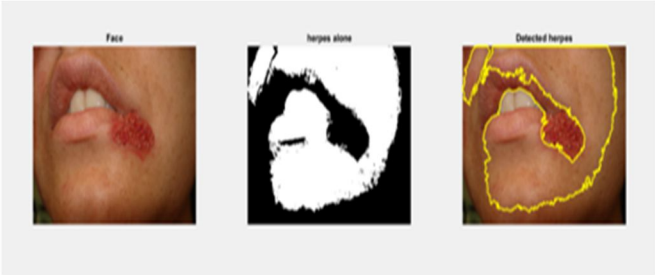


Fig. 2. Above image clearly shows that herpes is been detected to this patient by the software.

Here various computer language has been used to correlate faster response to our task (python, OpenCV, c programming, MATLAB codes, Java, JavaScript).

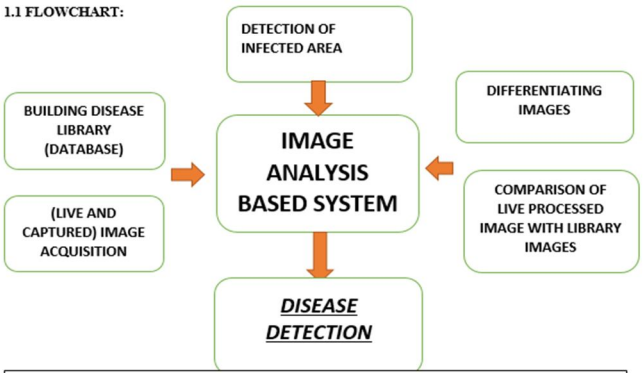


Fig. 3. The above flowchart represents all the components of DDIP system in the software proposed.

We have to upload medical image of the patient in two ways either as captured image (under limit of some pixels in .jpg format) or as live image, the system is sufficient to adjust image uploaded according to the dimensions set in system by default. The complete idea about basic components of image processing system (DDIP) of our proposed software is shown in Fig. 3. The major components of these software are explained below:

1) *Image Acquisition:* It is the process of getting the live image of the patient ready, using algorithmic functions. Here the primary deformation present on the patients face can be detected. The size as well as other measurements can be modified by default in software itself. For convenience Python (OpenCV) has been used in this process and given in MATLAB inputs. The Numpy function has been used in Python, due to the requirement of large arrays of pixel calculation of the live data. Module which represents the corresponsive factor of Numpy value helps in regulating smooth flow line of pixel calculation. *Data acquisition->Python OpenCV->Module->Numpy->MATLAB->image detection*
2) *Image Pre-Processing:* During image pre-processing the image is adjusted for filtering the noise. Images is clarified by using Dilation and Erosion method .It gives precise view of the disease with respect to unaffected region .The CascadeObjectDetector function has been used to resize the image uploaded.

©IJRASET: All Rights are Reserved

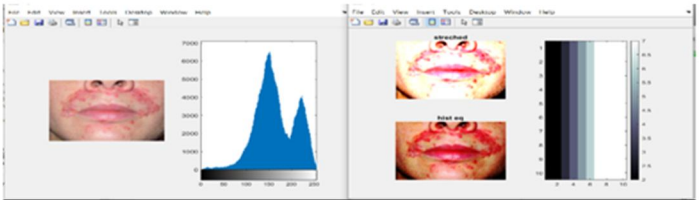


Fig. 4. Above image shows histogram and contrast variation graph.(image of dermatitis patient)

Image is converted to grey by using *Greyscale Image function.* The *RGB function* has been used to highlight the disease within range of

*[T] = R*0.021 +G*0.112+B*2.0,*

With respect to greyscale image due to which we get the changes in intensity needed to characterize infected area (as shown in Fig. *The histogram* has been used to detect the possible secondary deformation, by using function *[c]=histeq(image),*which *is* followed by calculation of saturation level of image by using function: *im=repmat(1:10 , 10, 1).* Saturation level is used to identify the intensity of the defective part of image .The adjusted value 'histeq' is in range of Imh=imadjust (A, [0.3, 0.6], [0.0, 1.0]). Saturation value: 1-2/R+G+B. Image can be of herpes, psoriasis or Dermatitis or any disease can be analyzed.

