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AI-Based Face Recognition Attendance System

Project Report

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1. Introduction

This project is an AI-based Face Recognition Attendance System, designed to automate the attendance process using deep learning and facial recognition. It replaces traditional, manual methods with a smart and secure system suitable for classrooms, offices, and public events. The system is built using PHP, JavaScript, and deep learning models, with a structured backend and intuitive frontend.

2. Project Objectives

- Automate attendance recording using face recognition.
- Enable secure, role-based access (admin, lecturer).
- Simplify management of students, courses, and records.
- Export attendance data to Excel.
- Store multiple images per user for higher recognition accuracy.

3. Motivation

Manual attendance systems are time-consuming and prone to manipulation, such as proxy attendance. This motivated the development of an AI-powered, contactless, and accurate attendance system. It ensures reliability, saves time, and provides a user-friendly experience for managing attendance in real-time.

4. System Features

- Real-time facial recognition with deep learning models
- Role-based login access (Administrator, Lecturer)
- Attendance database with SQL integration
- Export attendance reports to Excel
- Frontend dashboard for managing courses and sessions
- Secure image and label storage for enrolled users

6. Face Recognition Models

- ssd_mobilenetv1_model: High-accuracy face detector
- tiny_face_detector: Lightweight and fast
- mtcnn_model: Accurate multi-task detector
- face_recognition_model: Generates unique 128D embeddings
- face_landmark_68_model: Detects facial features
- face_expression_model: Analyzes emotions
- age_gender_model: Predicts demographic traits
- Each model is linked to its weights_manifest.json file for loading

7. How It Works

1. User logs in with role-based access.
2. System uses webcam to capture face.
3. Face is detected and encoded via deep learning.
4. Encoded vector is compared to stored vectors.
5. Attendance is marked and stored in SQL database.

8. Lecturer Panel

- ✓ View and manage students and courses
- ✓ Mark attendance manually if needed
- ✓ Export attendance to Excel for reporting

9. Advantages

- Secure and tamper-proof
- Fast and real-time attendance
- Intuitive dashboard
- Highly accurate facial recognition
- Scalable for any institution

10. Conclusion

The AI-based Face Recognition Attendance System is a practical, efficient, and scalable solution for attendance tracking. It demonstrates the powerful combination of deep learning and web development in solving everyday challenges. The modular design and flexible architecture allow for easy integration and future enhancements.