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Mobile Based Application for ANAEMIA Detection

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***Abstract*—: In present day the people are not aware of the symptoms and unable to detect the disease in the early stages which makes the situation awful. Most of the symptoms vary from subject to subject. Daily monitoring and comparing with the previous images is the best way for the prediction of the disease. In this project we aim to make a prototype for analyzing the color change pattern of eye in a subject with the help of selfie cameras available in the modern smart phones. The images that are taken daily will be stored and compared with the obtained images of the subject's eye. Anemia is usually defined as a decrease in the amount of red blood cells (RBCs) or hemoglobin in the blood. It can also be defined as a lowered ability of the blood to carry oxygen. Diabetic retinopathy is also known as diabetic eye disease is when damage occurs to the retina due to diabetes. It can eventually lead to blindness. Thyroid disease is one of the telltale signs of bulging eyes or protruding eyeballs.**

***Keywords:* Camera, Image Processing, MATLAB**

I. INTRODUCTION

Anemia is a condition that develops when your blood lacks enough healthy red blood cells or hemoglobin. Hemoglobin is a main part of red blood cells and binds oxygen. If you have too few or abnormal red blood cells, or your hemoglobin is abnormal or low, the cells in your body will not get enough oxygen. Symptoms of anemia -- like fatigue -- occur because organs aren't getting what they need to function properly. Women, young children, and people with chronic diseases are at increased risk of anemia. Anemia occurs when you have a level of red blood cells (RBCs) in your blood that is lower than normal. Iron deficiency anemia is the most common type of anemia, and it occurs when your body doesn't have enough of the mineral iron. Your body needs iron to make aprotein called hemoglobin. This protein is responsible for carrying oxygen to your body's tissues which is essential for your tissues and muscles to function effectively. When there isn't enough iron in your blood stream, the rest of your body can't get the amount of oxygen it needs. Certain forms of anemia are hereditary and infants may be affected from the time of birth. Women in the childbearing years are particularly susceptible to iron-deficiency anemia because of the blood loss from menstruation and the increased blood supply demands during pregnancy. Older adults also may have a greater risk of developing anemia because of poor diet and other medical conditions.

While the condition may be common, a lot of people don't know they have iron deficiency anemia. It's possible to experience the symptoms for years without ever knowing the cause. In women of childbearing age, the most common cause of iron deficiency anemia is a loss of iron in the blood due to heavy menstruation or pregnancy. A poor diet or certain intestinal diseases that affect how the body absorbs iron can also cause iron deficiency anemia. Doctors normally treat the condition with iron supplements or changes to diet.

The main aim of this project is to make a prototype for analyzing the colour change pattern of eye in a subject with the help of selfie cameras available in the modern smart phones. The images that are taken daily will be stored and compared with the obtained images of the subject's eye. The image of the eye will be taken using the camera which will be fed into a scanning system for the sorting of the area from the image that need to be analyzed, for example, if the detection of the rate of bulging of the edges of the eye is to be detected, edge detection technique in image processing is used. After the isolation of a particular area for analysis, the sorted area will be then fed to a processor and then to an RGB comparator for the further analysis of the isolated area for a particular symptom like paleness or the rate of redness in the eye.

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II.LITERATURE REVIEW

Imaging has become an essential component in many fields of medical and laboratory research and clinical practice. Biologists study cells and generate 3D confocal microscopy data sets; virologists generate 3D reconstructions of viruses from micrographs; radiologists identify and quantify tumors from MRI and CT scans; and neuroscientists detect regional metabolic brain activity from PET and functional MRI scans. Analysis of these diverse image types requires sophisticated computerized quantification and visualization tools. Until recently, 3D visualization of images and quantitative analysis could only be performed using expensive UNIX workstations and customized software. Today, much of the visualization and analysis can be performed on an inexpensive desktop computer equipped with the appropriate graphics hardware and software. This paper introduces an extensible, platform-independent, general-purpose image processing and visualization program specifically designed to meet the needs of an Internet-linked medical research community.

The application, named MIPAV (Medical Image Processing, Analysis and Visualization), enables clinical and quantitative analysis of medical images over the Internet. Using MIPAV's standard user interface and analysis tools, researcher and clinicians at remote sites can easily share research data and analyses, thereby enhancing their ability to study, diagnose, monitor and treat medical disorders. [1]
Color retinal photography is an important tool to detect the evidence of various eye diseases. Novel methods to extract the main features in color retinal images have been developed in this paper. Principal component analysis is employed to locate optic disk; A modified active shape model is proposed in the shape detection of optic disk; A fundus coordinate system is established to provide a better description of the features in the retinal images; An approach to detect exudates by the combined region growing and edge detection is proposed. The success rates of disk localization, disk boundary detection, and fovea localization are 99%, 94%, and 100%, respectively. The sensitivity and specificity of exudate detection are 100 % and 71 %, correspondingly. The success of the proposed algorithms can be attributed to the utilization of the model-based methods. The detection and analysis could be applied to automatic mass screening and diagnosis of the retinal diseases. [2]

The authors consider the problem of designing multi-resolution transforms that are adapted to the given image signal, in the sense that they maximize the coding gain at each resolution level. A simple alternating optimization algorithm is derived for solving this problem in the framework of the lattice realization of Para-unitary quadrature mirror filters. The resulting large coding scheme is discussed in some detail, and its performance is compared with that of the discrete cosine transform (JPEG) technique and with that of some non-adapted multi-resolution transforms. [3].

