

# Automated Blood Group Detection System Using Image Processing

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## Abstract

*The determination of the blood group is very important in the event of an emergency. The method is based on image processing and machine learning technology, it is currently very, very quickly, and it is widely used in the field of medicine. In this system, we can provide a more accurate and faster on the uptake of the human blood groups, on the basis of computer vision and machine learning technologies. Sometimes, the human eye can give us inaccurate results, but if we are to determine the blood group and with the help of computer vision with the help of machine learning technologies, this is a small error in the results that are calculated and set by the man disappears. With the help of computer vision technology, we can have even better results, as the technology is developing faster and faster. With this method, you will be able to quickly and accurately determine the blood type.*

**Key Words:** Image Processing, Machine Learning, Computer Vision.

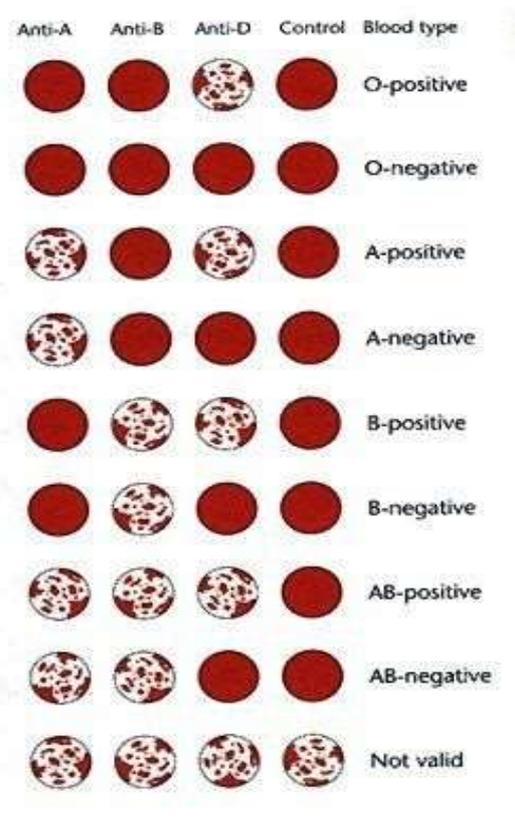
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## 1.INTRODUCTION

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. There are 4 major blood groups based on presence or absence of antigen on the surface of RBC (Red Blood Corpuscles) 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. An automated blood detection system will detect the blood group within a fraction of a second. Also, the manual intervention is less so human errors are completely eradicated.

## 1.1 EXISTING BLOOD GROUP TEST



To work out blood group of a person, red cells of that person are mixed with different antibody solutions. If, for example, the solution contains anti-B antibodies and the person has B antigens on cells, it will clump together. If the blood does not react to any of the anti-A or anti-B antibodies, it is blood group O. A series of tests with different types of antibody can be used to identify blood group. If the person has a blood transfusion, the blood of the person will be tested against a sample of donor cells that contains ABO and RhD antigens. If there is no reaction, donor blood with same ABO and RhD type can be used. It indicates that the blood has reacted with certain antibody and is therefore not compatible with blood containing that kind of antibody. If the blood doesn't agglutinate, it indicates that blood doesn't have antigens binding the special antibody in the reagent. In existing system, blood group is determined manually. In this system, adding solutions such as anti-a, anti-b, anti-d to the three samples of blood took place. After some time, agglutination may or may not occur. Depending upon the agglutination, blood group can be determined by the person manually. Disadvantages of this system are more chances of human errors are possible. Only experts can tell the blood type by seeing at the agglutination process.

## 1.2 OBJECTIVES OF PROJECT

- To improve the accuracy of human blood group determination and classification of blood type using image processing.
- To reduce the time required for blood group detection.
- To send notification automatically to the donor when there is a shortage of any blood group.

