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DEPARTMENT OF INFORMATION TECHNOLOGY

IT3811 - Project work

Third Review

Fingerprint-Based Blood Group Detection Using Deep Learning and Image Processing

Submitted by

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Abstract

1 Blood group prediction is crucial for medical diagnostics and emergency care.

2 Traditional methods are invasive, time-consuming and rely on laboratory resources.

3 This project proposes a non-invasive approach using fingerprint images and Convolutional Neural Networks (CNNs).

4 The method is faster, cost-effective and accessible in resource-limited or emergency settings.

5 Through experimentation, the proposed system has shown promising results for real-world healthcare application.

Introduction

- Traditional blood group testing depends on serological methods involving blood samples and lab equipment.
- These are not suitable for emergency or rural healthcare scenarios.
- With advancements in **deep learning** and **image processing**, we explore an alternative: predicting blood groups from **fingerprint patterns**.
- The project introduces a **CNN-based approach** that improves speed, accessibility and affordability in diagnostics.

Future Work

Data Expansion

Collect a larger fingerprint dataset for better accuracy.

Mobile Application

Develop a mobile app version of the system.

Real-time Integration

Integrate real-time fingerprint scanner input.

Explainability

Add explanation tools like Grad-CAM for transparency.

Documentation

Project Overview

Project Title: Fingerprint-Based Blood Group Detection Using Deep Learning

Platform: Django-based Web Application

Language: Python

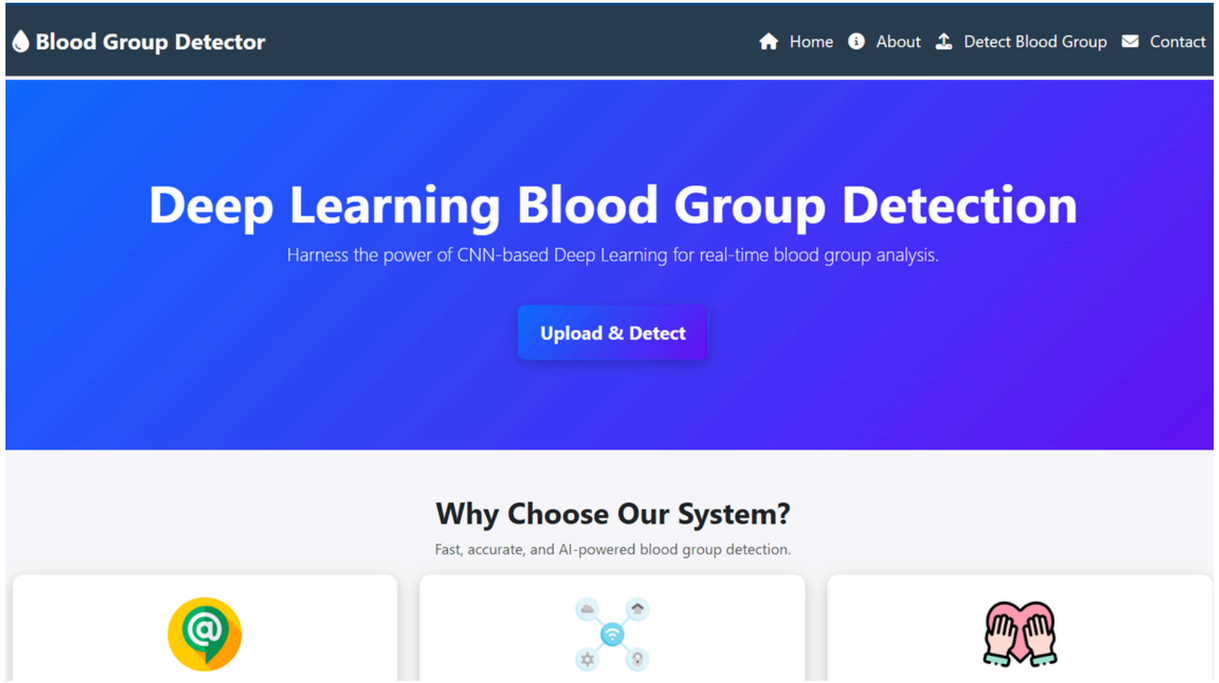
Technical Stack

Frameworks: TensorFlow, Keras, OpenCV

Modules Covered

- Data Acquisition & Preprocessing
- Model Training & Evaluation
- Blood Group Prediction
- Web App Deployment

