SMART CURRICULUM ACTIVITY & ATTENDANCE APP

REPORT

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1 .INTRODUCTION:-

Smart Curriculum activity and attendance app is a QR based attendance management system which is used to mark students attendance using QR codes unlike the olden versions like the manual attendance marking way it is super fast and efficient and more reliable . since all the process is digital teachers can easily view and analyse data of the students in the most efficient way.

Literature Review:-

Paper	Authors	Publication Year	Key Aspects	Methodologies	Results	Research Gaps
Face Recognition and Identification using Deep Learning Approach	KH Teoh, RC Ismail, SZM Naziri, R Hussin, MNM Isa, MSSM	2021	• Design a face recognition and identification system using a deep learning approach using opencv and python • Human face is a reliable biometric for identity	• OpenCV • TensorFlow • Haar Cascade Classifier • CNN classifier was trained for 3 days • Confusion Matrix was used to measure	• Image Recognition - 91.7% • Real-time Video Recognition - 86.7% • Lighting Conditions	• Accuracy drops in low-light environments. • Need to include training images captured under varied lighting
Face Recognition-Based Attendance System	Harsh Vardhan Dixit,Ankur Saxena, Arif ,Dr. Swati Sharma	2024	• automated face recognition-based attendance system for educational institutions • It aims to replace traditional attendance methods • The system uses deep learning,	• Dlib's Face Recognition Model • Python with OpenCV • Haar Cascade Classifier • Images captured via camera or webcam for each student	• High accuracy achieved using Dlib ResNet-34 model in classroom environment. • atomated marking significantly reduces time	• Recognition accuracy drops under poor lighting or occluded faces. • Future work could integrate illumination normalization or infrared

QR Code Based Smart Attendance System	Xiong Wei Anupam Manori Nandgopal Devnath Nitin Pasi Vivek Kumar	2017	• 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
				1. Attendance Management App
				2. System Components:
				3. Design Tools Used:
				  ○ Use Case Diagram
				  ○ Data Flow Diagram (DFD)
				  ○ Sequence Diagram
				  ○ Flowchart
					• 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
						• 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

Title	Authors	Year/ID	Description	Roles/Phases	Results	Gaps/Limitations
Students Attendance Management System Based on Face Recognition	Pakiza Bano, Sidra Tasleem, Hameedur Rahman	2020	• Face recognition–based automation in student attendance management • Manual attendance systems are time-consuming, error-prone, and allow proxy attendance. • Develop a low-cost, automated attendance management system using facial recognition technology. • Python (OpenCV, NumPy	• Admin – registers students, manages the database, trains the face recognition model. • Lecturer – enables/disables attendance sessions, views attendance records.	• Developed a graphical user interface (GUI) using Tkinter for admin, lecturer, and student interactions. • Successfully implemented real-time attendance marking through facial recognition. The system stores attendance data along with student name,	• System performance may degrade under poor lighting or different camera angles. • The training dataset (70–80 images per student) may not generalize well for large student populations. • Dependent on webcam quality and CPU — not yet optimized for real-time performance in large classes.
Implementing Student Attendance System Using Fingerprint Biometrics for Kolej Universiti Poly-Tech Mara	N. Zakiah Lamin, W. N. Asnida Wan Jusoh, Juanita Zainudin, Hafiza Samad	Vol. 1062 (2021), Paper ID: 012037	AreaDescription Research Domain Biometric authentication in student attendance systems Problem Addressed Manual attendance tracking at KUPTM is time-consuming, prone to manipulation, and error-prone. Students can sign on behalf of others, leading to unreliable data. Objective To verify and automate student attendance using fingerprint biometrics, making attendance records more systematic, efficient, and trustworthy. Technology Used Fingerprint biometric device, local server database, prototype system built using Evolutionary Prototyping Model Key Features • Fingerprint-based authentication for each student • Admin & lecturer login	PhaseDescription Phase 1 – Initial Concept Gathered user requirements via interviews (lecturers, students, admin). Defined project plan and business goals. Phase 2 – Design & Initial Prototype Designed user interfaces (login, attendance upload, reporting). Created and demonstrated early prototypes for user evaluation. Phase 3 – Refine Prototype Collected user feedback and improved UI, functionality, and reliability. Tested first prototype. Phase 4 – Complete & Release System Developed final working system; validated requirements; integrated	System Efficiency The fingerprint system eliminated manual attendance sheets, saving lecturer time. Accuracy & Security Reduced fake attendance as fingerprints are unique and non-transferable. Ease of Use Simple for students (only touch fingerprint sensor) and lecturers (auto reports). Automation Automatic population of attendance lists and report generation (including warning letters). Reliability The fingerprint data remained consistent over time, improving long-term record keeping.	• Developed a graphical user interface (GUI) using Tkinter for admin, lecturer, and student interactions. • Successfully implemented real-time attendance marking through facial recognition. • The system stores attendance data along with student name, ID, subject, date, and time. • Demonstrated that LBPH provides sufficient accuracy for classroom-scale implementations without expensive hardware.

