



CERBERUS –

Biometric Attendance for CA Dept.





Cerberus - Live Project

Guide:

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Team Members:

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1. Project Summary

Let's start with the first set of slides





“

Our project focuses on managing a distributed system of devices that are capable of scanning biometrics for the use of attendance for a large scope of stakeholders automatically on the basis of a timetable.



“

The student will be marked present through biometric (fingerprint) module and the attendance data can be accessed on our website by the users.





Scope of Device (w RaspberryPi)

- ⬡ Enroll fingerprints
- ⬡ Authentication
- ⬡ Manage Faculty/ Admin (Fingerprint data)
- ⬡ Manage Student (Fingerprint data)

Background Activities:

- ⬡ Sync:
 1. Attendance to database
 2. Fetch templates from database
 3. Fetch timetable from database.
 4. Fetch PRN



Scope of Web-App (made w Servlet)

For Faculty:

- ⬡ Login
- ⬡ Timetable Management
- ⬡ Subjects Management
- ⬡ Student Management
- ⬡ Attendance Management (Manual)
- ⬡ Admin Management
- ⬡ Student Progression
- ⬡ OTP for devices
- ⬡ Profile Management

For Students:

- ⬡ Login
- ⬡ View Attendance
- ⬡ Select Electives



Tools and Technology Used:

On Device (RaspberryPi):

- ⬡ OS: Raspbian
- ⬡ Lang: Python
- ⬡ Tool: Notepad++

Database:

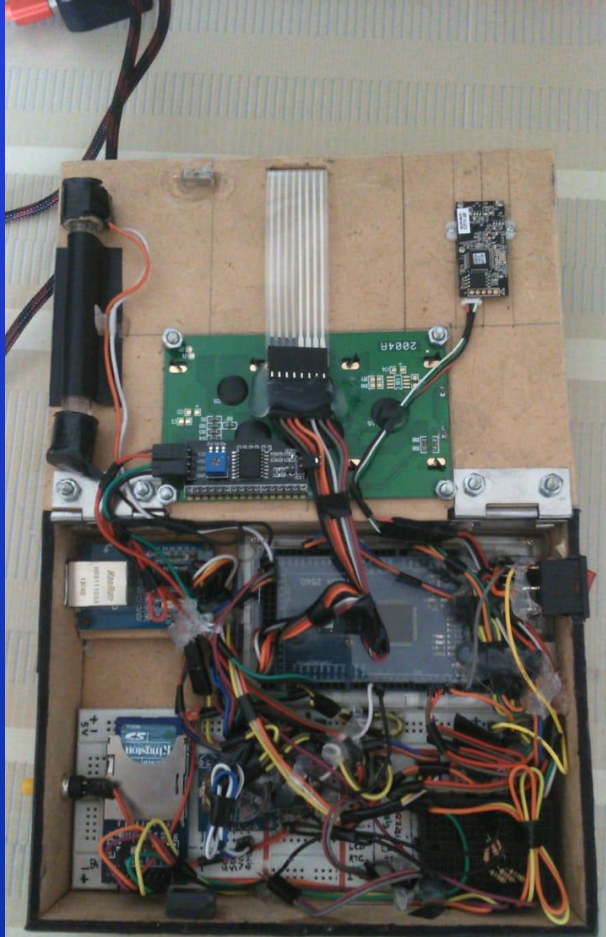
MySQL

On Web-App:

