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DIABETIC DETECTION USING IRIS IMAGES

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Abstract

For clinical diagnosis, Iris image analysis is one of the most efficient non-invasive diagnosis method which helps to determine the health status of organs. Though correct and timely diagnosis is critical, it is very essential requirement of medical science. From the literature survey that we have done, is observed that lot of modern technologies also fails in diagnose disease correctly. From different perspectives these attempts explore the area of diagnosis. Iridodiagnosis is the branch of medical science, with the help of which different diseases can be detected. Initially the images of eye are captured, database is created with their clinical history, features are found out and finally the classification is done whether the diabetic is present or not. Several classification methods can be used for training and classification purpose. We have implemented Machine learning KNN model, which will be useful in the diagnosis field which is faster and user friendly.

Keywords: Diabetes; health care; decision tree; machine learning; application; classification; approach; algorithm.

Introduction

Multiple opportunities for healthcare are created because machine learning models have potential for advanced predictive analytics. There are already existing models in machine learning which can predict the chronic illness like heart disorder, infections and intestinal diseases. [1-2] There are also few upcoming models of machine learning to predict non-communicable diseases, which is adding more and more benefit to the field of healthcare. Researchers are working on machine learning models that will offer very early prediction of specific disease in a patient which will produce effective methods for the prevention of the diseases. This will also reduce the hospitalization of patients[4,17]. This transformation will be very much beneficial to the healthcare organisations.The MAC modules increase the flexible of DSP pathway creation as a huge set of arithmetic elements can be effective plotted onto them. [5-6,16] Apart from the MAC/MAD processes, several DSP uses are depends on Add and Multiply (AM) processes (e.g., FFT algorithm). The proposal of the AM component, by first assigning an adder after that driving its Yield to the input of a multiplier, increases suggestively both area and critical path delay of the circuit.Pointing an improved design of AM processes synthesis methods are engaged depends on the straight coding of the sum of two numbers (regularly a number in carry-save represent) in its Modified Booth (MB) system [3,18-19]. Thus, [7] the carry-propagate (or carry-look-ahead) adder of the conservative AM proposal is removed subsequent in large improvements of

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performance. [8],[14-15] Presented a signed-bit MB recorder which changes redundant binary inputs to their MB recoding system. An exceptional development of the preprocessing step of the recorder is necessary in order to handing operands in carry-save representation

Related works

Jain and A. [9] Ross Biometric recognition, or simply biometrics, refers to automated recognition of individuals based on their behavioral and biological characteristics. The success of fingerprints in forensic science and law enforcement applications, coupled with growing concerns related to border control, financial fraud and cyber security, has generated a huge interest in using fingerprints, as well as other biological traits, for automated person recognition. Szczepanski et al, [10] a simple and robust solution for the pupil and iris detection is presented. The procedure is based on simple operations, such as erosion, dilation, binarization, flood filling and Sobel filter and, with proper implementation, is effective. The novelty of the approach is the use of distances of black points from nearest white points to estimate and then adjust the position of the center and the radius of the pupil which is also used for iris detection. The [11] obtained results are promising, the pupil is extracted properly and all the information necessary for human identification and verification can be extracted from the found parts of the iris. The paper, being both review and research, contains also a state of the art in the described topic.A. Sansola[12] Iris recognition is a validated and non-invasive human identification technology currently implemented for the purposes of surveillance and security (i.e. border control, schools, military). Similar to deoxyribonucleic acid (DNA), irises are a highly individualizing component of the human body. Based on a lack of genetic penetrance, irises are unique between an individual's left and right iris and between identical twins, proving to be more individualizing than DNA. Importantly, the data showed a false match rate or false accept rate (FAR) of zero, a result consistent with previous iris recognition studies in living individuals. The preliminary results of this pilot study demonstrate a plausible role for iris recognition in postmortem human identification. Implementation of a universal iris recognition database would benefit the medico legal death investigation and forensic pathology communities, and has potential applications to other situations such as missing persons and human trafficking cases. S. K. Saripalle, [3]. Although biometric utility of ante-mortem human iris tissue has been long established, post-mortem study of human iris tissue for its biometric utility has only been speculated. Given obstacles in measuring and analyzing biometric capability of post-mortem human iris tissue, an investigation into the feasibility of using post- mortem Sus scrofa domestics iris tissue as a biometric is undertaken.M. Trokielewicz, [13]. presents a unique analysis of post-mortem human iris recognition. Post- mortem human iris images were collected at the university mortuary in three sessions separated by approximately 11 hours, with the first session organized from 5 to 7 hours after demise. Analysis per- formed for four independent iris recognition. These findings show that the dynamics of postmortem changes to the iris that are important for biometric identification are much more moderate than previously believed. To the best of our knowledge, this paper presents the first experimental study of how iris recognition works after death, and we hope that these preliminary findings will stimulate further research in this area.

1. Proposed Method

The process includes six steps which are

MODULES:

1. Image Acquisition
2. Iris Segmentation & Normalization
3. Liver Part Extraction
4. Feature Extraction
5. Classification

MODULES DESCRIPTION:

1. Image Acquisition:

Image acquisition in image processing can be broadly defined as the action of retrieving an image from some source, usually a hardware-based source, so it can be passed through whatever processes need to occur afterward.

