

SMART CURRICULUM ACTIVITY & ATTENDANCE APP

REPORT

SUBMITTED BY:-

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1 .INTRODUCTION:-

Literature Review:-

Paper	Authors	Publication Year	Key Aspects	Methodologies	Results	Research Gaps	published in
Face Recognition and Identification using Deep Learning Approach	KH Teoh, RC Ismail, SZM Naziri, R Hussin, MM Isa, MSSM Basir	2021	<ul style="list-style-type: none"> Design a face recognition and identification system using a deep learning approach using opencv and python Human face is a reliable biometric for identity Verification other methods are less secure and not dependent it is used in phone unlocking, criminal identification, and home security Deep Learning improve 	<ul style="list-style-type: none"> OpenCV TensorFlow Haar Cascade Classifier CNN classifier was trained for 3 days Confusion Matrix was used to measure accuracy Accuracy = $\frac{(TP+TN)}{Total} \times 100\%$ 	<ul style="list-style-type: none"> Image Recognition - 91.7% Real-time Video Recognition - 86.7% Lighting Conditions High light intensity improves accuracy Detection works better when the face is >60cm away from camera 	<ul style="list-style-type: none"> Accuracy drops in low-light environments. Need to include training images captured under varied lighting Accuracy is lower in real-time video due to low FPS Future work could use GPU acceleration Classifier requires long training durations 	Journal of Physics: Conference Series IOP Publishing
Face Recognition-Based Attendance System	Harsh Vardhan Dixit,Ankur Saxena,Arif .Dr. Swati Sharma	2024	<ul style="list-style-type: none"> automated face recognition-based attendance system for educational institutions It aims to replace traditional attendance methods The system uses deep learning, computer vision The system supports large-scale scalability, real-time detection 	<ul style="list-style-type: none"> Dlib's Face Recognition Model Python with OpenCV Haar Cascade Classifier Images captured via camera or webcam for each student Cropping facial regions, handling variations in lighting, expressions, and occlusions. System computes Euclidean distance between detected and stored embeddings. GUI with student and teacher login portals. 	<ul style="list-style-type: none"> High accuracy achieved using Dlib ResNet-34 model in classroom environment. automated marking significantly reduces time compared to manual roll calls. System successfully manages multiple users and group photos efficiently. Effective in real-time recognition, even in dynamic lighting and facial expression variations. 	<ul style="list-style-type: none"> Recognition accuracy drops under poor lighting or occluded faces. Future work could integrate illumination normalization or infrared imaging. Training was done with a small dataset (24 students). Future systems should employ larger and more diverse datasets for better generalization. Real-time detection speed could be improved with GPU acceleration or lightweight CNN models (e.g., MobileNet, 	SSRN Electronic Journal (Elsevier Preprint Repository)
QR Code Based Smart Attendance System	Xiong Wei Anupam Manori Nandgopal Devnath Nitin Pasi Vivek Kumar	2017	<ul style="list-style-type: none"> Proposes a QR Code-based smart attendance system to replace traditional manual attendance methods. Attendance is stored in a SQLite database and can be exported to CSV/XLS format Each student's attendance is marked as 1 (present) or 0 (absent). Designed to be cost-effective, user-friendly, and secure. 	<ul style="list-style-type: none"> 1. Attendance Management App 2. System Components: 3. Design Tools Used: <ul style="list-style-type: none"> Use Case Diagram Data Flow Diagram (DFD) Sequence Diagram Flowchart 	<ul style="list-style-type: none"> The developed system was successfully designed and tested on Android devices. The QR Code method was found to be accurate, efficient, and faster than manual attendance systems. Attendance could be easily analyzed and exported, eliminating paperwork. Improved data management compared to traditional methods. 	<ul style="list-style-type: none"> The system depends on manual QR code scanning, which may still be time-consuming for large classes. No automatic verification of student identity beyond scanning a QR code — possible misuse if QR is shared. <ul style="list-style-type: none"> Integrate face recognition to verify identity and prevent proxy attendance. Provide missed class notes and topics to students via the app. Add enhanced security and professor-level 	International Journal of Smart Business and Technology (IJSBT)

1.1 Objective of the Project :-

The main objective of this project is to develop a Smart Attendance App. Which uses QR code to mark attendance for students . Using QR code saves us a lot of time and are less prone to errors . The main focus is all about designing a app which replaces paper based attendance system and the manual attendance system using QR code technology

Objectives Include:-

- Mark attendance using QR code
- Attendance tracking for every individual subject
- Objectives and ideas for children to do in their free time which helps them to use their free time in proper way
- Digital report for Teachers and children's data
- Its the first step towards smart education through digital transformation

1.2 Description of the Project:-

Most of the college's and schools use paper based attendance to mark student attendance which is time consuming and can also causes errors along with that students don't actually know what to do with there free time or on a long break between classes.

