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NON INVASIVE BLOOD GROUP DETECTOR USING IRSENSOR

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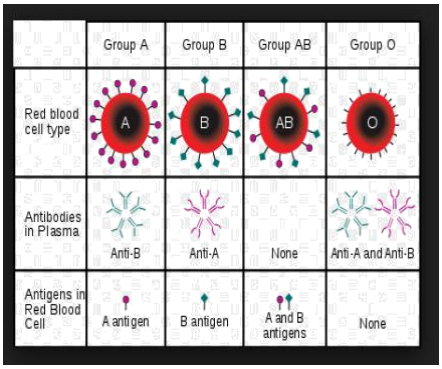
Abstract

The estimation of blood group of an individual is important in different circumstances like transfusion and transplantation. Every individual have a different antigen in their red blood cells. An individual above six month of age have antigen formed in the outer layer of the RBC which determines the blood group of a person .The conventional method involves drawing of blood sample from the patient and adding chemical reagent to the blood and interpreting the blood group of the patient .Based on the agglutination of the antigen with the antibody present in the blood samples. It may consume time, there are chances of clinical errors. When there arises incompatibility of blood it may become fatal as the antibody may destroy the red blood cells in the blood of the donor. In the proposed method the puncturing of patient's skin is avoided. optical signals reflected from the patient antigen is used to detect the blood group.IR sensor is used in the experiment emits a light when a voltage is generated across its terminals.The emitted light is reflected back by the antigen present on the surface of the RBC.The ray reflected back is received by the receiver it generates a voltage based on the intensity of the reflected light .The optical property may differ for every antigen thus based on the voltage generated blood group of the individual is found. The method consumes less time hence can be used economically in hospitals.

Keywords: Blood Group,Antigen,optical property,IR sensor.

1. INTRODUCTION

The blood group of an individual is determined based on antigen present on the surface of the Red blood cells. Austrian immunologist Karl Landsteiner found ABO blood group of human for which he was awarded noble prize for making blood group determination easier[1]. Transfusion and transplantation may become risky if the blood group is not appropriately found. As ABO incompatability may lead to Acute Haemolytic transfusion reaction[1]. Slide test by collecting blood samples from the patient is used to determine blood group in existing method. Classificaton of blood group based antigen and antibody agglutination is carried out in conventional method of blood group detection. Blood type A has antigen A and type B has a antigen B ,type AB has both antigen A&B and blood type O has no antigen .The determination of blood group is based on the agglutination of the different antigen with their respective antibodies[1].The proposed system uses the voltage generated by the IR sensor to determine the respective blood group .The method consumes short span of time and is available at affordable cost.The method serves to be useful during emergency situations.



2. **WORKING METHOD**

2.1 **TECHNIQUE**

1) The finger is placed on the IR transmitter the sensor transmits light through the skin of the patient due to the voltage generated across its terminals.

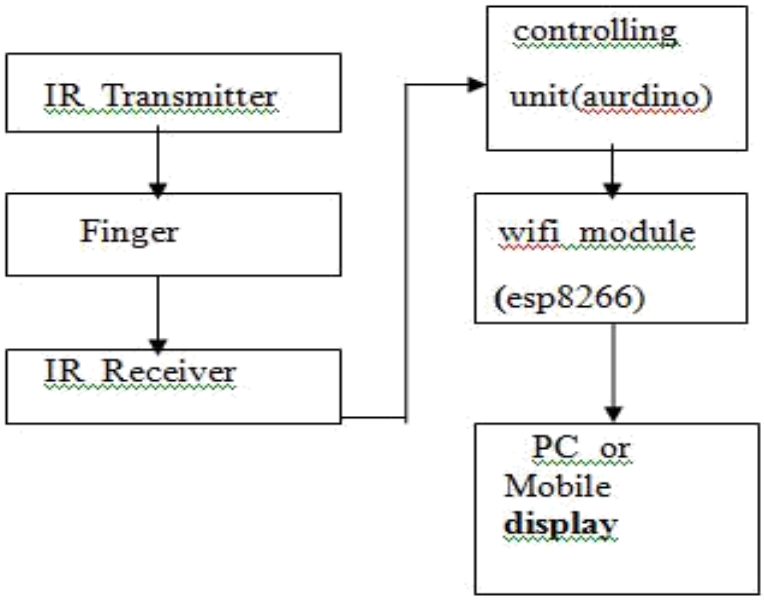
2) The transmitted light is absorbed by the antigens present on the surface of RBC it reflects back the light to the IR receiver.

3) The reflected light is captured by the IR receiver and generates a voltage accordingly to the pattern of light absorbed.

4) Different antigen reflect light in Z unique pattern which is used in determing the blood group of an individual

5) Thus the blood group of an Individual is detected.

BLOCK DIAGRAM

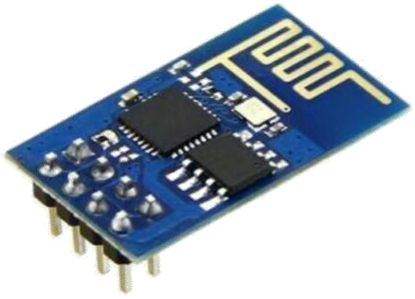


COMPONENTS

ARDUINO

Arduino is programmable with Arduino IDE .It has 14 analog pins and 6 digital pins.Universal serial buses are used for loading program from the computer.

WIFI MODULE



The wifi module is used to store and view data in the cloud.It is used to make simple TCP/IP connections. It contains 1MB of flash memory.

TRANSFORMER

Transformers are essential for the transmission and distribution of alternating current. Step down transformer is used to reduce the voltage and give it to the circuit. It works on the principle of faradays law of induction

IR SENSOR

IR sensor consists of a transmitter and receiver. Photodiode is used as IR receiver. IR transmitter emits IR radiation which cannot be seen through naked eyes. LM358 operational amplifier is also used. The sensor works on the basis of the absorbtion and emission of infra red Light.

CONCLUSION

The invasive method of blood group detection may consume more time.The complex procedures carried out in laboratories using chemical reagent may cause clinical errors .Such errors during transplantation and transfusion cause ABO incompatability ,which may leadto Auto Haemolytic Transfusion Reaction. Hence to overcome such drawbacks non invasive method of blood group detection is proposed.

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