Research Article

A Novel Blood Group Detection Using Deep Learning

D. Jayaram,
Assistant Professor,
Dept. Of MCA,
Chaitanya Bharathi Institute of Technology (A),
Hyderabad -500075.
mail: jayaramcbit1974@gmail.com

J Shiva Sai
Assistant Professor,
Dept. Of CSE,
Chaitanya Bharathi Institute of Technology (A),
Hyderabad -500075.
mail: shiva.jakkuva@gmail.com

ABSTRACT

Division and tallying of platelets are considered as a significant advance that assists with separating highlights to analyze some particular ailments. The manual tallying of RBCsin minuscule pictures is an amazingly dreary, tedious, and off base procedure. Programmed investigation will permit hematologist specialists to perform quicker and more precisely. Examination of blood classification plays an imperative gathering in the restorative field for any treatment. False transfusion of blood will prompt numerous issues. This framework gives simple and quick methods for distinguishing proof of blood classifications and Rhesus factor none obtrusively. Our structure is tried on a few genuine informational collections of numerous individual images of human finger-tip images. Blood classification is grouped dependent on the nearness and nonappearance of certain organic substances called antibodies and furthermore dependent on the nearness or nonattendance of acquired antigenic protein substances on the surfaces of the erythrocytes in the body. Along these lines by utilizing the optical properties of the antigens and the rhesus calculate present the blood, the blood gatherings can be ordered.

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 machine recognition. The agglutinationreaction 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.

LITERATURE SURVEY

Dr. Kiran Y. C proposed a system as per the present framework the discovery of blood gather is moderate and furthermore not exact. At present, human blood groups are resolved physically through slide test. So presented the solution for Image processing techniques used for determination of the blood types such as Preprocessing techniques, Morphological operations, Thresholding HSL Luminance plane Quantification and after using this techniques it resulted different pre handling systems, for example, shading plane extraction, dim and twofold transformations were utilized. The caught pictures ought to have same power and they are preprocessed to a similar size for handling. In Mrs. G. Sangeetha Lakshmi, and Ms.M.Jayashree, Automated blood group recognition system using image processing Traditional way of detecting blood group have remained analogue in this era and are therefore vulnerable to human fallibility. To develop an system which uses image processing algorithm to perform blood tests based on ABO and rh blood typing system. Here the improved results were observed and it Helps reducing human intervention and perform complete test autonomously from adding antigen to final generation of result.

PROBLEM ANALYSIS

This project we will develop using python and web technology. First we will collect raw blood image from various hospitals and medical labs. Then these images are preprocessed by using machine learning algorithm. We will Cleans the data for doing image processing. Then we are doing preprocessing on the dataset. The local binary pattern (LBP) is applied to these images. Using classification algorithm, we will classify the image as blood groups. Once model will generated, take the raw image from patient for blood group detection. These all-purpose we are using python as backend, MySQL is database and for frontend html, css, JavaScript.
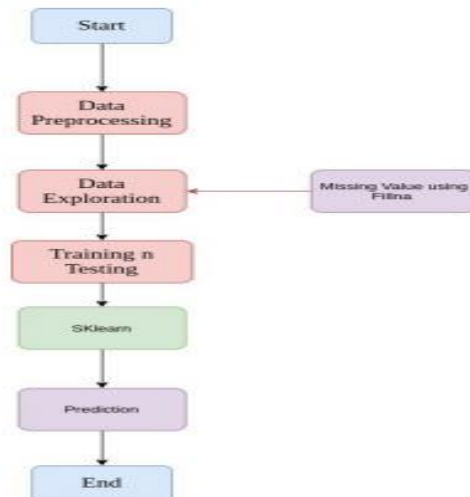
In this diagram, it explains that the image is uploaded directly from the camera, next it undergoes pre-processing where we machine learning methods like grey scaling, binarization and thresholding are used for processing. Once the image is preprocessed it next goes for image segmentation where we get four image parts from thatfeatures are extracted, the extracted feature is sample matched on matching we get prediction data upon that we can tell which type of blood group it is. The result is stored in database for further use.

PROPOSED WORK

Certain standardized tests are necessarily to be performed before the blood transfusion, one such standardized test is blood group detection and this is essential for the safe transfusion of the blood, so that blood type of the donor is compatible with the blood type of the receives. During emergency situations, blood transfusion is very necessary and blood group detection is manually done in laboratory which takes more time. In blood group O negative which is consider universal donor there is low risk of incompatibility. Delay in time can also lead to the death of a patient secondly; the pretransfusion tests are performed manually by technician, sometimes this lead to the human error which causes fatal consequence for patent. So in order avoid such consequences, we have come up with an automated system which detects the blood group in a faster manner and also a special type of blood group known as Bombay blood group (also called HH group) can be detected. Both Bombay blood group and group O negative gives the same result when mixed with reagents antigen A, antigen B, and antigen D. this leads to confusion, so in order to avoid such situation antigen H is added to the blood sample, so that Bombay blood group could be easily identified.