Summary Of Key Gaps:-

Most of the paper we did are on face recognition attendance system and QR based attendance system . In the case of face recognition we feel there are lot of challenges like less accuracy in low-light environment and camera angles should also be perfect and should have some good camera along with this and many models are trained on small datasets which limits their ability to work for large student population . Real time performance is also a challenge some don't work due to FPS and CPU only processing and long training time .

QR based attendance system has some challenges too it is still vulnerable to misuse because they do not verify identity beyond scanning students can share QR codes and let other scan it so head count helps us to solve the problem

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:-

- Automate student attendance using QR codes, proximity, or face recognition to save time and improve accuracy.
- Provide students with personalized academic or skill-building tasks during free periods to enhance productivity.
- Generate structured daily routines that integrate class schedules with long-term academic and career goals.

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 there attendance and will be 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 is 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 there 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 there 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
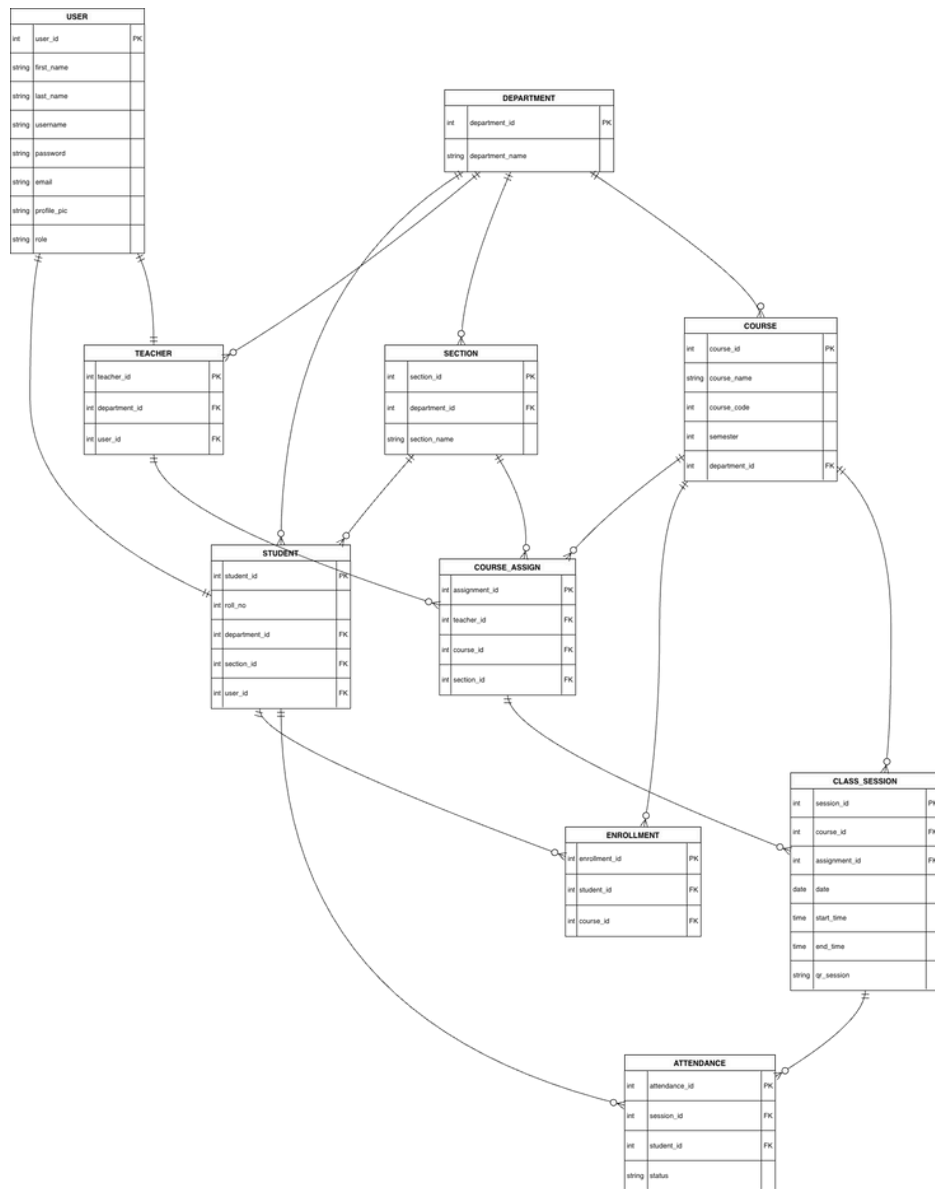- Available every time
- Reliable with data given

