**IT323: APPLICATIONS DEVELOPMENT AND EMERGING TECHNOLOGIES**

# CULMINATING ACTIVITY: DEVELOP AND DEPLOY A UNIVERSITY-WIDE ELECTRICITY CONSUMPTION MONITORING DASHBOARD WITH IOT INTEGRATION

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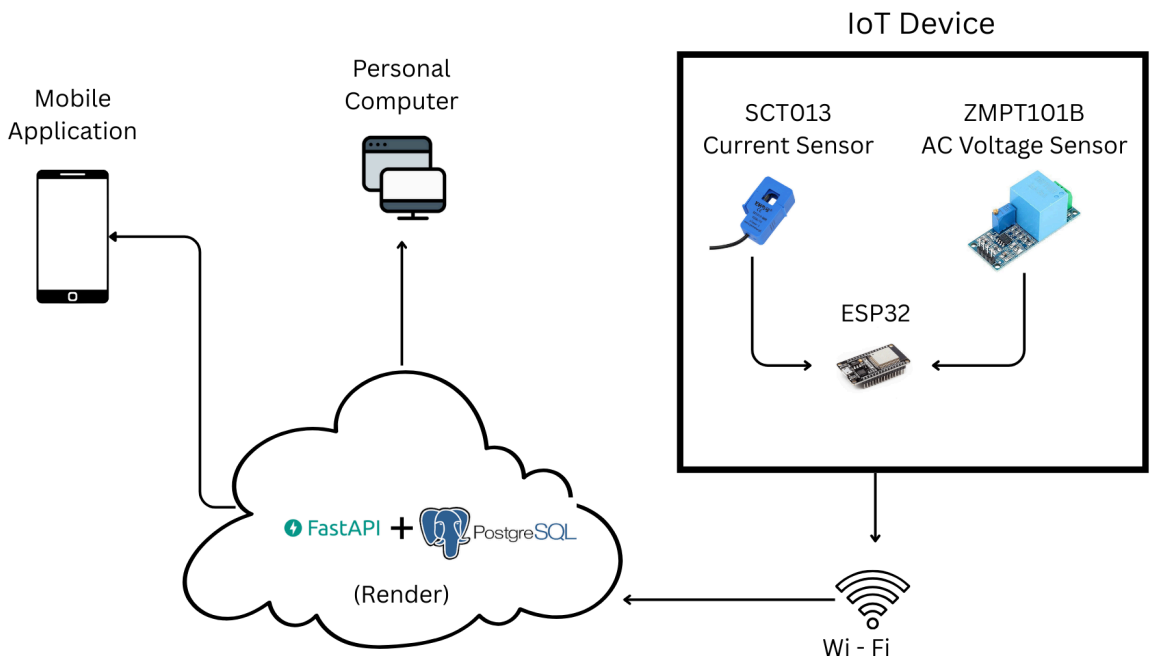
## SYSTEM ARCHITECTURE DIAGRAM




## CHALLENGES FACED DURING DEVELOPMENT AND HOW THEY WERE OVERCOME

During the development of our application, one of the most challenging parts was learning how to use Flutter. Since most of us were new to the framework, it took a lot of time to understand how it works, especially when it came to designing the user interface and managing the data properly across the app. We ran into a lot of issues, especially when the frontend did not match the backend in terms of data and methods, which caused errors and made the app behave differently than we expected.

On the IoT side, the hardest part was connecting the wires between all the components, like the sensors and the microcontroller. It was tricky because everything has to be connected correctly for the system to work, and at the same time, we were all a bit scared of getting electrocuted. Unfortunately, one of our members did get slightly electrocuted while working on the wiring. After that, we became extra cautious. We used towels to hold the wires and made sure our hands were dry whenever we handled anything electrical. We also started double-checking everything before turning on the system.

We faced a lot of obstacles, but we were able to overcome them by doing our own research, and learning from online sources like tutorials and YouTube video lectures. Most

importantly, we worked as a team. We helped each other out along with the other groups, divided the tasks, and made sure everyone contributed. It was not easy along the way but through teamwork and persistence, we were able to push through the difficulties and make big progress on our project in just one night.

## TECHNOLOGIES AND TOOLS USED

FRONTEND (MOBILE):

- SOFTWARE:
    - Flutter

- HARDWARE:
    - Laptop (Windows 11)

FRONTEND (WEB)

- SOFTWARE:
    - ReactJS

BACKEND:

- FastAPI
- PostgreSQL (Database)

## FUTURE IMPROVEMENTS OR FEATURES TO ADD

- Enclose the IoT device in protective casing to enhance durability, safety, and weather resistance.
- Use a web socket to ensure real time updates of readings.