RESULTS AND DISCUSSION

The method developed proves that it is effective and efficient method to detect the agglutination and determines the blood type of the patient accurately. The use of image processing techniques enables automatic detection of agglutination and determines the blood type of the patient in a short interval of time. The method is suitable and helpful in emergency situations. The proposed system aims to develop a system which uses Image processing algorithm to perform blood tests based on ABO and Rh blood typing systems. The input taken to this system is a blood sample whose images are captured and forwarded to the image processing algorithm. It uses algorithm for classification of images and pattern matching algorithms for matching of images. It makes use of GPU for faster computation of the process of blood detection.
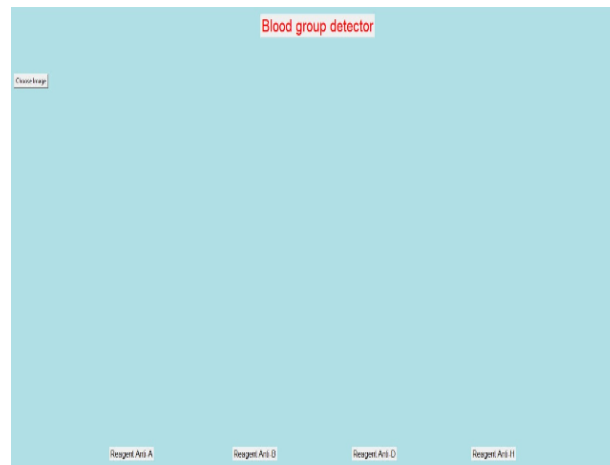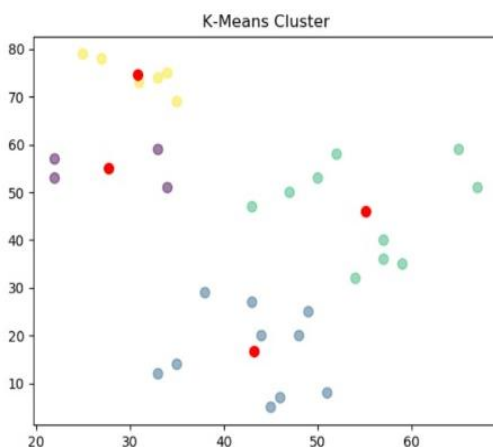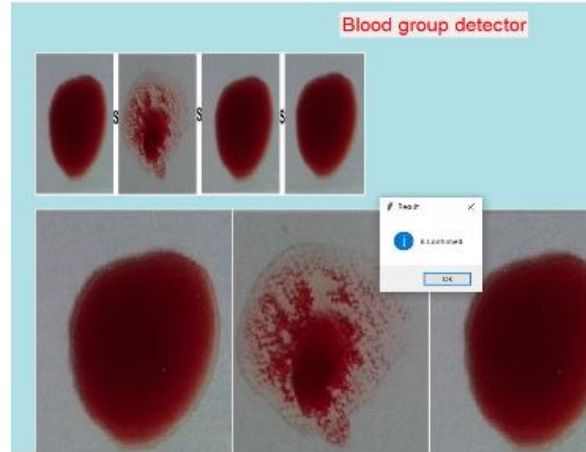
CONCLUSION

This project enables blood type detection without the use of invasive methods like syringes, needles, etc. This can easily be used for in-home requirements. It is an inexpensive method which helps in quick and correct access to blood detection. It helps to avoid diseases like Hepatitis, HIV, etc. It is best for people who have fear of needles. This project comes handy for cases where rapid blood detection is urgently required for emergency cases. As the world is moving towards technology in every field, this project takes a major step in moving towards it . There are 3 stages involved in the project- image acquisition, preprocessing, binary conversion in conclusion. All we need is a Logitech webcam camera to take the picture of a finger-tip of a human body. The preprocessing stage removes the unwanted noises from the picture 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 other types of filtering techniques like mean filter, gaussian filter, adaptive filter, etc. but the reason we use median filter is that is it is less sensitive to boundary values as compared to other filters and so can preserve it while removing unwanted noises. For complete removal of noises, we first add some noise to it so that all hidden and unhidden noises are removed. The image is resized and the image in the next stage where its pixels are used to derive certain features which help in segregating the blood groups. The feature extraction is done with the help of GLCM or Gray Scale Co-occurrence matrix. Once the features are derived the blood groups are classified in to various types namely, O+,A+,B+,AB+,O- , A-, B-, AB-. The negative and positive values are determined by the presence or absence of an antigen called rhesus in certain blood groups. We collect the dataset from hospitals and train the data.

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