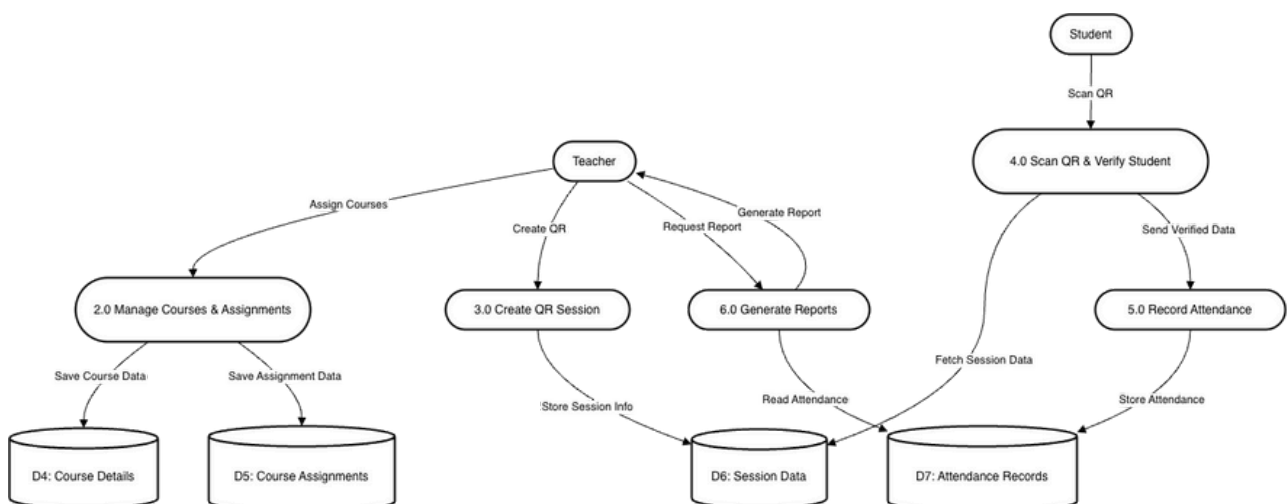# 3. Design

3.1 System Design:-
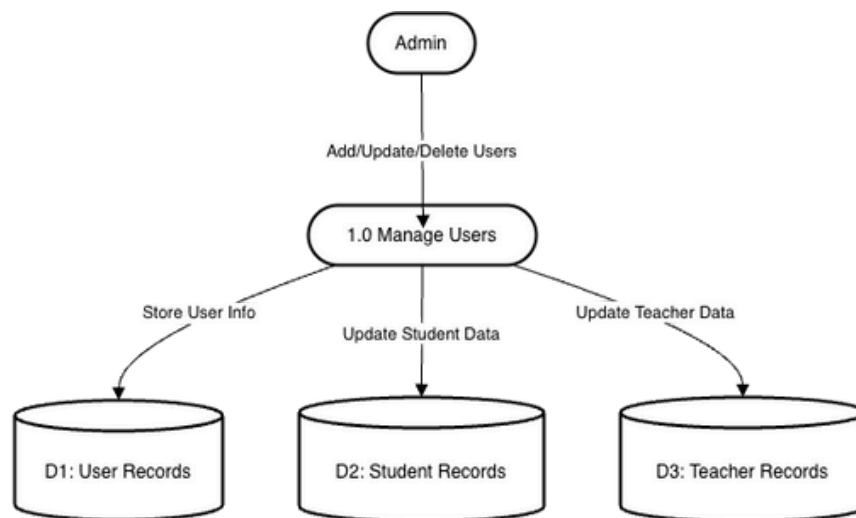
It has three layers Frontend, Backend and Database
- Frontend :- ReactJs, TailwindCss, Axios, Jwt Decode
