



BLOOD GROUP IDENTIFICATION USING DEEP LEARNING AND IMAGE PROCESSING - A REVIEW OF LITERATURE

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ABSTRACT Before administering a blood transfusion in an emergency, it's critical to know your blood type. Currently, these tests are carried out manually by laboratory personnel, which can be tedious and lead to human errors when dealing with a high number of samples. The suggested system attempts to provide an embedded system that performs blood tests using an image processing algorithm based on the ABO and Rh blood typing systems. The suggested method reduces human intervention and performs the entire test autonomously, from antigen addition through result creation. The suggested system attempts to provide results in the quickest time possible while maintaining precision and accuracy, as well as storing the results for future reference. As a result, the technology enables us to detect a person's blood type, obviating the need for traditional transfusions based on the universal donor concept, lowering the risk of transfusion reactions, and storing the results without human mistake.

1.INTRODUCTION

Blood group identification is the key step to ensure blood transfusion safety. In the case of emergency blood transfusion, rapid identification of the type of blood is essential, directly related to the survival of the patient. Blood Typing system is basically used to determine the blood group that the person possesses. Blood Detection is most important and essential activity. The differences in the blood group of individuals are due to presence or absence of certain protein molecule named as antigens or antibodies. The antigen is any foreign substance that causes an immune response either alone or it forms a complex with a large protein molecule. Antibodies are the proteins produced by the immune system to defend against the foreign substances that may cause harm to our body, therefore, they are the guards of our body. The ABO blood group system is found and identified as the first human blood group system by Austria Rand Steiner in early nineteenth Century. There are 4 major blood groups based on presence or absence of antigen on the surface of RBC (Red Blood Corpuscles) . Blood groups are divided into four types i.e. A, B, AB and O. ABO blood group detection follows the agglutination method and then it goes for a machine recognition. The agglutination reaction means that occurred reaction between the antibody and the antigen, indicating the presence of the antigen. Group A has only the A Antigen on the blood cells Group B has only the B antigen on the blood cells. Group AB has both Antigen A and Antigen B on their blood cells. Group O has neither Antigen A nor Antigen B on their blood cells. Based on the compatibility of blood groups the blood transfusion is done. Not all the blood groups are compatible with each other. So for safe transfusion of blood determining the blood group is mandatory. Nowadays blood group detection is done manually by lab technicians but there are some drawbacks of this traditional method like this technique consumes more time. Also in some cases if appropriate blood group is not detected then it may result in the death of an individual.

2.LITERATURE SURVEY

2.1 Selvakumari, T.M. (2011). Blood Group Detection Using Fiber optics, American Journal of Physics, vol.4, issue 3, pp.165-16.

Determining of blood types is very important during emergency situation before administering a blood transfusion. Presently, these tests are performed manually by technicians, which can lead to human errors. Determination of the blood types in a short period of time and without human errors is very much essential. A method is developed based on processing of images acquired during the slide test. The image processing techniques such as thresholding and morphological operations are used.



This paper based on literature survey of different types of blood group determination method. The developed automated method determines the blood type using image processing techniques. Also we discuss the methodology & advantages of human blood group determination using SIFT, SVM classifier. The developed method is useful in emergency situation to determine the blood group without human error. Before the blood transfusion it is necessary to perform certain tests. One of these tests is the determination of blood type and this test is essential for the realization of a safe blood transfusion, so as to administer a blood type that is compatible with the type of receiver. There is certain emergency situation which due to the risk of patient life, it is necessary to administer blood immediately.

2.2 Mehdi HasanTalukder, Md. Mahfuz Reza, Mahbuba Begum, Md. Rabiul Islam, Md. MahmudulHasan, "Improvement of Accuracy of Human Blood Groups Determination using Image processing Techniques", (MBSTU) Santosh, Tangail, Bangladesh IJARCCCE Vol. 4, Issue 10, October 2015.

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2.3 Ryszard S, Romaniu and Jerzy Gajda (2013). LASER Technology and Application 2012, International Journal of Electronics and telecommunications, vol.59, pp.195-202.