3) *Image Segmentation:* It is used to convert Digital image to various segments to get detail analytical view of various background. The image is cropped to finest rate of interest with addition of edge colour for easy detection of disease. The basic input given for cropping image is

[s] = imcrop(image) With characteristics like: *rectangle('Position',BB,'LineWidth',4,'LineStyle','','EdgeColor','r').*

Kmeans applied segments give image of disease with colour different from skin background. It helps in eliminating the basic confusion of skin background to disease. Which can be coded as:

[L,sides]=imsegkmeans(single(A(0.04,0.11,1)),3)

Algorithm for K-means Clustering: *Kmeans segments* give image of disease with colour different from skin background. It helps in eliminating the basic confusion of skin background to disease. Which can be coded as:

[L,sides]=imsegkmeans(single(A(0.04,0.11,1)),3) . Algorithm for K-means Clustering: 1. Firstly, Decide the number of cluster k, along with that we have to pick initial centroid randomly.2. Square of Euclidean distance will be calculated for each image, which is computed, and accordingly, each object is assigned to the closest cluster.3.For each cluster, the new centroid will be computed and each seed value will now replace by the respective cluster centroid .4.Euclidean distance from an object to each cluster is calculated, and the image is allotted to the cluster with the smallest Euclidean distance. This process will continue until image is in same cluster at every possible iteration.

Black and grey scale image used to highlight the finest presence of the disease on the surface of skin, where the healthy skin turns black and disease of intreast turns grey to white in range(as shown in figure6). im2bw(Igray,level) with level analytics of 0.1 – 0.74, Igray=rgb2gray(F).

Binary images has been used to isolated maximum possibility of infected area in white region and shading the unaffected part with black colour.

Input=im2bw(A,0.65); g=bwarea(Input); .

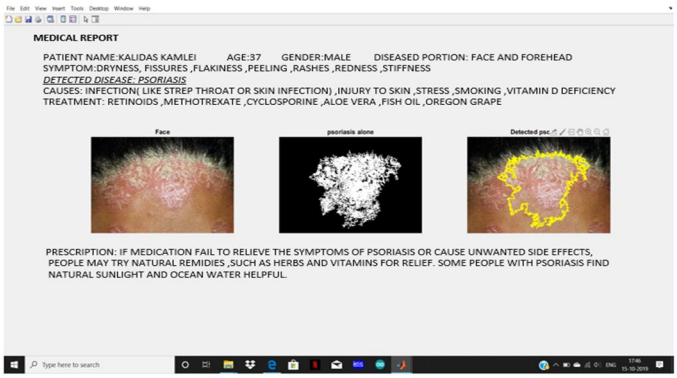


Fig. 5. Above image shows the Medical Report of a Psoriasis patient generated by software after analyzing the medical image uploaded.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VII July 2020- Available at www.ijraset.com

4) *Feature Extraction: The density of the disease is done to find location of disease and level of disease with respect to co-relation and equality comparison of skin tone with respect to disease tone and value of solidity function. The function in given command deals with area of infection and its area-density equilibrium.*

stats = regionprops(label, 'Solidity', 'Area');
high_dense_area = density>approx.threshold;

By using this method we get knowledge about density of wound and detection of wound got easier.
label pixel matrix has been used to get the pixel count of disease with complement function:
BW=im2bw(s,number);BW1=imcomplement(BW); imshow(BW1)
Threshold function is the function where suitable range is given for recognizing the disease so that it can give disease faced by the patient in defined terms with parallel run through the prescribed range:Ithresh=im2bw(Igray,level);
imshowpair(F,Ithresh,'montage');Machine learning has been given for isolating the image of infected region by colouring the unwanted noise for easy access. Here the clustering function has been done to cluster the output and decode the noise.
nColors = 3;
[cluster_idx cluster_center]= *kmeans(ab,nColors,'distance','sqEuclidean', ... 'Replicates',2);*
(Fig. 5. Shows the medical report of psoriasis patient generated by the software).

B. Comparison

Each of the diseases or types of damage was distinctive/differentiable and the variation of symptom expression between varieties was minor in comparison to the contrasts between diseases. So we have used different characterizing and classifying features such as: *wound texture, cluster formation, area/malignance, intensity, saturation level, contrast/RGB value.* Images were then evaluated for co-infections in order to limit the Number of images with multiple diseases. This dataset, called the "original dataset," comprising thousands of images.
These photos were then cropped into segments using segmentation techniques to build the second dataset. This dataset, called the "secondary dataset," comprises of images of differently segmented portions versus cropped segments (with more images). The assumptions were that the cropped images (from secondary dataset) would improve model performance to correctly identify a disease as the dataset was larger.
Both datasets comprise of different class labels (like fungal, infectious, cancerous, allergic, etc.) along with sub-class labels. To assess the model performance we have set specific dimensions for image of different classes [A. Ramcharan et al (2017)]. *After the image is compared (using tested algorithms and functions) the software will ask various questions about the disease its symptoms and according to the answers provided by the user the software will choose the specific library and will provide the medical report(displayed in a specific pattern).*