- Backend :- Django, Django rest framework, Python-Decouple, Simple JWT, CORS headers, Pillow
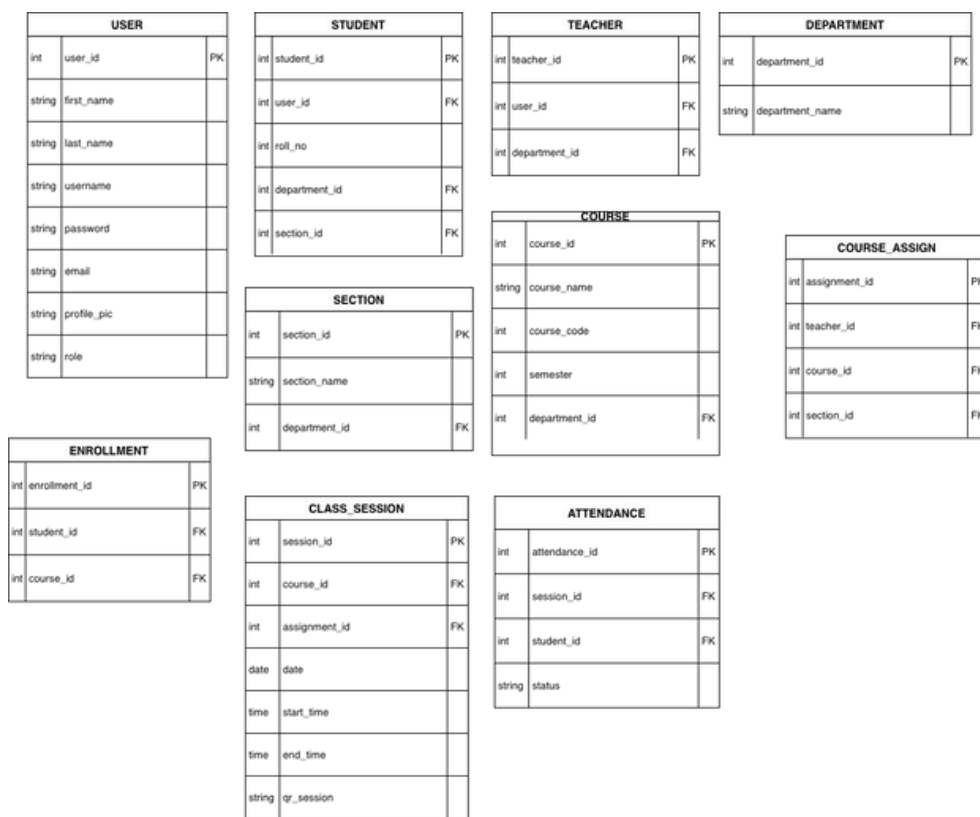- DataBase :- MySQL

3.1.1 E-R Diagram

3.1.2 DFD's :-

3.2 Database Design:-

4. Scheduling and Estimates:-