The research and technical achievements in the area of lasers are summarized every three years by the National Symposium on Laser Technology held in the Baltic Sea Resort Swinouj ´ scie near Szczecin, Poland. The paper presents a review ´ of the main symposium subjects tracks debated during this key national laser event in September 2012. There are shown development tendencies of laser materials and technologies and laser associated branches of optoelectronics in this country, including the efforts of academia, governmental institutes, research businesses and industry. The symposium work are divided to two branches: development of lasers and laser applications, where the laser systems operators and laser users present their achievements. Topical tracks of the meeting are presented, as well as the keynote and invited subjects delivered by key representatives of the laser industry. The STL 2012 was a jubilee meeting held for the Xth time. VERY three years the organization team of then Technical University of Szczecin and now West Pomeranian University of Technology in Szczecin duly prepares a cyclic National Symposium on Laser Technology (STL). The 2012 STL was held in Swinouj ´ scie near Szczecin in September. ´ The Symposium is intentionally held as a national event to enable a free exchange of research, technology, construction and application ideas.

3.PROPOSED SYSTEM

The point of this framework is to give an outcome inside the most brief conceivable time with exactness and precision alongside capacity of result for additional utilization[55]. The framework utilizes picture handling calculation to performed blood test dependent on ABO blood composing framework. The picture of the plate area is divided and distinguished naturally. At that point, the middle channel is utilized to smother the clamor to get the best estimation of the first picture.

At that point, the trademark parameters of ABO blood bunch are removed by the dark level dissemination of the picture. At long last, joined with the agglutination response among antigen and immunizer, the last blood bunch was resolved [56]. Along these lines this framework is useful in a crisis circumstance to decide blood bunch without human mistake