C. Approach

We have tested the applicability of transfer learning applications from a deep convolutional neural network (CNN) model for the medical image datasets. According to recent approaches, Convolutional neural networks have shown wide applications in computer vision tasks.
The hierarchy for feature characterization and classification is usually trained using multi-layer CNN models starting from pixels to classifier, training layers jointly giving an appropriate model.CNNs may take weeks to get fully-trained due to model complexity, hence we are using applications of transfer learning to shortcut training timeperiod, byinvolving a fully-trained model for a set of classes and for other classes we are retraining the existing model according to some inputs provided by users and the by using memory from pre-trained models .
Our research/approach retrains the existing components of the CNN model to classify diseases of different categories/classes in datasets by exploring and evaluating a huge amount of visual knowledge which the model had already learned from the databases [A. Ramcharan et al (2017)].

D. DDSP (Signal Processing)

The second part of our software is DDSP which is based on signal processing techniques. In this we have shown an example on ECG report analysis to predict patient's cardiac & related disease.

©IJRASET: All Rights are Reserved

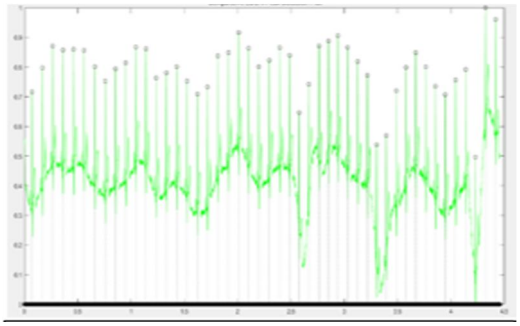


Fig. 6. It shows the detection of R-wave of normal ECG signal.

Electrocardiogram (ECG) is a graphical representation of cardiac activity, that measures and records the electrical activity of the heart. Interpretation of these details allows diagnosis of a wide range of heart and associated body parts conditions. These conditions can vary from minor to life threatening ones [M. K. Islam et al.(2012)], [J. L. Azevedo De Carvalho(2002)].

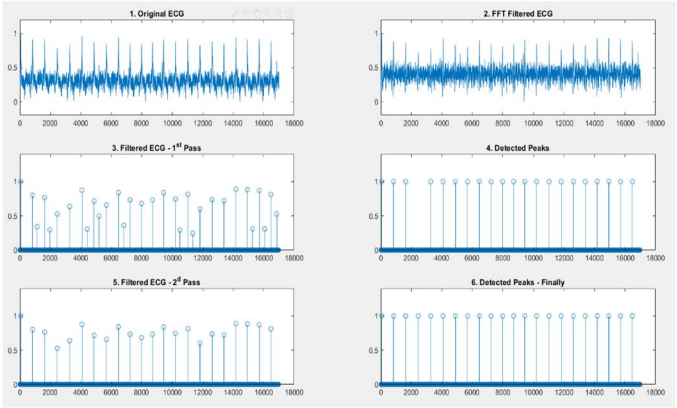


Fig. 7. shows different filters performed on the ECG signal by the system.

An ECG is generated by a nerve impulse stimulus provided to a heart by body systems. The current is diffused around the body surface. The current at the body surface will build on the voltage drop, which ranges from few µV to mV with an impulse variation. Usually, this is very small amplitude of impulse, which requires atleast thousand times of amplification. The electrical activity of the heart is generally observed by monitoring electrodes placed on the skin surface. The electrical signal is very small (normally 0.0001 to 0.003 volt). These signals are usually within the frequency range of 0.05 to 100 Hertz (Hz.) or cycles per second [J. L. Azevedo De Carvalho(2002)].The ECG waveform is created using an ECG measuring device which is developed using applications of micro-controllers. The waveform is captured using multiple electrode system connected directly to some specific regions of body. The use of this device has many advantages in the simulation of ECG waveforms. First one is saving of time and another one is removing the difficulties of capturing real ECG signals with both invasive and non-invasive methods. Such devices are used at labs to generate an ECG report with accuracy, as they have highly promising results. Similar devices are used to generate EMG, ENG, etc. reports. In this software we are using scanned signals report uploaded in particular dimensions and format for analysis.

