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## ABSTRACT



- As the technology improves over years, the amount of energy consumed by humans has increased dramatically. This rapid rise in the consumption has drove people to seek for ways to reduce the adverse impacts of massive energy consumption.
- One of the adverse impacts is the cost result of high energy consumption in the houses. The consumers can see only monthly energy usage on the bill at the end of month..
- Our motivation is designing a device so that customers can see the immediate power consumption in the house through a mobile application or browser .
- By looking at the data logging, user can see the expected bill. Thus, the device would create awareness about power consumption and to optimize and minimize their power usage.

## OBJECTIVES

- Show power consumption data with +/- 10% margin of error.
- Monthly, weekly, daily, hourly and immediate power consumption data and estimation of the corresponding cost.
- Easily installable, hand-held device for users to access the device through mobile application from anywhere.

## PROJECT DETAILS

### COMPONENTS



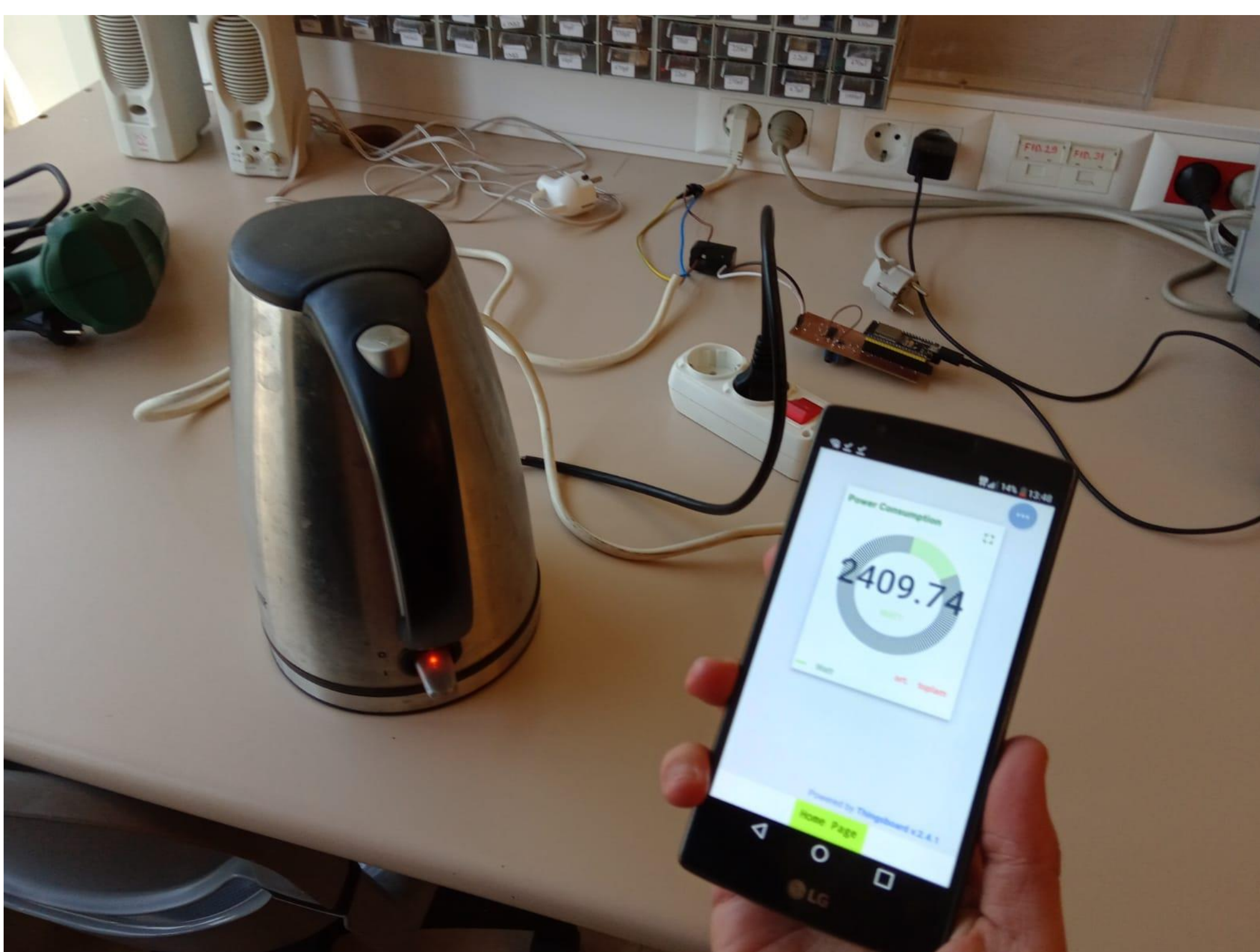
**Transducer** : Detects the current and converts it to voltage..



