CHAPTER V

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5.1. THESIS SUMMARY

In this process, diabetes can be identified with the retinal parameters such as extra blood vessels growth in the retina, exudates, microaneurysms, shape of the optic disc. This steered to the expansion of system-based method of discovery and intensity level classifying of diabetic and retinal abnormalities. The system invents a straight application throughout the screening of eye diseases for the comprehensively flourishing diabetic populace.

Chapter-1 delivered the universal Introduction of the components of eye perception, eye diseases and diabetic retina disorders with their implications in the human eye. Along with the Additional description of the inadequacies of the prevailing benefits of automated eye fundus image examination for diagnosis. Chapter - 2 delivered with the momentary literature review associated to prevailing procedures of optic disc extraction, optic cup to disk ratio, Microanyrsms extraction, exudates identification, learning classifiers, along with the Shortcomings of the current algorithms to detect the eye disorders and retinopathy.

Chapter - 3 is dedicated to the pre-processing and depiction of fundus image databases utilized to appraise the approaches. The fundus images acquired from government hospital, Guntur has an extremely huge inconsistency in relation to the disease and image quality. The preprocessing stage was done using different types of filters. The filter performance was calculated by using different types of parameters like (SNR), MSE, SSIM, RMSE, and PSNR. The feature extraction was accomplished by four parameters, such blood vessels, exudates, microaneurysms, shape of the optic disc with image processing algorithms. The image processing algorithms utilized in this procedure are proposed edge detection algorithm, modified fuzzy clustering algorithm, modified morphological algorithm and deformation method respectively. And applied with the algorithm for the segmentation of retinal features, along with the other
characteristics the other few procedures as well. The diabetic stages and eye diseases
are classified into mild, medium and severe using a SVM classifier technique. The
simulated results are compared with the clinically tested blood sample values. The
compared results are found co-equal in both the contextual investigations. The
comparison is illustrated in a tabular form representing the patients name, blood sugar
values, retinal images, segmented results of retinal image and severity.

Chapter- 4 investigated with the algorithm for retinal features detection from blood
sample values with the experimental results expounded with the quantitative analysis
as well. And the extra blood vessels growth, exudates area, exudates perimeter, no of
dots, optic cup to disc ratio are found using the Matlab software. The stages of diabetic
are diagnosed evaluating the diagnostic parameters, along with an approach explicated
to diagnose the diabetics using segmented and textural features pursued with the
sorting of images and a GUI to provide the designed image analysis as well.

In this work, proposed mathematical expression to show the relation between blood
sugar values and retinal abnormal parameters using a polynomial coefficient. The
correlation coefficient is calculated between the above two parameters and both are
found correlated to each other. Amongst 110 images deliberated for appraising the
procedures blood vessels, exudates, Microaneurysms and optic disk are confined.

The retinal images and expansion of mechanized method for the discovering of
diabetic maculopathy has been defined in Chapters 3 & 4, is recognized with the
exudates. The exudative maculopathy discovered with the expanding 2 levels of
segmentation for enhanced precision are accountable by the exudate. The abrasive
division of exudates are accomplished expanding K-Means assembling afford an
enhanced primary rough division after matched with the discrepancy founded
technique projected in the literature. Sufficient division expanding morphological
refurbishment procedure categorized the precise exudates pixels from the background.
Total of 110 images from government hospital Guntur is utilized to appraise the
technique. Regular image founded sensitivity of 97.9% and specificity of 96.1% is
accomplished in the database. Founded on the position of exudates in the macular
expanse, the relentlessness intensities of diabetic maculopathy are categorized into
minor, reasonable and serious. The prevailing prototypes of retinal screening are
affluent, arduous and necessitate proficient ophthalmologists. The advanced automatic method can identify diabetic maculopathy and its intensity level in little period. The example image data utilized to authorize the software can be compared across manual graders through the dissemination of intensity of the disease. The segmental outcomes can display the method applied to various kinds of images provide substantial outcomes. The consequences of every division and enhancement stages display the method efficiently identifies the skinny blood vessels. Subsequently the investigation provides the association among the glucose values in terms of eye varieties. In every feature primeval and irregular varieties in terms of glucose values and ultimately from 4 features of retina, the severity like minor, reasonable and serious which can be evaluated. Throughout this proposal it delivers novel method or procedure to recognize the consideration varieties from the glucose values itself. This might reduce the ophthalmologist’s time to distinguish the eye functions. Graphical user interface was industrialized for facilitating the clinicians throughout the airing process The current ophthalmologists are still found utilizing the old methods such as the iris scanner, digitech technology. But this proposed evaluation and development of this software program will certainly facilitate and revolutionize the face of ophthalmology in discovering the retinal abnormalities from the blood sugar ranges.

5.2 CONTRIBUTION OF THE PROPOSITION
The chief influences of the exposition are abridged as:

The expansion of novel approaches for recognising of the ensuing functional edifices in retina.

1. General pre-processing techniques include
   - Image acquisition and digitization
   - Image denoising and enhancement

2. Segmentation and feature extraction
   - RGB segmentation
   - Exudates extraction
   - Microaneurysms
   - OD Measurements

3. Measurement of Blood vessel thickness & Vein diameter

4. Classification using SVM classifier.
5. The expansion of computer centered method of automatic recognition and severity level categorization of diabetic maculopathy. Likewise, expansion of GUI for supporting ophthalmologists throughout screening procedure.

6. Comparing Classification result with blood sample values.

7. Analysis and case study on eye diseases in terms of the blood sample values.

5.3 FUTURE SCOPE
While the outcomes offered now exhibit the efficiency of the recommended procedures, always we can find tremendous scope of development in the programmed retinal image exploration method.

The division of blood vessels can additionally be utilized in assorted for number of resolves. The presented prophetic aspect for cardiovascular diseases and diabetes is the retinal vascular tortuosity. The change in retinal vascular tortuosity is an indication of intensity or expansion of the disease. A novel method to appraise and enumerate tortuosity discerning the vessel segment's width will be identified. Cataloguing the images of the patient are as simulated expending diverse modalities, the retinal vessel bifurcating facts are utilized as control points can be charted in two images.

Discovery and cataloguing of Diabetic retinopathy is enhanced by recognizing other kinds of lesions like, hemorrhages, microaneurysms and cotton wool spots. Hard exudates recognition is enhanced additionally seeing the additional assembling methods. The method industrialized is proficient in discovering maculopathy comprising recognition and severity of retinopathy. In conclusion, a feature to entrench patient diagnosis data inside the image is always constructive.