Our project Smart Curriculum Activity and Attendance App is a break through to the problems . Here teachers display a unique QR code which changes for every 5 secs . Students use there mobile phone and scan the QR code to mark there attendance instantly.

Then the data is send to the database after authenticating the request and teacher can view attendance of students and vice versa students can also see there attendance percentage overall and for each subject along with this it also suggests students some activity based on there interests and hobbies.

This is a powerful integration of Attendance management, Curriculum progress and students attendance tracking

1.3 Scope of the Project:-

This App is designed for educational institutions such as universities, colleges and schools to simplify attendance and academic activities

- Teachers generate a unique QR code for every class
- Students Scan this QR code to mark there attendance for that class in real time
- Backend verifies if the student credentials are valid
- Then the data is stored in the database
- Teachers can see and analysis the students attendance and participation records for each class of every student
- Students can track there attendance and get curriculum activity updates

Future Scope:-

- Automating Absence alerts to parents
- Can be used as a university management system
- Can also be integrated with biometrics for better security

1.3.1 Use Case Model:-

- Teacher/Student Login
- Generate QR code
- Display QR code
- Scan QR code to mark attendance(Students)
- Validate Attendance
- View Report of Attendance
- Manage Daily Activities in free time

2. System Description

2.1 Customer/User Profiles:-

1.Teachers:-

These are the primary users. They display QR codes and mark the attendance of the students along with that they also manage the student progress

2. Students:-

These users scan the displayed QR code of the class for marking their attendance and will be able to view the percentage of attendance they were having in each subject and will also be shared important messages by the Teachers.

3. Administrator:-

These user is the pillar for the website they manage, create, delete and student and teacher users along with complete summary of all users

2.2 Assumptions and Dependencies

Assumptions:-

- All the students in the classroom are having a working smart phone with camera of 8MP and a good internet connection
- Teacher should be able to show the QR code with a laptop or a screen in the classroom
- Every user is having their UserId and Password with them
- All the students and teacher are registered in the backend

Dependencies:-

- Good internet
- Camera for QR scanning
- Secure Backend server
- Good Data Base Management System

2.3 Functional Requirements

1. User Authentication:-

- Authentication of Users like Students, Teachers and Admins
- Web tokens based password encryption
- Access based on the role of the user

2. QR Code Generation:-

- A unique QR is different for every session and changes for every 5-10 secs
- Displayed by teachers for students to mark attendance

3. QR Code Scanning:-

- Students use their mobile phones with internet to scan this QR code
- Attendance is marked after scanning the QR code

4. Attendance Management:-

- Stores the users attendance in the backend database server
- Display data according to the subject and display overall

5. Messages Tracking:-

- Send messages to the required Students
- Import info will also be shared here

6. Curriculum:-

- Take interests from students and help them do tasks in the free time of the class

2.4 Non-Functional Requirements:-

- Performance of phone and Screens of Classroom
- Security with the data in the database
- Scalability with increasing students
- Simple to use
- Available every time
- Reliable with data given