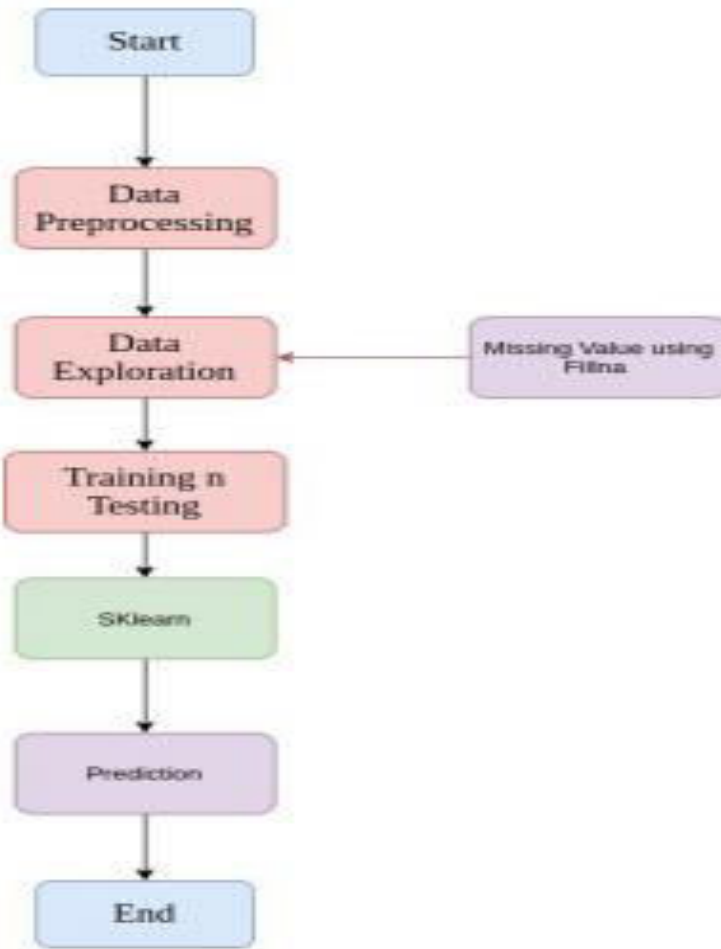


Fig 1:Flow chart

4.RESULTS AND DISCUSSIONS

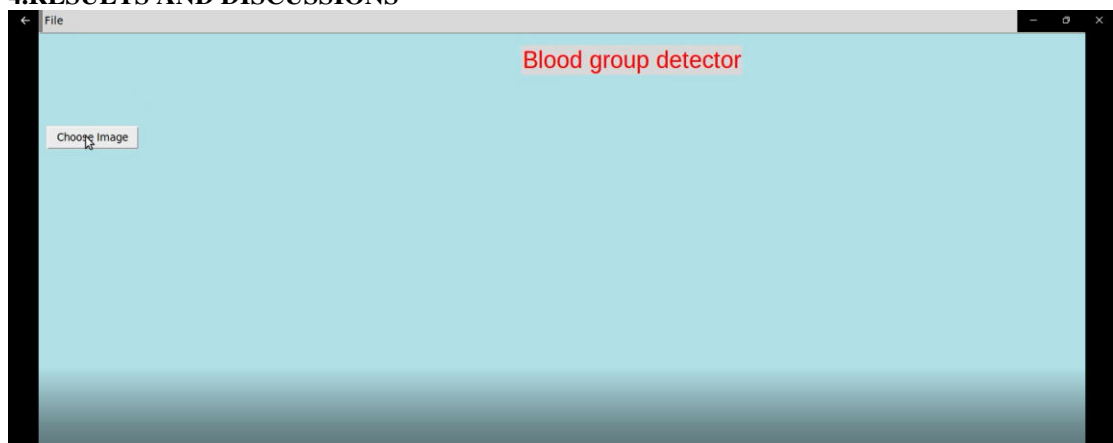


Fig 4.1 Choose image

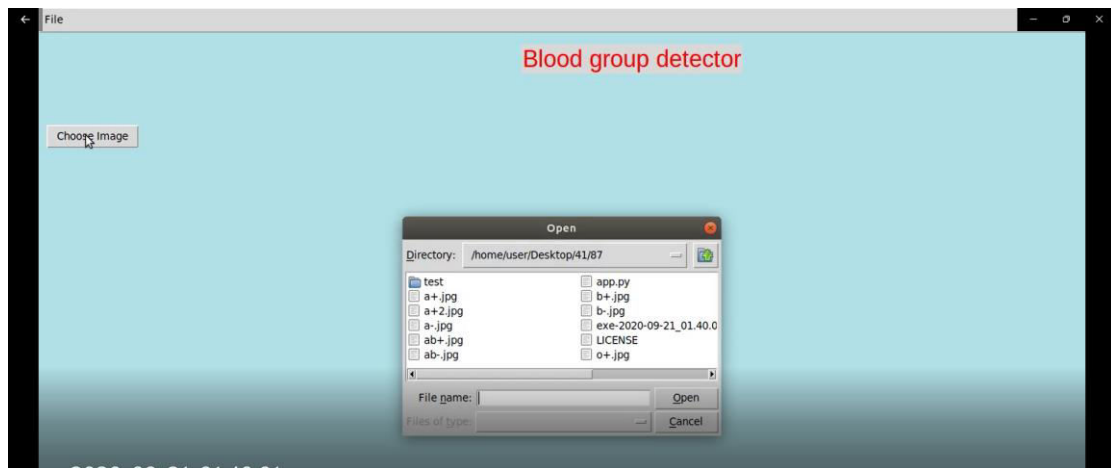


Fig 4.2 Upload image

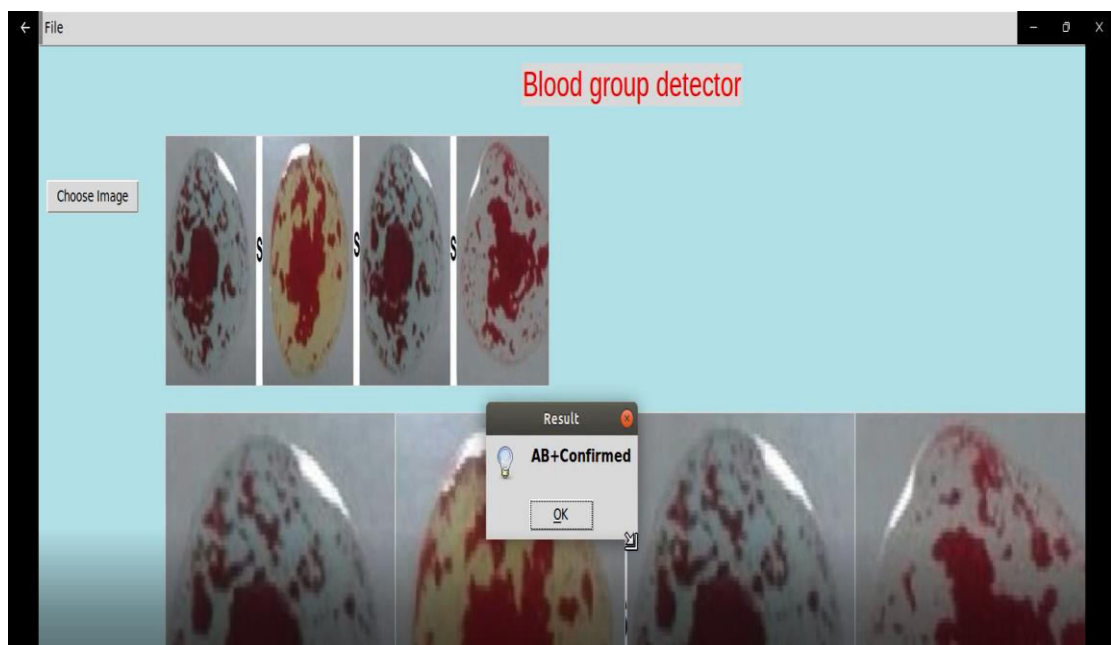


Fig 4.3 Blood group detected



Fig4.4 K-means Cluster

5.CONCLUSION

This assignment allows blood kind detection except the use of invasive techniques like syringes, needles, etc. This can without difficulty be used for in-home requirements. It is an cheaper technique which helps in rapid and right get right of entry to to blood detection. It helps to keep away from ailments like Hepatitis, HIV, etc. It is exceptional for human beings who have concern of needles. This assignment comes accessible for instances the place speedy blood detection is urgently required for emergency cases. As the world is transferring in the direction of science in each and every field, this undertaking takes a primary step in shifting in the direction of it . There are three levels concerned in the project- photo acquisition, preprocessing, binary conversion in conclusion. All we want is a Logitech webcam digital camera to take the photo of a finger-tip of a human body. The preprocessing stage eliminates the undesirable noises from the photo and converts it to an infrared image. The filter used in preprocessing stage is median filter which is a non-linear digital filtering technique. There are different sorts of filtering methods like suggest filter, gaussian filter, adaptive filter, etc. however the purpose we use median filter is that is it is much less touchy to boundary values as in contrast to different filters and so can retain it whilst disposing of undesirable noises. For entire elimination of noises, we first add some noise to it so that all hidden and unhidden noises are removed. The picture is resized and the photo in the subsequent stage the place its pixels are used to derive positive elements which assist in segregating the blood groups. The characteristic extraction is achieved with the assist of GLCM or Gray Scale Co-occurrence matrix. Once the elements are derived the blood businesses are labeled in to quite a number sorts namely, O+,A+,B+,AB+,O- , A-, B-, AB-. The terrible and tremendous values are decided by way of the presence or absence of an antigen known as rhesus in positive blood groups.

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3. Mohammad Reza Rakhshani and Mohammad Ali Mansouri-Birjandi , “Engineering Hexagonal Array of Nanoholes for High Sensitivity Biosensor and Application for Human Blood Group Detection” , March 08,2018
4. Manuel González-Hidalgo, F. A. Guerrero-Peña, S. Herold-García, Antoni Jaume-i-Capó, and P. D. Marrero-Fernández, “Red Blood Cell Cluster Separation from Digital Images for use in Sickle Cell Disease”, September 08,2015

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