Trisha Ashok

Prof. Tejaswi Linge Gowda

AME 598/EEE 591

Programming for Internet of Things

05 November 2023

Smart Access System

"Introducing a cutting-edge feature that combines Android Application and Advanced Facial Recognition Technology."

Introduction

This novel system consists of a client-side app that communicates with cameras and an admin-side tool for access control. Our system aims to revolutionize access management by leveraging Python and machine learning Algorithm for model training and OpenCV for facial recognition, Node.js for connecting with the server. The motive of this project is to guarantee a strong security and convenient solution by focusing on identifying individuals and maintaining comprehensive records. Furthermore, an Android app allows admin control over unregistered faces, ensuring complete oversight.

Architecture
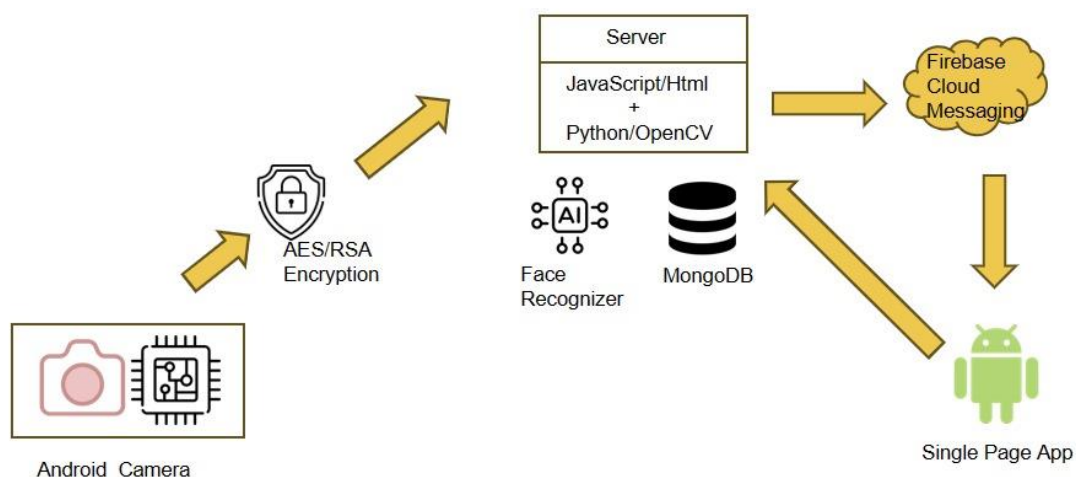
Workflow

Demonstrated portable application with facial acknowledgment capabilities, particularly outlined for Android. Below is the breakdown of the components that has been implemented in the project.

1.Android Camera: The picture is captured utilizing the camera to start with the recognition part.

2. AES/RSA Encryption: After the picture is captured, it is scrambled utilizing AES and RSA encryption strategies. This guarantees that the picture information is secure amid transmission.

3. Server: The scrambled picture is at that point sent to a server. The server appears to utilize JavaScript for the front-end conclusion, and Python/OpenCV for backend handling.

5.MongoDB: MongoDB is utilized to store and recover information. This stores the facial acknowledgment data logs for future reference.

6.Firebase Cloud Informing: Once the server has prepared the picture for facial recognition, it communicates with Firebase Cloud Informing (FCM).It is used for better server communication for messages Android, and JavaScript.

7.Single Page App: At last, the result from the server, which might incorporate the facial acknowledgment information, is sent to a single-page application (SPA) on the Android device.

Conclusion

The culmination of this project marks a significant role in access management and security solutions. The key takeaway lies in the system's user-centricity, manifesting in streamlined processes for both clients and administrators. Moreover, in the subsequent levels showcases a commitment to user convenience without compromising security. This project not only establishes a benchmark in access control systems but also highlights the potential for facial recognition technology to revolutionize security protocols across various domains. The experimental result shows that the system has achieved face recognition performance of 95.32%.

Feedback

My work has been greatly impacted by the readings and workshops we've done in class, especially when it comes to using web development to create resumes.

Working on ESP32, using AWS , integrating these for humidity monitoring has given us a solid foundation in cloud services, server connection and IoT (Internet of Things) which provides real-time environmental data collection, processing and analysis capabilities have highlighted the value of scalable and dependable cloud infrastructures for both academic and industrial use.

From the takeaway of this class, we have worked on server-based connection as well as incorporating MongoDB database management into our project work.

References

1. S. S. Ali, J. H. Al' Ameri and T. Abbas, "Face Detection Using Haar Cascade Algorithm," 2022 Fifth College of Science International Conference of Recent Trends in Information Technology (CSCTIT), Baghdad, Iraq, 2022, pp. 198-201, doi: 10.1109/CSCTIT56299.2022.10145680.
2. R. Rojas Flores and M. Jamett Domínguez, "Real time automatic face recognition system using LBPH technique," 2021 IEEE CHILEAN Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON), Valparaíso, Chile, 2021, pp. 1-6, doi: 10.1109/CHILECON54041.2021.9702960.
3. M. Khan, S. Chakraborty, R. Astya and S. Khepra, "Face Detection and Recognition Using OpenCV," 2019 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS), Greater Noida, India, 2019, pp. 116-119, doi: 10.1109/ICCCIS48478.2019.8974493.
4. An android based course attendance system using face recognition Dwi Sunaryono a , Joko Siswantoro b,⇑ , Radityo Anggoro a aDepartment of Informatics, Institut Teknologi Sepuluh Nopember, Surabaya, Indoneisa bDepartment of Informatics Engineering, Universitas Surabaya Jl. Kali Rungkut, Surabaya 60293, Indonesia