**ESP32** : Programmable microcontroller, integrated with Wi-Fi module.



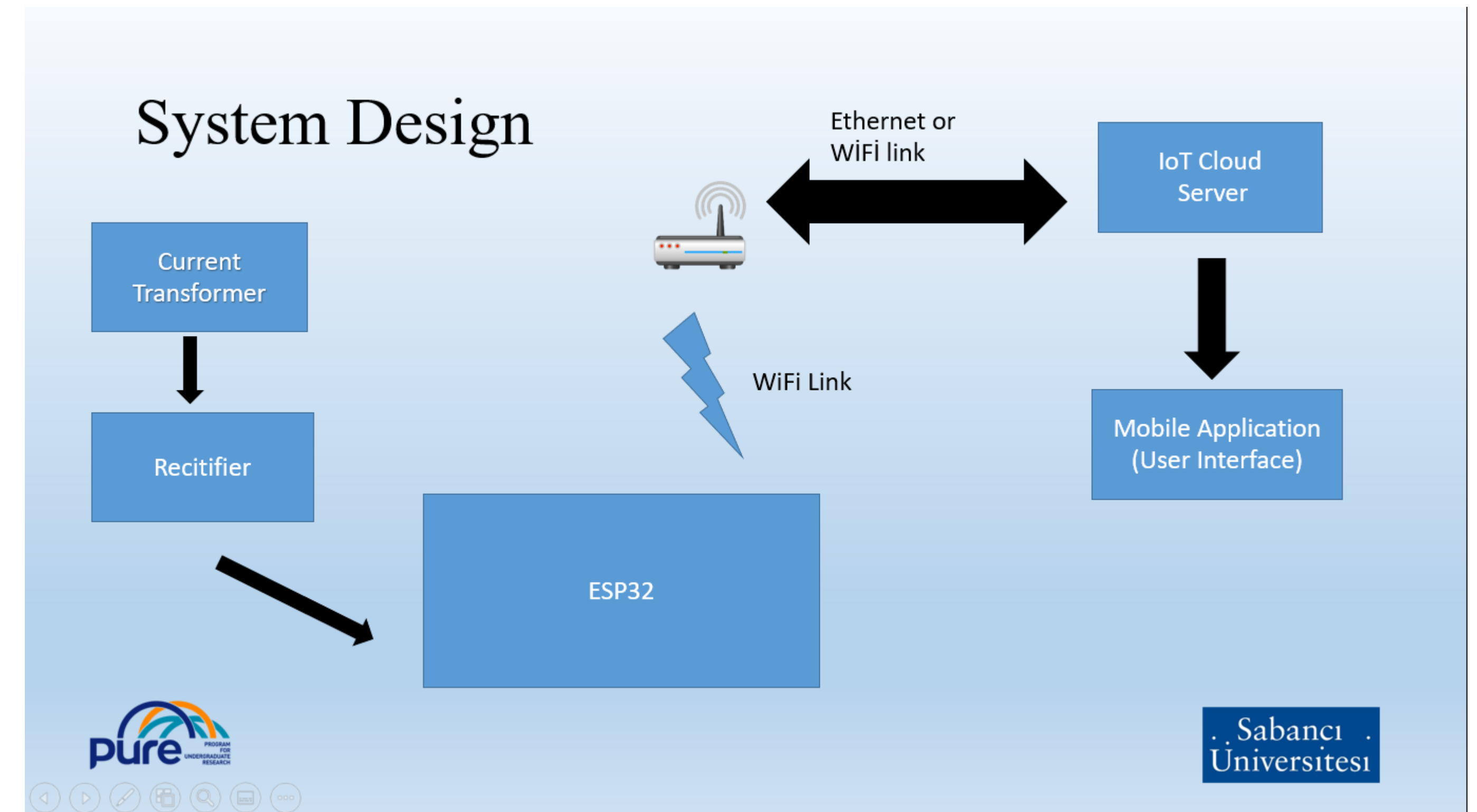
**User Interface App** : Mobile application to monitor data.



