

AI-Based Real-Time Blood Group Detection Using Fingerprint Pattern

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Abstract: *This The project Blood Group Detection Using Fingerprint in Real Time aims to develop a non-invasive, intelligent, and efficient system for identifying an individual's blood group using fingerprint patterns. Traditional testing methods require blood samples, reagents, and laboratory facilities, making them time-consuming, costly, and invasive. In contrast, this project presents a modern AI-based approach that employs image processing techniques to analyze fingerprint images, extract unique ridge and minutiae features, and accurately predict blood groups in real time.*

Using machine learning and deep learning algorithms, particularly Convolutional Neural Networks (CNNs), the system learns the relationship between fingerprint characteristics and specific blood group types. The model is trained on labeled fingerprint datasets to improve accuracy, reliability, and generalization. The system architecture consists of image acquisition, preprocessing, feature extraction, and classification stages to ensure precise and consistent results.

This proposed system offers a contact-based, rapid, and cost-effective alternative to conventional testing, eliminating the need for invasive procedures. It is highly beneficial in emergency medical scenarios, rural or remote areas, and healthcare centers with limited laboratory resources. Moreover, integrating biometric identification with AI enhances medical diagnostics, healthcare accessibility, and digital health innovation. This project demonstrates the potential of AI-driven biometrics to revolutionize medical testing and promote non-invasive, efficient diagnostic solutions for the future.

Keywords: Blood group detection, Fingerprint recognition, Real-time analysis, Image processing, Artificial intelligence, Machine learning, CNN, Biometric identification