An automatic contrast enhancement method improves the quality of an image by increasing the dynamic range of the tone levels in an image without causing an undesirable hue shift. An overall stretch factor that stretches the dynamic range of all the colors is generated based on the standard deviation of the tone levels for the overall luminance of the image. A color weighting factor is used to individually control the amount that each color is stretched. The color weighting factor is based on the difference between the standard deviation of the tone levels for the overall luminance of the image and the standard deviation of the tone levels for each color. An anchor factor is used to preserve the mean tone level for each color while the tone levels far from the mean tone level are changed more dramatically than the tone levels close to the mean tone level, which minimizes hue shifts while maximizing contrast enhancement. [4]

III. DESIGN

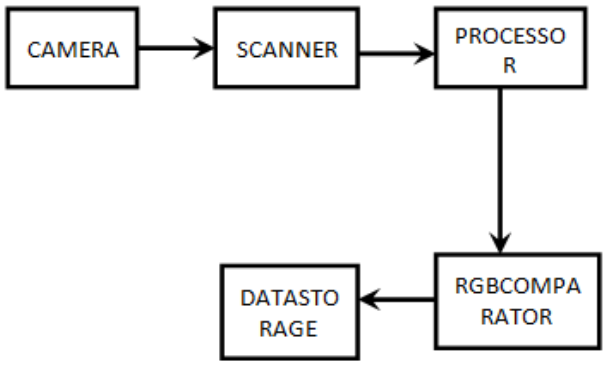

Fig no: 3.1 Block Diagram

IV. EXPERIMENTAL SETUP

The module consists of a camera, scanner, processor, RGB comparator and data storage system. The image of the eye will be taken using the camera which will be fed into a scanning system for the sorting of the area from the image that need to be analyzed, for example, if the

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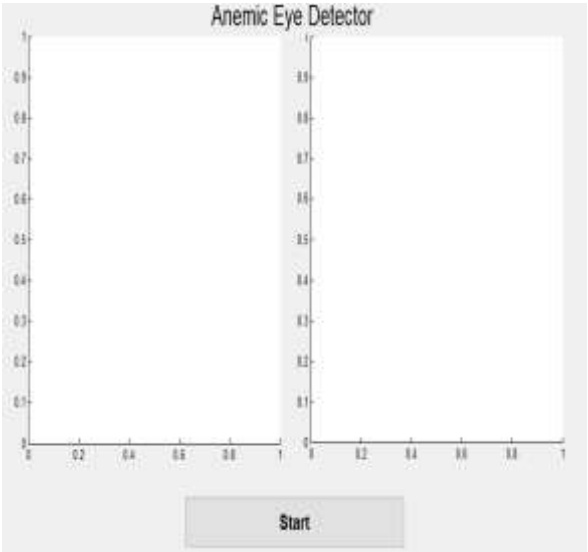
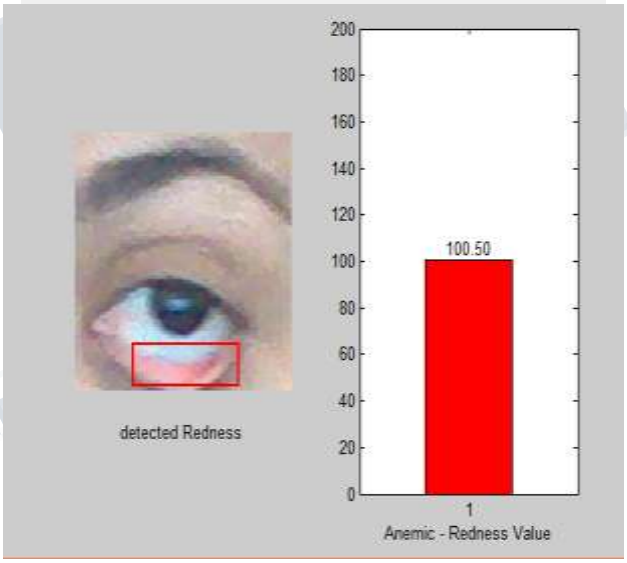
detection of the rate of bulging of the edges of the eye is to be detected, edge detection technique in image processing is used. After the isolation of a particular area for analysis, the sorted area will be then fed to a processor and then to an RGB comparator for the further analysis of the isolated area for a particular symptom like paleness or the rate of redness in the eye.

V.RESULT AND DISCUSSION

The measure of conjunctival pallor was taken as a random measurement for different individuals. The conjunctival pallor showed a decrease in the redness depending on whether the patient was anemic or not. The detected redness is the approximate value of the patient being anemic. From the detected anemic percentage from graphs, a value less than 100 in the graph shows that person is not anemic and a value greater than 100 from graph shows that person isanemic.





VI. FUTURE WORKS

The diagnostic system for anemia detection had been implemented in matlab. If the system for finding the probability of a person being anemic is incorporated into a mobile application the entire system will prove to be a very helpful daily monitoring app. The procedure will be simple enough as a taking a selfie regularly which will be stored in the app and then analyzed daily which will process the information of the person being anemic or not over a period of time. By knowing whether he/she is probable to anemia the patient can take required medication by consulting his/her physician. A daily notification of the percentage of

redness and the probability of being anemic is an informative data for the detection of anemia.

VII. CONCLUSION

Anemia is defined as a hemoglobin concentration less than or equal to 90 g/L. Screening for anemia is as simple as taking a selfie – it is a simple, non-invasive and easily accessible screening tool for anemia made for use by everyday people. It analyses the conjunctiva and calculates the risk of anemia, putting months of medical training into the hands of untrained users. Assuming that this app actually arrives at a conclusion that points to a positive case of anemia, it is always better to step up and go to the nearest doctor or medical lab in order to confirm or debunk the app's diagnosis. The app then analyzes the conjunctiva before its algorithms allow it to arrive at a prediction, letting you continue from there as to seek further professional help or not.

VIII. ACKNOWLEDGEMENT

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