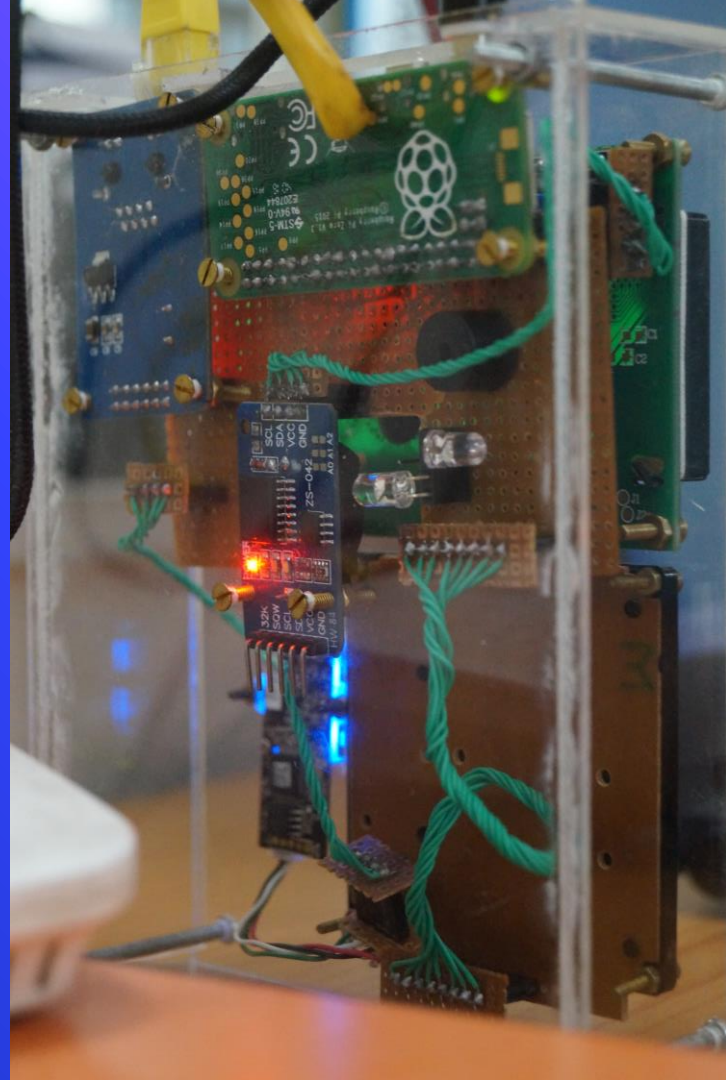
- ⬡ frontend:
 - AJAX, HTML, JS, CSS
- ⬡ backend:
 - Java-Servlet, JSP.

Server:

Apache Tomcat 8.0



Circuit of Arduino vs RaspberryPi





We switched to RaspberryPi

| Feature | Arduino Mega | RaspberryPi Zero |
|----------------|--------------|------------------|
| RAM | 8 KB | 512 MB |
| Download Speed | 16 MBPS | 10 MBPS |
| OS | - | Linux Raspbian |
| Multitasking | No | Yes |
| Price | 850 | 990 |

- ⬡ Download/Upload Templates from/to FPS.
- ⬡ Support for multiple SPI interface
- ⬡ Inbuilt SD card support

Agile Methodology

To iterate the development and testing throughout the software development lifecycle of the project.

Extreme programming (XP) is a software development practice which is intended to improve software quality and responsiveness to changing customer requirements.





Backlogs

- Testing components/ Modules.
- FPS, LCD Libraries
- Custom functions for RaspberryPi
- Database connection with RaspberryPi
- Launcher functions for RaspberryPi
- Sync fingerprints
- Switching to GitHub for version control.
- Commercializing the project
- Circuit Diagram for Arduino/ RaspberryPi
- Blob/Clob for finger data
- Database Schema
- View Attendance
- View Timetable
- Edit Timetable
- Manage password
- Password encryption (SHA2)
- Edit timings
- Add slot
- Remove slot
- View Student Details
- Student Subject Selection
- Add Student
- Delete Student
- Manage Subjects (Add, View, Delete)
- Faculty Management (Add, View, Delete)
- Final Database Normalization



Backlogs 2

- Adding logs
- Dividing storage space into classes
- Simultaneous interaction of SPI Devices.
- Ethernet Sleep mode.
- Add light show for standby
- Download data to excel (Backup)
- Upload student data from excel file.
- Profile Page
- Activity log
- Session Management
- ReCAPTCHA
- Mailer
- OTP
- Email verification
- Handle SQL Exceptions
- Validations in forms (AJAX)
- Animations using CSS and JS
- Particle.js
- Theme and logo
- Box Design
- Student Progression
- JSON format data
- Testing
- About Us page
- Copy timetable from previous week
- Fix scrollbar
- First login asks for details
- Manual Attendance
- Email and network connectivity check
- Documentation
- Presentation