We may notice that a single period of an ECG signal is a mixture of triangular and sinusoidal wave forms. Each significant feature of ECG signal can be represented by shifted and scaled versions One of these waveforms is shown in Fig. 6. The specifications taken as default for any signal can be changed according to the user's requirement while simulating the MATLAB code. We take heartbeat as 72, amplitude of P, R, Q, T waves as 25mV, 1.6mV, 0.025mV, 0.35mV respectively while the duration of P-R interval, S-T interval, P interval, QRS interval as 0.16s, 0.18s, 0.09s, 0.11s respectively. The ECG signal processing is fundamental for analysis of the heart. Signal de-nosing is very important in ECG signal analysis. Both wavelet thresholding methods and time domain signal processing can be used for this purpose. After the report is uploaded on software the system will perform many filters on image to make it appropriate for pattern recognition and then the segmentation will be performed to analyze each part of report accurately.

©IJRASET: All Rights are Reserved

As the segmentation of multi-channel signals should be performed over all channels, in most cases it is important to extract information present in all parallel time series at first. The proposed method of signal segmentation is based upon the two sliding overlapping windows and the detection of signal properties changes. As the average frequency of signals changes, but lies between ranges for each component, so distinctive/ selected frequency bands were choosen for ECG signal segmentation.
The graphical user interface for segmentation of the ECG signal using the average signal energy in given frequency bands Owing to the necessity of multi-channel signal processing the first principal Component has been further used for segmentation of the whole set of observed time-series.

Fig. 8. Above image shows the medical report of a normal person generated by software after analysing his ECG report.

After segmentation the system will move towards feature extraction process. The selection of the most efficient and reliable method of feature extraction becomes a very important problem of signal segments classification. Methods applied are usually based upon the time-domain or frequency-domain signal analysis. The following study is devoted to the wavelet domain signal feature extraction and comparison of results achieved. The discrete wavelet transform (DWT) forms a general mathematical tool for signal processing with many applications in data processing using time-scale signal analysis, signal decomposition and signal reconstruction. The initial wavelet can be considered as a pass-band filter(different filters analysed using signal are shown in Fig. 7.) and in most cases half-band filter covering the normalized frequency band _0.25, 0.5).A wavelet dilation by the factor $a = 2m$ corresponds to a pass-band compression. The set of wavelets define a special filter bank in this way. Suggested algorithm is based upon the wavelet decomposition of signal segments and evaluation of its coefficients for estimation of segment features and their analysis is performed by using a harmonic wavelet transform resulting in features standing for scales 1, 2 and 3 respectively covering three frequency bands. The discrete wavelet transform enables estimation of signal segment features with changing resolution in time and frequency for different scales and in this way it is possible to obtain the complex description of data segments. Each signal segment can be described by R features specified in the pattern matrix $\mathbf{P}R$, Q and forming clusters in the R-dimensional space. The proposed algorithm for their classification has been based upon the application of self-organizing neural networks using Q feature vectors as patterns for the input layer of neural network. The comparison and classification is done to which include dual level of comparison with two libraries present in system (“original dataset” and “secondary dataset”) one include the full ECG signal and other one contain segmented ECG signal for various diseases. The libraries are also divided into certain classes describing different types of diseases. The system chooses the class according to some observations based on analysis of ECG for some set characteristics. And completing the procedure system will present the patient’s report (Fig. 8. shows the medical report of a normal person generated by software after analysing his ECG report).

E. Open Library Function

In this software we are introducing an open library function. Since more and more images needed to be added in library for comparison ,there should be proper and adequate space for storing the huge dataset , there should be a proper database for the comparison purpose so here we have tried to propose an open library system in which doctors or medical practitioner will be able to create their own library for each disease and can choose with which library they want to compare the real time medical image and signal reports if they don’t want to go with system library for comparison. Here we use ANACONDA python database and many more which can be easily accessible to get the input with respect to OpenCV functions. It is also suitable of using 3d image module for the analysis. The keyways are as follows:-Image processing -> ANACONDA CLOUD->MATLAB process ->Image access.

©IJRASET: All Rights are Reserved

IV. FUTURE WORKS

A. Image Processing

1) Better information for future medical analysis,
2) Easy access in electronic gadgets (can use in mobile apps)**,**
3) More knowledge and information within less time,
4) Less communication lapse between doctor and patient**,**
5) Not restricted to only morphological diseases but in all other fields too.