Prototype Output Screens



PROJECT HOME PAGE

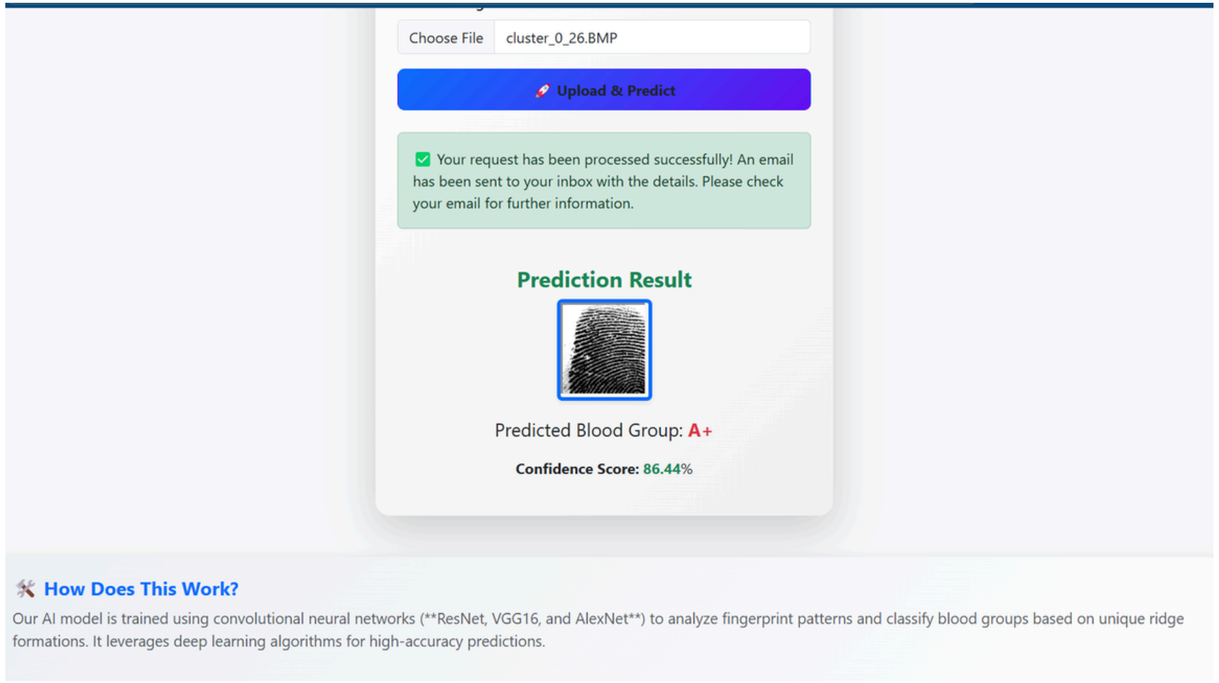


IMAGE UPLOAD PAGE

Summary

Zeroth Review
- Project Title and Relevance
- Abstract, Problem Statement
- Initial Literature Review

First Review
- Methodology and Implementation Plan
- CNN Architectures: LeNet, AlexNet, VGG16, ResNet34
- Software Requirements
- Proposed System Architecture & UML Diagrams

Second Review
- Model Training, Testing & Evaluation
- **Dataset Description:** 6,000+ Fingerprint Images
- **Performance Comparison**: ResNet34 showed best result
- Metrics: Accuracy, Precision, F1-Score
- Output Interface: Django-Based Prediction Page

Third Review
- Conclusion
- Future Work
- Documentation
- Presentation

Conclusion

Viability Demonstrated

This work demonstrates the **viability of using fingerprint biometrics** to predict blood groups through deep learning.

Best Performance

ResNet34 showed the best performance, validating the choice of architecture.

Practical Benefits

The approach is **non-invasive**, **cost-effective** and **suitable for real-time medical applications**.

Potential Impact

It has potential to revolutionize emergency diagnostics, especially in **rural and under-resourced areas**.

Contribution

The study contributes to the growing intersection of **AI and healthcare diagnostics**.

THANK YOU!