GitHub Demo w User Stories



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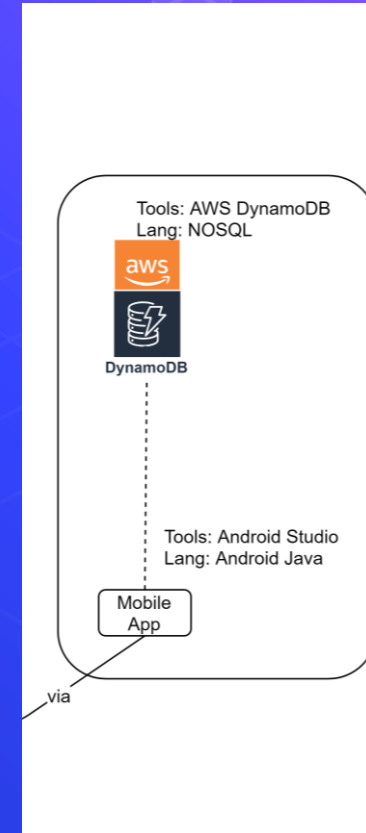
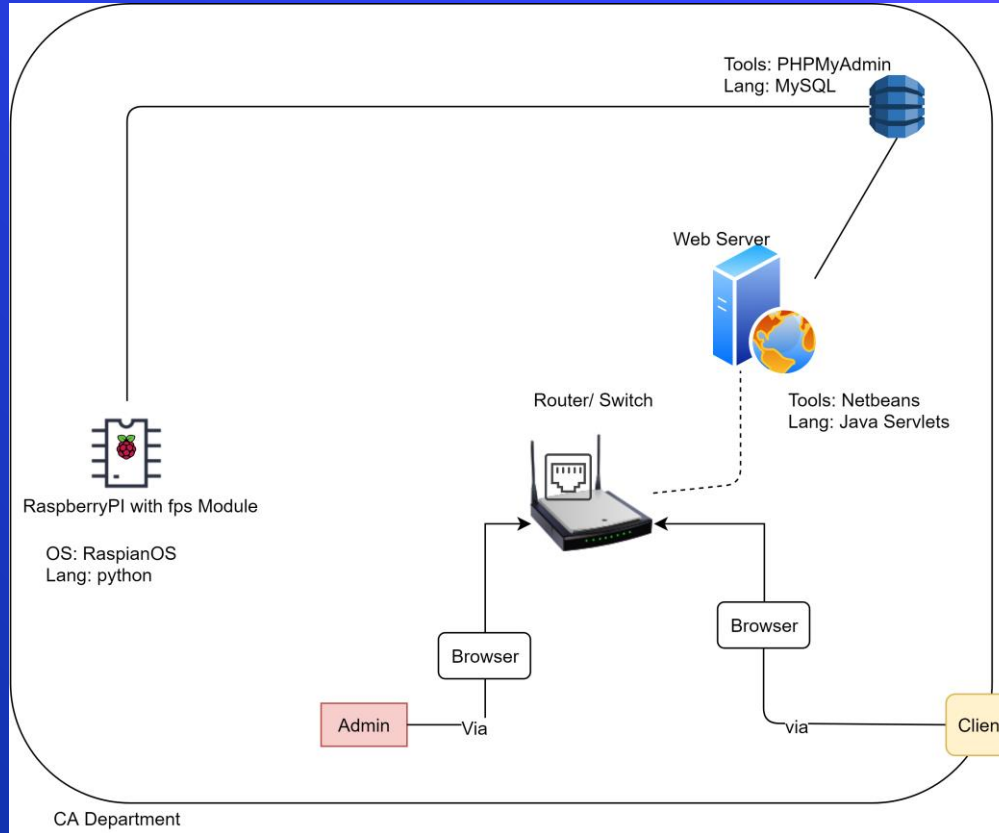