Performing image acquisition in image processing is always the first step in the workflow sequence because, without an image, no processing is possible. The image that is acquired is completely unprocessed and is the result of whatever hardware was used to generate it, which can be very important in some fields to have a consistent baseline from which to work. Test iris images are acquired from gallery.

2. Iris Segmentation & Normalization:

After image acquisition, DCT transform is applied to iris image.Next, a segmentation algorithm is used, which would localise the iris region from an eye image and isolate eyelid, eyelash and reflection areas.

Automatic segmentation is achieved using the circular Hough transform for localizing the iris and pupil regions, and the linear Hough transform for localizing occluding eyelids. Thresholding is also employed for isolating eyelashes and reflections.Third, the segmented iris region is normalized to eliminate dimensional inconsistencies between iris regions.

This is achieved by implementing a version of Daugman’s rubber sheet model, where the iris is modelled as a flexible rubber sheet, which is unwrapped into a rectangular block with constant polar dimensions.

3. Liver Part Extraction:

- In this module, iris normalized image divided into six parts.
- In that, 4th part is the liver part it is identified based on iris chart.
- After liver part identification, thresholding method is used to detect theliver part and only detected liver part is extracted to further process.

4. Feature Extraction:

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In this module, texture features like energy, contrast, correlation, homogeneity and mean features are extracted to liver part based on gray level co-occurrence matrix.

Energy: Entropy shows the amount of information of the image.

Contrast: Measure of the intensity contrast between a pixel and its neighbor over the whole image.

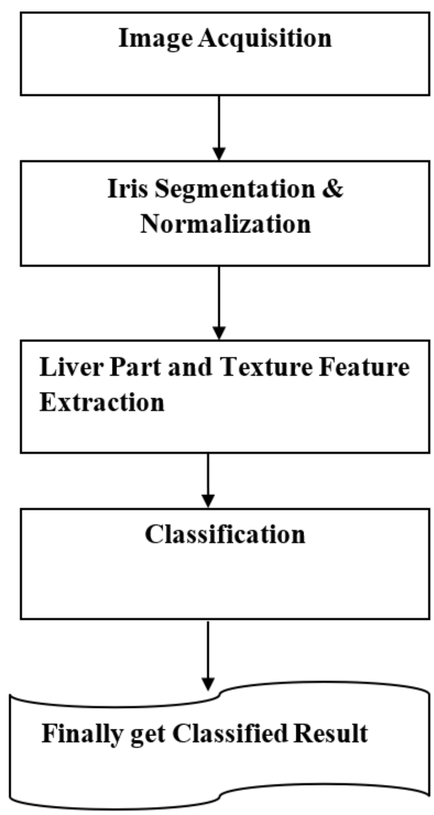
Correlation: Correlation measures the linear dependency of grey levels of neighboring pixels.

Homogeneity: Homogeneity measures the closeness of the distribution of elements in the gray levels.

Mean: Mean defined as the average color value in the image.

5. Classification:

- The classification process is done over the extracted features.
- The main novelty here is the adoption of K-nearest neighbour.
- KNN is applied over the features and the classification is done



2. Results and Discussion

In this work an iris image is taken as required input and it is then is converted from RGB to grey then it is segmented and normalized and important parts are extracted from the image and the extracted region is given as the input to the algorithm (i.e) knn , then the algorithm evaluate the image and predict the person is affect by diabetes or not. Most of the image editing is done using image processing toolbox. and MATLAB is used as the main software here. From the given figure

2 we can say that the person is abnormal (i.e) has diabetes. It is one of the faster, simple and non-invasive method to predict that a person has diabetes or not.

Figure 2 Output Screenshot.

5. Conclusion

This approach is reliable and efficient in carrying out the function of recommending an iris diagnosis and authentication. This would improve the diagnostic phase and give it more trust. The iris is very useful for human authentication and recognition because of its unique and consistent spatial patterns. Such successful iris detection is used to recognize people and verify whether iris is impaired and distinguish the damaged portion of the human eye. Since every part of the iris reflects the various areas of the human body, it will be used to diagnose the different diseases without any more damage to the human body.

References

1. Szczepanski, K. Misztal, and K. Saeed, “Pupil and iris detection algorithm for near-infrared capture devices,” in Computer Information Systems and Industrial Management, ser. Lecture Notes in Computer Science, K. Saeed and V. Snel, Eds. Springer Berlin Heidelberg, 2014, vol. 8838, pp. 141–150. [Online].

2. Sansola A, “Postmortem iris recognition and its application in human identification,” Master’s Thesis, Boston University, 2015.

