SYNOPSIS

PROJECT REFERENCE NO.	**46S_BE_2671**
TITLE OF THE PROJECT	BLOOD GROUP DETECTION

NAME OF THE COLLEGE	DAYANANDA SAGAR ACADEMY OF TECHNOLOGY AND MANAGEMENT-560080
DEPARTMENT	ELECTRONICS AND COMMUNICATION ENGINEERING DEPARTMENT

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INTRODUCTION

Deep learning methods, such as Convolutional Neural Networks, can also be used to analyze images and classify different classes of objects. There are many applications for this blood detection system, especially in areas where access to laboratory facilities may be limited. This system can be used to identify the correct blood group of donors at blood donation camps, or in rural areas where laboratories may not be available. Ultimately, this technology can help ensure the safety and success of medical procedures that require the correct blood type.

This is the background information on detecting blood group: A light-emitting diode (LED) serves as a semiconductor light source. This LED exploits the phenomenon of electro-luminescence, which generates photons when electrons and holes recombine. To convert the emitted light into a voltage signal, an OPT101 optical detector is employed, which is then amplified by an operational amplifier (OP-AMP). The detection range of this setup spans from 300nm to 1100nm.This proposed system differentiates itself from existing non-invasive

techniques by leveraging LED technology instead of relying solely on photoplethysmographic principles. By utilizing LEDs and avoiding light scattering, the system offers enhanced accuracy compared to other methods. In summary, puts forth a system that utilizes an LED as a semiconductor light source, harnessing the electro-luminescence effect. The system employs an optical detector and an OP-AMP to convert the emitted light into a voltage signal, providing a wider detection range and improved accuracy compared to conventional techniques.

OBJECTIVES

- To create our own dataset for training and testing purposes
- To develop a CNN model that can classify various blood groups
- To improve the accuracy of the model by pre-training it on an image dataset.
- To utilize Genetic algorithm, to classify each blood group from the features extracted from PPG signals.
- To generate a PPG signal to get the features from the dataset (NIR images).**5.2**

METHODOLOGY

The actual process in detecting the blood group starts from now with the comprises of all the components in detecting this blood group, and it follows with the use of the dataset collection and the system design and the components that are used in detecting blood group.

In this, the picture of a human being will be collected and stored in the dataset. These images are the main input formats and datasets for this model. In this model, the blood slide images (palm or hand) is been captured using a NIR camera or by passing NIR lights to get the rays reflected. The slided image is been pre-processed. This pre-processing involves several steps: We explored various existing datasets to find a suitable one for our project, but unfortunately, we couldn't find any that met our specific requirements in terms of raw photo data. The datasets we came across primarily consisted of representations using RGB values rather than actual photos. Consequently, we made the decision to construct our own dataset from scratch, following the steps outlined below.