Excel file with sprint and backlogs



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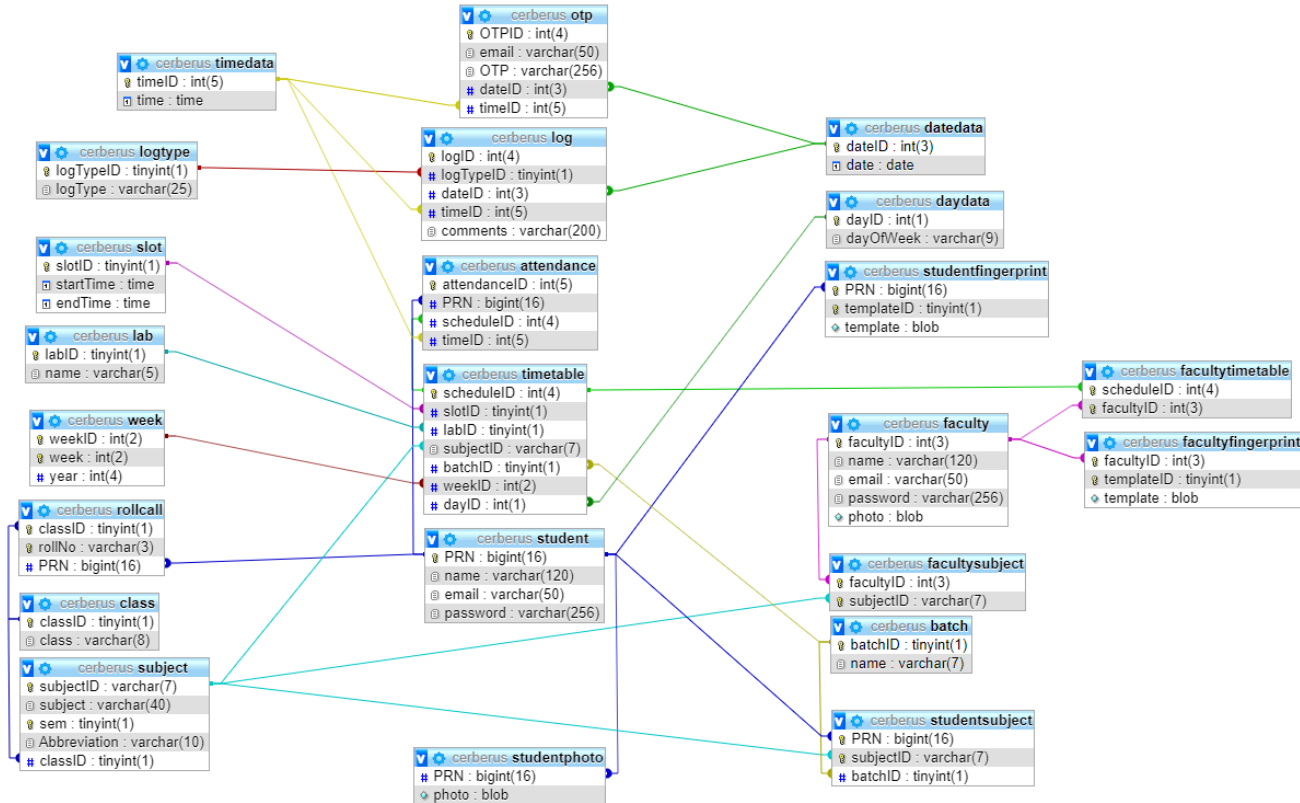
System Architecture





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System Design – ERD (Relational)



Tables and database dictionary from phpMyAdmin





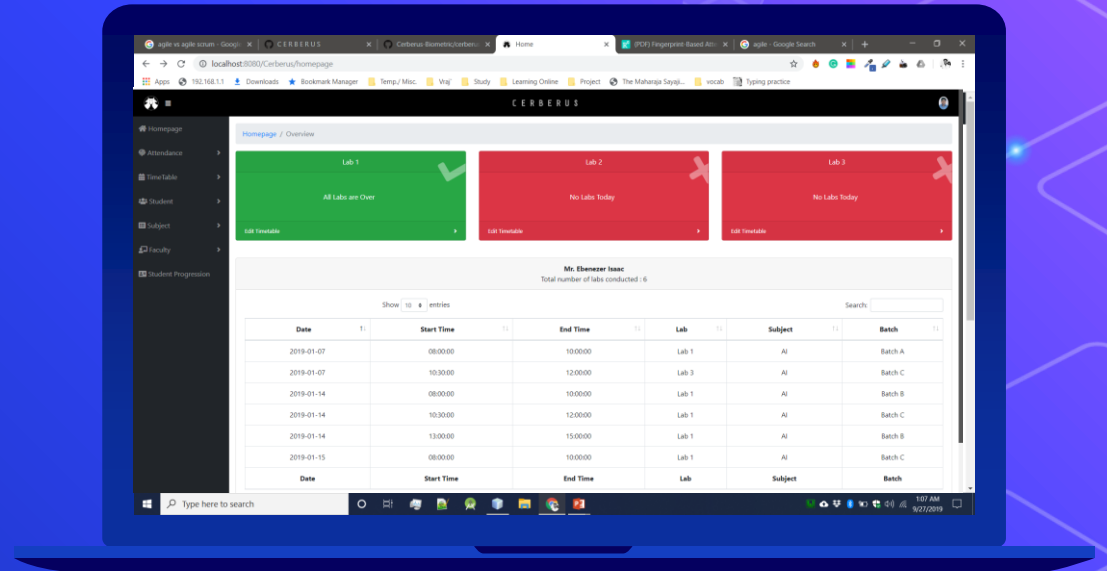
2. Implementation

ScreenShots and Live Demo



Desktop project (Web)

