**UFCFXK-30-3:**

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Project Title: FaceAdmin

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| **Abstract:** This project focuses on developing a secure and efficient facial recognition system tailored for office environments. By leveraging modern deep learning algorithms, the system aims to automate and streamline employee attendance tracking and entry authorization. A Django-powered backend provides RESTful endpoints for facial recognition requests, while a React-based frontend offers administrators a comprehensive dashboard for user and attendance management. PostgreSQL ensures reliable data storage and retrieval, and containerization with Docker simplifies deployment. Together, these technologies create a robust, scalable, and user-friendly application that addresses everyday operational challenges, enhances security protocols, and maintains ethical standards for biometric data handling.  **Aims and Objectives:** The primary aim of this project is to deliver a fully integrated, facial recognition-driven access control and attendance management solution for office settings. By prioritizing accuracy, performance, and usability, the system demonstrates how advanced biometric technologies can positively transform day-to-day security and administrative operations.  The project objectives are:   * Develop a facial recognition module capable of real-time verification under diverse conditions * Integrate a secure API (Django REST Framework) to handle recognition requests and attendance records * Implement a React-based dashboard for administrators to manage users and monitor system activity * Ensure reliable and scalable data management using PostgreSQL * Containerize the entire application with Docker for streamlined deployment and maintenance   **Research:** Contemporary face recognition systems increasingly leverage deep learning methods such as MTCNN for detection and FaceNet for feature embeddings, achieving near real-time performance but often exhibiting limited scalability when facing large user populations (Ejaz et al., 2023). Earlier PCA-based approaches, though effective under constrained conditions, struggle with variations in lighting and pose (Kar et al., 2012), highlighting a lack of adaptability crucial for real-world applications. Commercial platforms such as Amazon Rekognition and Microsoft Azure Face API, while backed by extensive proprietary datasets, raise concerns over recurring costs and data sovereignty. Conversely, open-source frameworks like InsightFace provide flexibility and transparency but demand specialized in-house expertise to maintain and scale effectively (Deng et al., 2019). These mixed outcomes underscore the need for solutions that balance accuracy, scalability, and regulatory compliance—key considerations for implementing biometric systems in office environments. | **Key Requirements:**  Functional   * System must detect and verify faces in under 2 seconds * Log attendance data with timestamps and user IDs * System must allow authorized admins to manage user profiles   Non-functional   * Maintain secure data storage * Operate reliably within containerized (Docker) environment * Frontend should be responsive and user-friendly   **Design, Implementation & Testing:** PlantUML diagram  Testing was conducted at multiple levels, including unit tests for core detection logic, integration tests to verify communication between Django, PostgreSQL, and React, and basic load tests to confirm the system’s ability to handle real-time recognition in typical office scenarios.  **Planning and Management:** A lightweight Agile approach was adopted, with short development sprints to iteratively refine the face recognition module, database integration, and web interface. Tasks were tracked on a shared project board, and regular feedback sessions helped prioritize features and address issues promptly.  **References:** 1. Md. Sabbir Ejaz, Debnath, S., Mohammad Kamrul Hasan and Md. Mahbubul Alam (2023) Facial Recognition-Based Entry System for Student Residence Halls: Enhancing Security and Accessibility. Asian Journal of Research in Computer Science [online]. 16 (4), pp. 344–353. Available from: http://archive.pcbmb.org/id/eprint/1766/1/Ejaz1642023AJRCOS110323.pdf [Accessed 8 January 2025].  2. Kar, N., Debbarma, M.K., Saha, A. and Pal, D.R. (2012) Study of Implementing Automated Attendance System Using Face Recognition Technique. International Journal of Computer and Communication Engineering [online]. 1 (2), pp. 100–103. Available from: http://www.ijcce.org/papers/28-N010.pdf [Accessed 8 January 2025].  3. Deng, J., Guo, J., Xue, N. and Zafeiriou, S. (2019) ArcFace: Additive Angular Margin Loss for Deep Face Recognition openaccess.thecvf.com. 2019 [online]. pp. 4690–4699. Available from: https://openaccess.thecvf.com/content\_CVPR\_2019/html/Deng\_ArcFace\_Additive\_Angular\_Margin\_Loss\_for\_Deep\_Face\_Recognition\_CVPR\_2019\_paper.html [Accessed 12 January 2025]. |