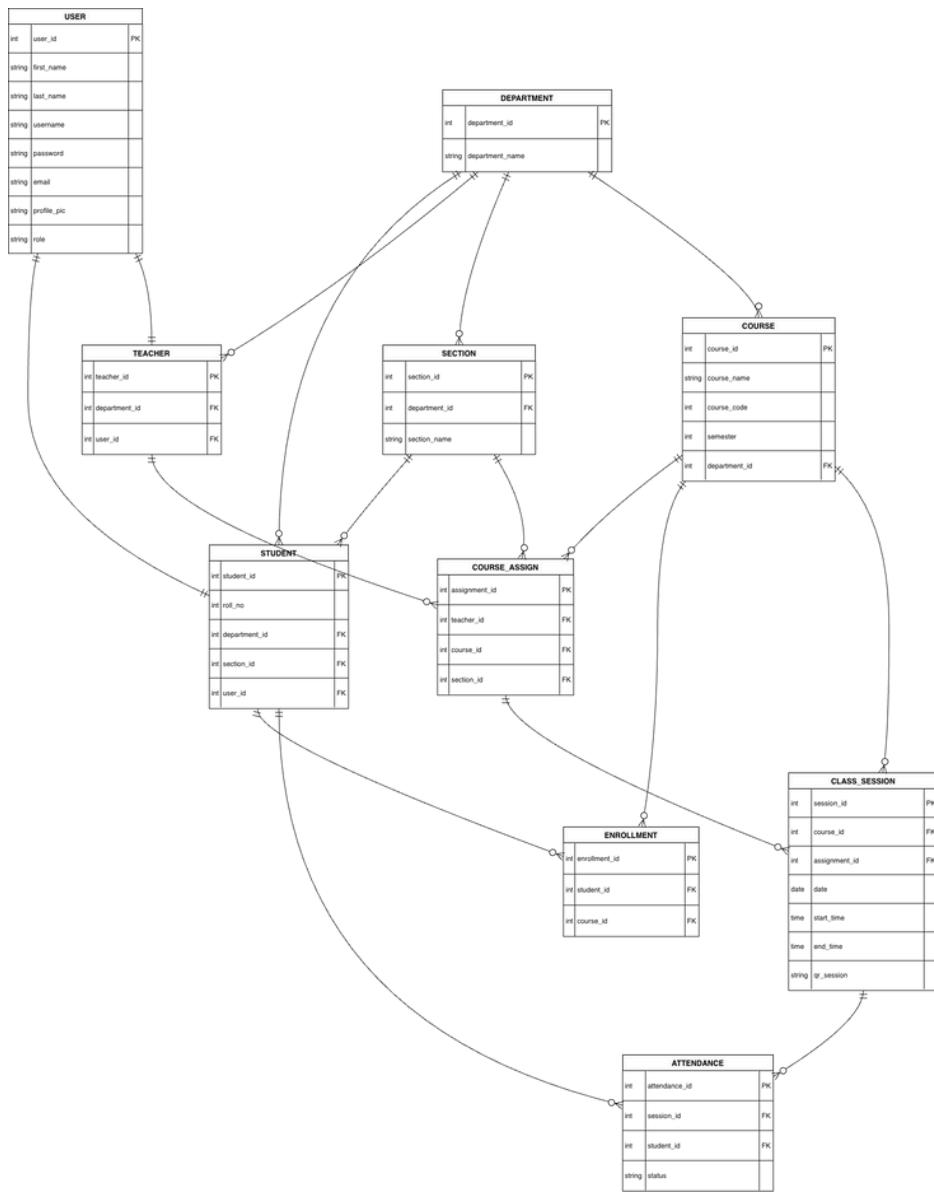
3. Design

3.1 System Design:-

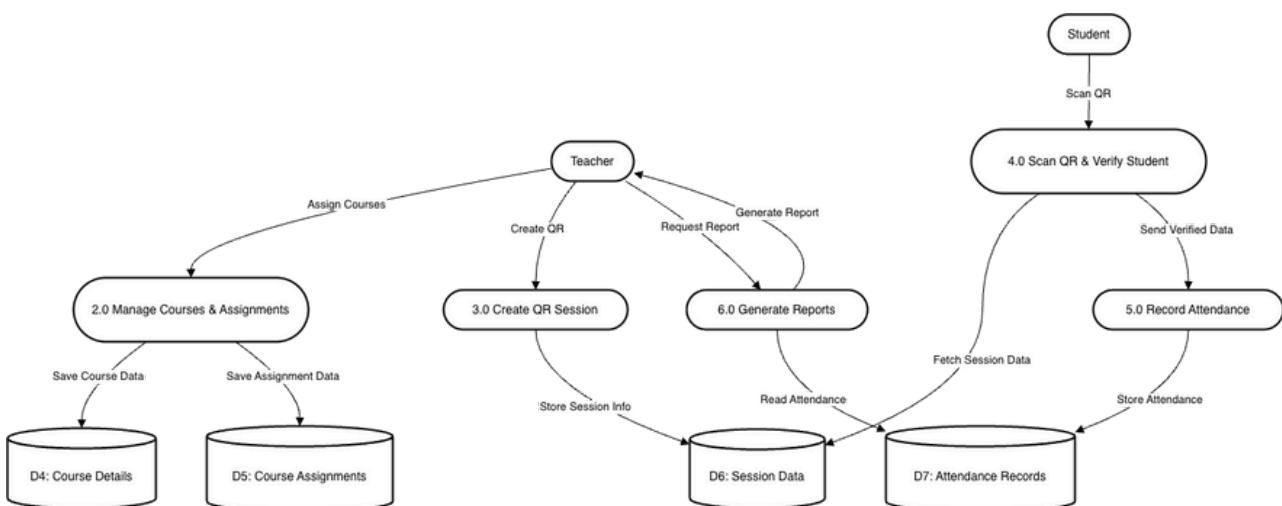
It has three layers Frontend, Backend and Database