B. Signal Processing

1) Gives more precise and detailed information,
2) Less power consumption**,**
3) Need not to rely on lab generated reports**,**
4) Giver rough idea of future disturbances or short comings.

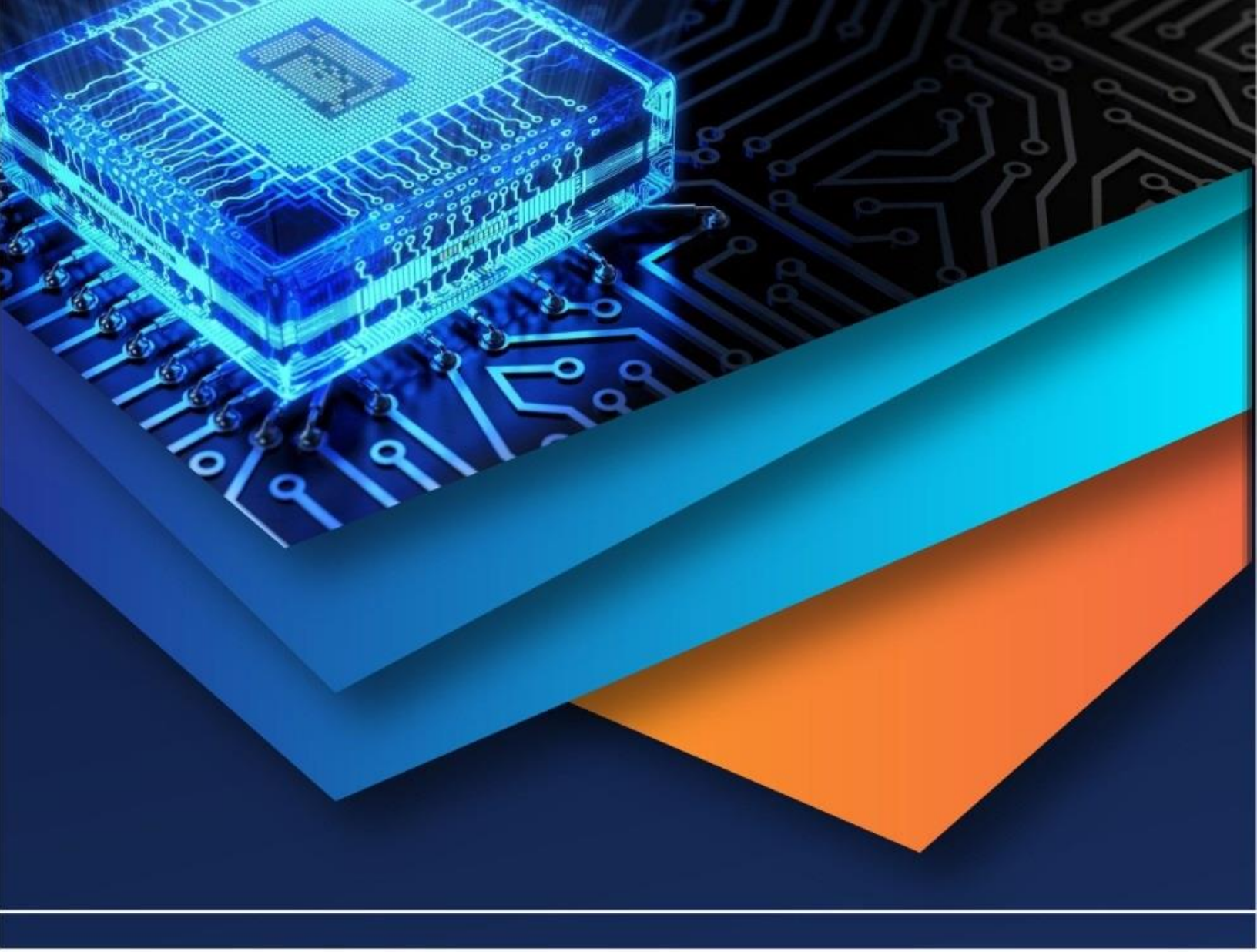
V. RESULT & CONCLUSION

A MATLAB based system mentioning two parts DDIP & DDSP developed using concepts of image and signal processing proposed for early detection of diseases based on its morphological features and body signals, capable of diagnosing multiple diseases at a time of every type like: fungal, infectious, cancerous, allergies, cardiac, neuro-muscular, brain related, spine related, etc. based on morphological or signals report analysis. By using this concept, live detection of images is possible, through which one need not to bother for image quality (not too low), software can readily enhance, contrast, detect edges, and quantify intensity and many more operations to make image appropriate for diagnosis. Because of this software fast, effective and precise diagnosis of any patient can be done for all kind of diseases. If software, fails to predict disease (in case of accidents), then this software can identify the affected area through which person/doctor can rectify the region of problem very easily. For signal processing, ECG, EMG, ENG, etc. are graphical representations of our body signals capable of predicting deflections from normal cycling, but hard to understand, this software can easily analyze scanned reports using highly promising algorithms for accurate diagnosis of different diseases. Feature extraction of ECG, ENG, EMG, and bio signals (based on its different peak levels) use a wide variety of machine learning and pattern recognition algorithm tested for highest accuracy. Finally, generating a medical report. This software is not to replace doctors but to help them in diagnosis as a reference with 99% accuracy. It can be used to enhance healthcare facilities around the globe with promising outputs.

REFERENCES

[1] V. Singh and A. K. Misra, “Detection of plant leaf diseases using image segmentation and soft computing techniques,” Inf. Process. Agric., 2017.
[2] S. D. Khirade and A. B. Patil, “Plant disease detection using image processing,” in Proceedings - 1st International Conference on Computing, Communication, Control and Automation, ICCUBEA 2015, 2015.
[3] S. Sindhu Priya and B. Ramamurthy, “Lung cancer detection using image processing techniques,” Res. J. Pharm. Technol., 2018.
