Design Lab

Automated attendance system using face recognition models

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INTRODUCTION

- Uses computer vision to automate the process of taking attendance by identifying faces from live or recorded camera feeds.
- Employs face detection and recognition models (e.g., Haar Cascades, CNNs, or deep learning models like FaceNet).
- Reduces manual effort and speeds up the attendance process without physical interaction.
- Modern models offer high precision in varied lighting and environmental conditions.
- Prevents proxy attendance through unique facial biometrics.
- Widely used in schools, colleges, offices, and even remote learning platforms.

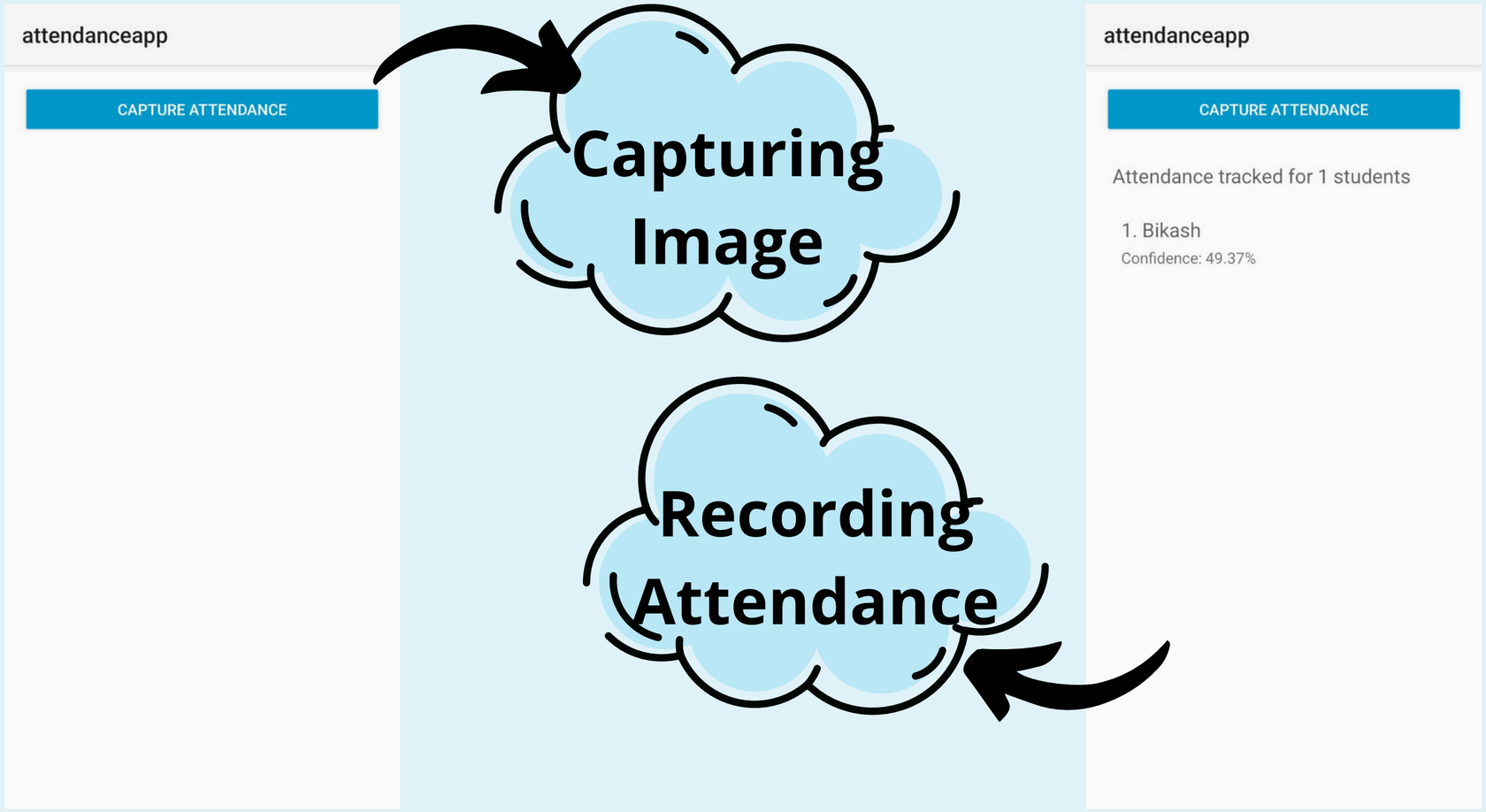
TECHNOLOGIES USED

- Artificial Intelligence
- App Devlopment
- Machine Learning
- Cloud Computing
- Python Coding Language
- Retina Face Recognition Model

HOW FACE RECOGNITION MODELS WORKS

- Unlike traditional models, RetinaFace detects faces without relying on predefined anchor boxes, allowing more flexibility and precision.
- Detects key facial points (eyes, nose, mouth, jawline) for improved alignment and recognition accuracy.
- Uses powerful backbones like ResNet or MobileNet to extract deep features from facial images.
- Accurately detects faces at various scales (near/far, big/small) using feature pyramids.
- Provides real-time performance with high detection accuracy, even under occlusions, varied poses, or lighting conditions.

ARCHITECTURE



WORK FLOW

Training given dataset using RetinaFace Model

We are adding the path of the classroom image

Model independently recognises each faces

Then faces are matched with the trained dataset

Attendance is marked according to matched faces

ADVANTAGES

- Eliminates the need to call names one by one, saving significant time, especially in large groups.
- Reduces human errors and ensures accurate attendance recording.
- Uses unique facial features to prevent impersonation or buddy punching.
- Automatically generates attendance logs and analytics for quick access and analysis.
- No physical interaction required—ideal for hygiene and modern smart classrooms/offices.
- Can be linked with databases, access control systems, and dashboards for seamless tracking.

CHALLENGES

- Poor lighting or shadows can reduce facial recognition accuracy.
- Masks, glasses, or headwear may block facial features and affect detection.
- Handling large groups simultaneously may require higher processing power and better hardware.
- Storing biometric data raises ethical and legal concerns; compliance with data protection laws is essential.
- System needs regular updates and retraining to maintain accuracy over time.

CONCLUSION

The automated attendance system using face recognition offers a fast, and reliable alternative to manual roll calls. It reduces human effort and ensures accurate tracking. In the future, it can be enhanced with cloud integration, mobile access, liveness detection, and AI-based analytics for better security, scalability, and insights.

THANK YOU