SKP ENGINEERING COLLEGE

Approved by AICTE New Delhi | Affiliated to Anna University - Chennai

Tiruvannamalai, Tamil Nadu | Phone: +91-4175-252633 | +91-9443105139

ZEROTH REVIEW

A Project on

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

Submitted by

PARASURAM T **512221205012**

PARASURAMAN K **512221202013**

CO-ORDINATOR

MS. M.SAMHITHA, M.E.,

Department of Information Technology

GUIDE

Dr. V. RAJI, M.E., Ph.D.,

Department of Information Technology

Project Title & Relevance

1 **Clarity and Relevance**

The project aims to detect blood groups from fingerprint images using **Deep Learning and Image Processing** techniques.

2 Traditional blood testing requires lab-based analysis, while this approach offers a **non-invasive, fast, and cost-effective alternative**.

3 The project has **medical, forensic, and biometric security applications**, making it relevant for real-world use.

Introduction

1

Background & Motivation

Blood group detection is crucial in medical emergencies, organ transplants, and forensic investigations.

2

Existing methods rely on **blood sample analysis**, which can be **time-consuming, invasive, and requires specialized equipment**.

3

Fingerprint patterns are **unique for individuals and have potential correlations with blood group types**.

4

Using **CNN-based deep learning models**, we aim to develop a system that accurately predicts blood groups from fingerprint images.

Literature Review

Paper Title	Authors	Year	Methodology Used	Pros	Cons
Blood Group Determination Using Fingerprint	T. Nihar, K. Yeswanth, K. Prabhakar	2024	CNN (LeNet, AlexNet), Ridge Frequency Analysis, Gabor Filters	Non-invasive approach, potential for real-time use	Accuracy not specified, requires a larger dataset
A Novel Approach to Predict Blood Group using Fingerprint Map Reading	P. N. Vijaykumar, D. R. Ingle	2021	Ridge Frequency Estimation, Gabor Filters, Multiple Linear Regression (OLS)	Cost-effective, uses fingerprint ridge features	Low accuracy (62%), lacks deep learning advancements
Fingerprint-Based Blood Group Prediction Using Deep Learning	Swathi P, K. Sushmita, Horadi	2024	Convolutional Neural Networks (CNNs)	Deep learning approach, improved feature extraction	Accuracy only 62%, requires better dataset quality

Thoroughness & Relevance

Previous research has explored **biometric-based blood group detection** using **fingerprints, iris scans, and genetic markers**.

Deep learning, particularly **CNN architectures (LeNet, AlexNet, ResNet, and VGG)**, has shown promise in **medical image classification**.

Studies indicate that certain **minutiae points in fingerprints** might correlate with blood group types, though extensive research is still needed.

Existing Work & Project Contribution

Existing studies primarily use **statistical and image-processing techniques** rather than **deep learning-based models**.

This project enhances accuracy by leveraging **ResNet34**, which has **better feature extraction and generalization capabilities**.

Unlike conventional methods, this approach can provide **instant results without requiring blood samples**.

Problem Statement

Clearly Defined Problem

1

Current blood group identification methods are **invasive, time-consuming, and require laboratory equipment**.

2

There is no widely accepted **non-invasive and AI-driven** method for blood group detection.

3

Manual fingerprint analysis lacks precision and consistency in identifying **biometric-blood group patterns**.

Alignment with Project Objectives

1

Develop a **deep learning-based model** capable of predicting **blood groups from fingerprint images**.

2

Compare various **CNN architectures** (LeNet5, AlexNet, VGG16, ResNet34) to determine the **most effective model**.

3

Implement a **user-friendly interface using Django** for real-time predictions.

4

Improve accessibility, especially in **remote areas where lab-based testing is challenging**.

Conclusion

Key Takeaways

The project explores an innovative **non-invasive** approach to blood group detection.

It leverages **deep learning and image processing** to improve accuracy and efficiency.

ResNet34 has shown **promising results**, outperforming other models in validation accuracy.

Future work will focus on **expanding datasets, optimizing models, and integrating real-time applications**.

Thank You!