### 1.3 LITERATURE SURVEY

| Title   | Year Published | Technique's Used         | Algorithm                            | Demerits  |
|---|----------------|--------------------------|--------------------------------------|---|
| Improvement of accuracy of human blood groups.                  | Oct 2015       | Name Plate               | Thresholding                         | Requires minutes which is excessive especially in emergency situation   |
| Determination and classification of blood types                 | Feb 2017       | Morphological processing | Quantification                       | More chances of human error are possible only experts can tell the blood type by seeing at the agglutination process. |
| ABO blood group detection based on image processing technology. | Feb 2017       | Feature extraction       | Niblack segmentation, Otsu algorithm | Gives accurate result but time consuming  |

### 2. PROPOSED ARCHITECTURE



This is Hardware part of our system. Here we have taken blood samples by putting Antigen A, B and D resp. in it on three glass plate. Firstly, give power supply to our system and then press start button to start the system. Once the system is started it will ask for putting Anti -A slide which means the glass plate on which we putted blood samples and mixed Antigen A in it likewise after 3 seconds system will ask for putting Anti-B slide again after 3 seconds it will ask for putting Anti - D slide. Based on agglutination it will display result of blood group detection.

### 3. MESSAGING SYSTEM:



This System Provide 3 Main Functionality.

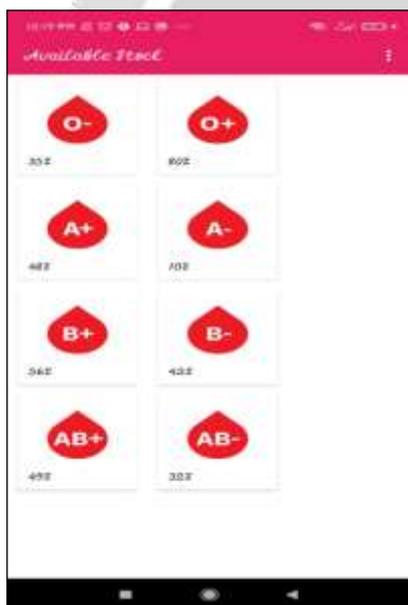
### 1. Register User

- When user visit the Hospital to identify his/her blood at that time admin register some important detail of user like his Name, Phone no, State & Determined Blood group. After Click on submit button we will get notification that submit successful. These information will store in Database, Which will use later for message sending purpose.

**2. Search User**



**3. Check Availability of Blood Stock**



- Now check the Availability of blood stock , if blood stock below 20% , it means we have deficiency of that blood group. So admin has a responsibility to increase that blood stock. So he go to Search donor then enter the deficient blood type Then select deficient blood type & state and Search the respective donar and send the messages to all the donars at a time.



The message like “Due to deficiency of blood group A negative Please donate blood in nashik blood bank at nashik. Contact us : 9139750025, 7057031538.



**3. RESULT :**

| Blood Group | No of Samples Tested | Samples Detected Correctly |
|-------------|----------------------|----------------------------|
| A+          | 8                    | 8                          |
| A-          | 5                    | 5                          |
| B+          | 9                    | 9                          |
| B-          | 5                    | 4                          |
| AB+         | 7                    | 7                          |

|               |    |    |
|---------------|----|----|
| AB-           | 6  | 5  |
| O+            | 10 | 10 |
| O-            | 10 | 10 |
| Total samples | 60 | 58 |

We have applied 5 to 10 samples of each blood group and check the result given by our system. & It is observed that blood group detected by proposed system gives the correct result . but only it is to be noted that slides must be in front of camera for at least 3 second. If the slide is exposed for less than 3 seconds then the image of same slide will be taken again and result obtain may be wrong .

#### 4. CONCLUSIONS

For quick and accurate blood type identification in the event of an emergency blood transfusion, it provides a rapid, accurate, and reliable method for the detection of a person's blood type. Many of the experiments show that this method can quickly and accurately determine whether or not the reaction is agglutination of the blood serum antibodies, and to obtain a determination of the type of the first part of the group, in order to comply with the mandatory requirements of the automatic detection of blood groups. Our future scope is the to test the system for more samples of all the blood group.

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