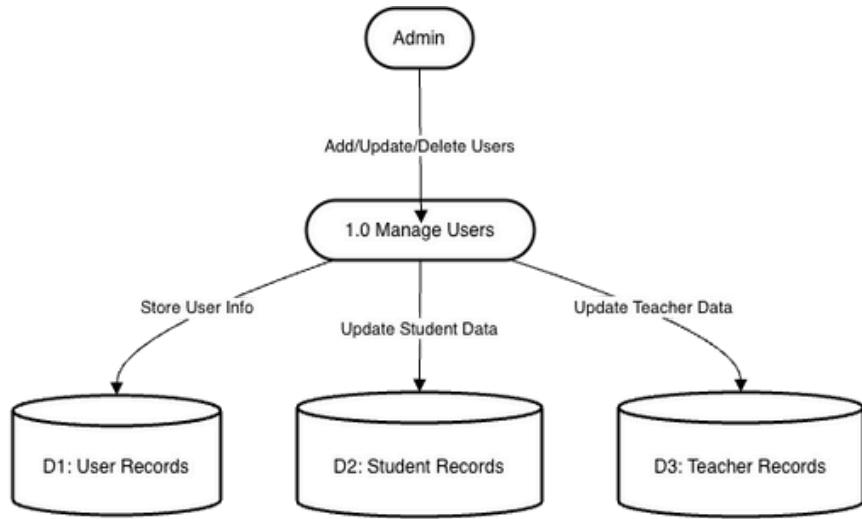
- Frontend :- ReactJs, TailwindCss, Axios, Jwt Decode
- Backend :- Django, Django rest framework, Python-Decouple, Simple JWT, CORS headers, Pillow
- DataBase :- MySQL

3.1.1 E-R Diagram



3.1.2 DFD's :-





3.2 Database Design:-

USER		
		PK
int	user_id	
string	first_name	
string	last_name	
string	username	
string	password	
string	email	
string	profile_pic	
string	role	

STUDENT		
		PK
int	student_id	
int	user_id	
int	roll_no	
int	department_id	
int	section_id	

TEACHER		
		PK
int	teacher_id	
int	user_id	
int	department_id	

DEPARTMENT		
		PK
int	department_id	
string	department_name	

SECTION		
		PK
int	section_id	
string	section_name	
int	department_id	

COURSE		
		PK
int	course_id	
string	course_name	
int	course_code	
int	semester	
int	department_id	

COURSE_ASSIGN		
		PK
int	assignment_id	
int	teacher_id	
int	course_id	
int	section_id	

ENROLLMENT		
		PK
int	enrollment_id	
int	student_id	
int	course_id	

CLASS_SESSION		
		PK
int	session_id	
int	course_id	
int	assignment_id	
date	date	
time	start_time	
time	end_time	
string	qr_session	

ATTENDANCE		
		PK
int	attendance_id	
int	session_id	
int	student_id	
string	status	

4. Scheduling and Estimates:-

DURATION	TASK
2 weeks	Frontend(reactjs & tailwindcss)
2-3 weeks	Backend and database(django & sql)
1 week	Testing
1 week	Integration and Deployment