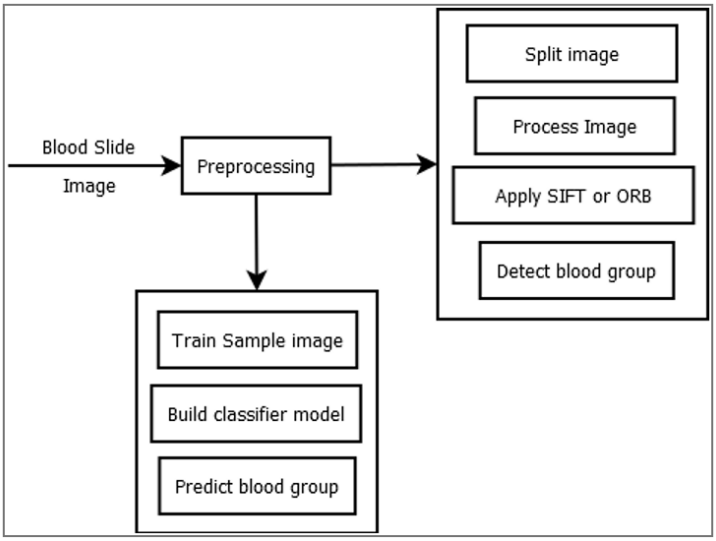


Fig 1: Block diagram

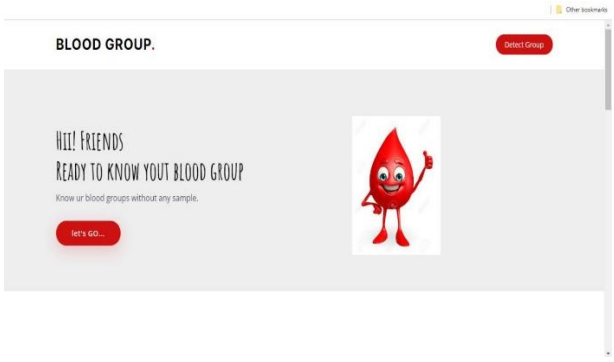
For blood group detection, we require a special type of images, such as NIR images or Hyperspectral images. These images are very hard to find and we require a sto get this type of images.

Fig 2: NIR image

NIR image exerts some excellent features which help in detecting blood group but these images are very hard to find. They use a specialised cameras to get the images or the NIR spectrum light is passed to the object and te image is been detected and the PPG signal is been generated. So, After looking on the difficulties it became the biggest challenge to achieve the dataset, so for that case we considered another type of image which are quiet possible to get, in comparision to NIR images..

RESULTS AND CONCLUSION

In our work, the CNN models for the dataset were developed, it was important to provide a user interface that could enable users to interact with the models. To achieve this, a web application was built with the aim of ensuring that the user interface is simple and easy to use. The web application was developed using a combination of different programming languages. HTML, CSS, and JavaScript were used for creating the front-end of the application while Python was used for the back-end of the application. HTML was utilized for the overall structure of the web pages, CSS was used for styling the content of the web pages, and JavaScript was employed for interactivity and client-side validation of user inputs



. Fig 3: GUI

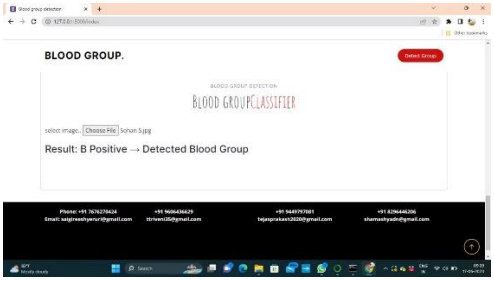


Fig 4: GUI with Result

This web application is made using Bootstrap, HTML /CSS and Javascript. This is the home page for the web application and it consists of all the hyperlinks regarding testing and how the blood group is tested and what is the uses of blood testing and so on. Our method uses a distinct strategy to identify and understand features extracted from PPG signal, whereas other studies mostly concentrated on hardware implementation like LED and IoT to recognise hand printings.

CONCLUSION

In this report, Detection of blood type of a person is very essential in urgent situation or during blood transfer. Non-invasive blood group detection using the Inception V3 model offers a promising and convenient alternative to traditional invasive methods. One of the key benefits of using Inception V3 for non-invasive blood group detection is its ability to learn and extract features from images. With its deep neural network structure, Inception V3 can learn to recognize complex patterns and features associated with different blood groups, enabling accurate and efficient blood typing without the need for invasive procedures. . One of the

challenges is the need for a large and diverse annotated dataset to train the model accurately. Additionally, variations in lighting, and other factors can affect the accuracy of the model, and ongoing research is needed to improve the model's robustness. With further advancements in training techniques, dataset availability, and optimization of the Inception V3 model, this approach has the potential to revolutionize blood typing procedures, improve healthcare accessibility, and enhance patient care outcomes.

SCOPE FOR FUTURE WORK

We aim to improve accuracy, especially in the presence of complex backgrounds by employing a variety of background elimination strategies.

We are also considering ways that will improve in the most reliable way of working model. In order to extracting images in conditions of low light. To make it easier for users to access this project, it might be improved by being developing a particular code forconverting a RGB image to the NIR image using Computer vision technology. Additionally, the project as it only supports NIR images or hyperspectral images; but, with the suitable data collection and training, it might be expanded to support RGB images. However, this project uses a finger spelling translator to translate sign language into speech. Therefore, further processing would be needed for more accurate performance to detect the blood group of individuals

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