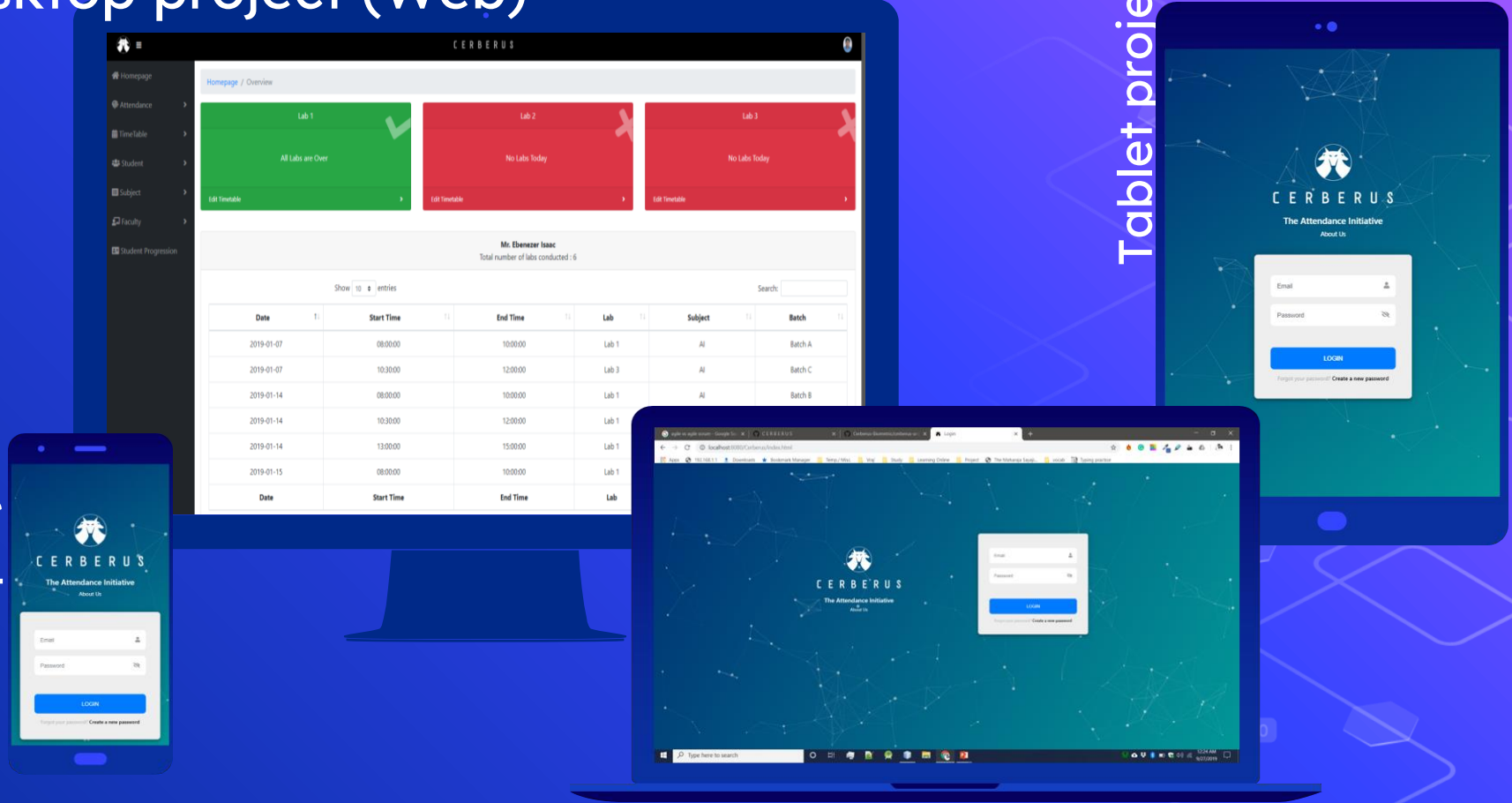
Home page when
faculty logs In.



Desktop project (Web)

Tablet project

Mobile project



Demo of RaspberryPi and Web Application



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Finance

| | |
|------------------------|-------------|
| RaspberryPi + Heatsink | 1035 |
| FPS Module | 1640 |
| Ethernet Module | 250 |
| RTC Module | 110 |
| Screen | 450 |
| Keypad | 390 |
| SD Card | 250 |
| Box Design | 250 |
| Misc. | 150 |
| | 4525 |



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Project Work Division

- Coding on RaspberryPi: Ebenezer
- Raspberry Circuit Design
- Box design: Vraj.
- Backend: Ebenezer & Vraj
- Front end & GUI: Huseinali
- Database & SQL: Vraj
- Documentation: Vraj
- Testing: All 3 of us.

Thank you!