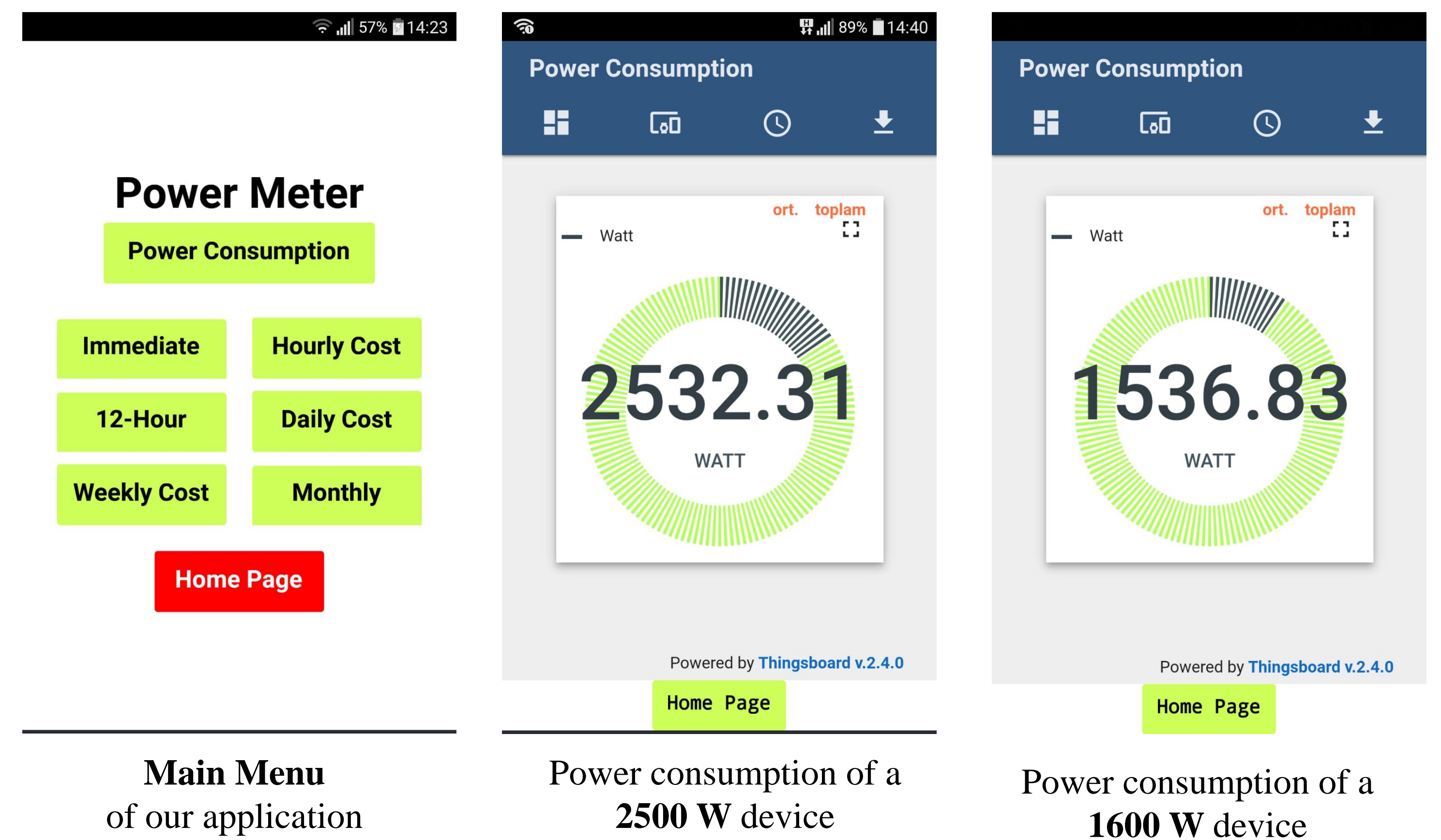
A photo taken during the live demonstration.

## PROJECT DETAILS

### WORKING PRINCIPLES OF THE SYSTEM



- The transducer detects the current that flows through the main cable and converts it to voltage signal.
- Since the micro-controller used in the project can not handle negative voltages, negative half of the signal wave is rectified by a precision rectifier circuit.
- ESP32 micro-controller receives the rectified signal from its analog input. By following this, ADC in the micro-controller converts analog signal to digital signal.
- The data is sent to IoT cloud server through a wireless remoter. Cloud server transfers the data to mobile application.
- Mobile application displays immediate power consumption and its corresponding cost to the user.



## CONCLUSION

- In conclusion, we have achieved our objectives, as we are able to build a system which gathers and processes voltage data and converts it into power data.
- This power data is used to calculate daily, weekly and monthly power consumptionn and power cost which is stored in our IoT cloud server.
- Mobile application that we developed takes this information from IoT cloud server and shows graphs of power consumption and cost data.
- In future studies, researchers might take additional steps to improve our Arduino code or the interface of our application.

## REFERENCES

[https://people.ece.cornell.edu/land/courses/eceprojectsland/STUDENTPROJ/2009to2010/csm44/DESIGN\\_REPORT.pdf](https://people.ece.cornell.edu/land/courses/eceprojectsland/STUDENTPROJ/2009to2010/csm44/DESIGN_REPORT.pdf)