[4] R. Ijaz, M. Jamil, and S. O. Gilani, “Brain Tumor Extraction from MRI Images using MATLAB,” Int. J. Multimed. Ubiquitous Eng., 2017.
[5] T. Acharya and A. K. Ray, Image Processing: Principles and Applications. 2005.
[6] H. C. Shin et al., “Deep Convolutional Neural Networks for Computer-Aided Detection: CNN Architectures, Dataset Characteristics and Transfer Learning,” IEEE Trans. Med. Imaging, 2016.
[7] M. Bhange and H. A. Hingoliwala, “Smart Farming: Pomegranate Disease Detection Using Image Processing,” in Procedia Computer Science, 2015.
[8] Ramcharan, K. Baranowski, P. McCloskey, B. Ahmed, J. Legg, and D. P. Hughes, “Deep learning for image-based cassava disease detection,” Front. Plant Sci., 2017.
[9] R. Shekhar, V. Walimbe, and W. Plishker, “Medical image processing,” in Handbook of Signal Processing Systems: Second Edition, 2013.
[10] K. Parvati, B. S. Prakasa Rao, and M. Mariya Das, “Image segmentation using gray-scale morphology and marker-controlled watershed transformation,” Discret. Dyn. Nat. Soc., 2008.
[11] Chaudhary and S. S. Singh, “Lung cancer detection on CT images by using image processing,” in Proceedings: Turing 100 - International Conference on Computing Sciences, ICCS 2012, 2012.
[12] M. K. Islam, A. N. M. M. Haque, G. Tangim, T. Ahammad, and M. R. H. Khondokar, “Study and Analysis of ECG Signal Using MATLAB &LABVIEW as Effective Tools,” Int. J. Comput. Electr. Eng., 2012.
[13] M. Mahmud, A. Bertoldo, S. Girardi, M. Maschietto, and S. Vassanelli, “SigMate: A Matlab-based automated tool for extracellular neuronal signal processing and analysis,” J. Neurosci. Methods, 2012.
[14] J. L. Azevedo De Carvalho, A. F. Da Rocha, F. A. De Oliveira Nascimento, J. S. Neto, and L. F. Junqueira, “Development of a matlab software for analysis of heart rate variability,” in International Conference on Signal Processing Proceedings, ICSP, 2002.
[15] F. Sadikoglu, C. Kavalcioglu, and B. Dagman, “Electromyogram (EMG) signal detection, classification of EMG signals and diagnosis of neuropathy muscle disease,” in Procedia Computer Science, 2017.
[16] Procházka, M. Mudrová, O. Vyšata, R. Háva, and C. P. S. Araujo, “Multi-channel EEG signal segmentation and feature extraction,” in INES 2010 - 14th International Conference on Intelligent Engineering Systems, Proceedings, 2010.
[17] P. Sasikala and D. R.S.D., “Robust R Peak and QRS detection in Electrocardiogram using Wavelet Transform,” Int. J. Adv. Comput. Sci. Appl., 2010.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)