3. Subburam, S., Selvakumar, S. & Geetha, S. High performance reversible data hiding scheme through multilevel histogram modification in lifting integer wavelet transform. Multimed Tools Appl 77, 7071–7095 (2018). https://doi.org/10.1007/s11042-017-4622-0

4. Rajesh, G., Mercilin Raajini, X., Ashoka Rajan, R., Gokuldhev, M., Swetha, C. (2020). A Multi-objective Routing Optimization Using Swarm Intelligence in IoT Networks. In: Peng, SL., Son,

L.H., Suseendran, G., Balaganesh, D. (eds) Intelligent Computing and Innovation on Data Science. Lecture Notes in Networks and Systems, vol 118. Springer, Singapore. https://doi.org/10.1007/978-981-15-3284-9_65

5. Kathiresan, S., & Mohan, B. (2020). Multi-Objective Optimization of Magneto Rheological Abrasive Flow Nano Finishing Process on AISI Stainless Steel 316L. Journal of Nano Research, 63, 98–111. https://doi.org/10.4028/www.scientific.net/jnanor.63.98

6. G. Indira, A. S. Valarmathy, P. Chandrakala, S. Hemalatha, and G. Kalapriyadarshini , "Development of an efficient inverter for self powered sand sieving machine", AIP Conference Proceedings 2393, 020144 (2022) https://doi.org/10.1063/5.0074347

7. S. K. Saripalle, A. McLaughlin, R. Krishna, A. Ross, and R. Derakhshani, "Post- mortem Iris Biometric Analysis in Sus scrofa domesticus," IEEE 7th International Conference on Biometrics Theory, Applications and Systems (BTAS), 2015.

8. M. Trokielewicz, A. Czajka, and P. Maciejewicz, "Post-mortem Human Iris Recognition," 9th IAPR International Conference on Biometrics (ICB 2016), June 13-16, 2016, Halmstad, Sweden, 2016.

9. "Human Iris Recognition in Post-mortem Subjects: Study and Database,"8th IEEE International Conference on Biometrics: Theory, Applications and Systems, Sep 6-9, 2016, Buffalo, USA, 2016.

10. Warsaw University of Technology, "Warsaw-BioBase-PostMortem-Irisv1.0: http://zbum.ia.pw.edu.pl/en/node/46," 2016.

11. D. S. Bolme, R. A. Tokola, and C. B. Boehnen, "Impact of environmental factors on biometric matching during human decomposition," 8th IEEE International.

12. Senthilkumar, K.K., Kunaraj, K. & Seshasayanan, R. "Implementation of computation-reduced DCT using a novel method. J Image Video Proc. 2015, 34 (2015). https://doi.org/10.1186/s13640-015-0088-z

13. Senthilkumar, K.K., Kumarasamy, K. & Dhandapani, V. Approximate Multipliers Using Bio-Inspired Algorithm. J. Electr. Eng. Technol. 16, 559–568 (2021). https://doi.org/10.1007/s42835-020-00564-w

14. V. S. Harshini and K. K. S. Kumar, "Design of Hybrid Sorting Unit," *2019 International Conference on Smart Structures and Systems (ICSSS)*, 2019, pp. 1-6, doi: 10.1109/ICSSS.2019.8882866

15. A.R. Aravind, K. K. Senthilkumar, G. Vijayalakshmi, J. Gayathri, and G. Kalanandhini , "Study on modified booth recoder with fused add-multiply operator", AIP Conference Proceedings 2393, 020139 (2022) https://doi.org/10.1063/5.0074212

16. G. Vijayalakshmi, J. Gayathri, K. K. Senthilkumar, G. Kalanandhini, and A. R. Aravind , "A smart rail track inspection system", AIP Conference Proceedings 2393, 020122 (2022) https://doi.ohrg/10.1063/5.0074206

17. G. Kalanandhini, A. R. Aravind, G. Vijayalakshmi, J. Gayathri, and K. K. Senthilkumar , "Bluetooth technology on IoT using the architecture of Piconet and Scatternet", AIP Conference

Proceedings 2393, 020121 (2022) https://doi.org/10.1063/5.0074188

18. K. K. Senthilkumar, G. Kalanandhini, A. R. Aravind, G. Vijayalakshmi, and J. Gayathri , "Image fusion based on DTDWT to improve segmentation accuracy in tumour detection", AIP Conference Proceedings 2393, 020120 (2022) https://doi.org/10.1063/5.0074183

19. J. Gayathri, K. K. Senthilkumar, G. Vijayalakshmi, A. R. Aravind, and G. Kalanandhini , "Multi-purpose unmanned aerial vehicle for temperature sensing and carbon monoxide gas detection with live aerial video feeding", AIP Conference Proceedings 2393, 020124 (2022) https://doi.org/10.1063/5.0074193

20. T Sunder Selwyn, S Hemalatha, Condition monitoring and vibration analysis of asynchronous generator of the wind turbine at high uncertain windy regions in India, Materials Today: Proceedings, Vol. 46, pp3639-3643, 2021.

21. T Sunder Selwyn, S Hemalatha, Experimental analysis of mechanical vibration in 225 kW wind turbine gear box Materials Today: Proceedings, Vol. 46, pp 3292-3296, 2021.

22. S Hemalatha, T Sunder Selwyn, Computation of mechanical reliability for Sub-assemblies of 250 kW wind turbine through sensitivity analysis, Materials Today: Proceedings, Vol. 46, pp 3180-3186, 2021