Non-invasive Smart Energy Monitoring System

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Problem statement

Design and develop non-invasive smart energy monitoring system.

Objectives

To develop a data acquisition system and forecast consumption usage with cloud computing
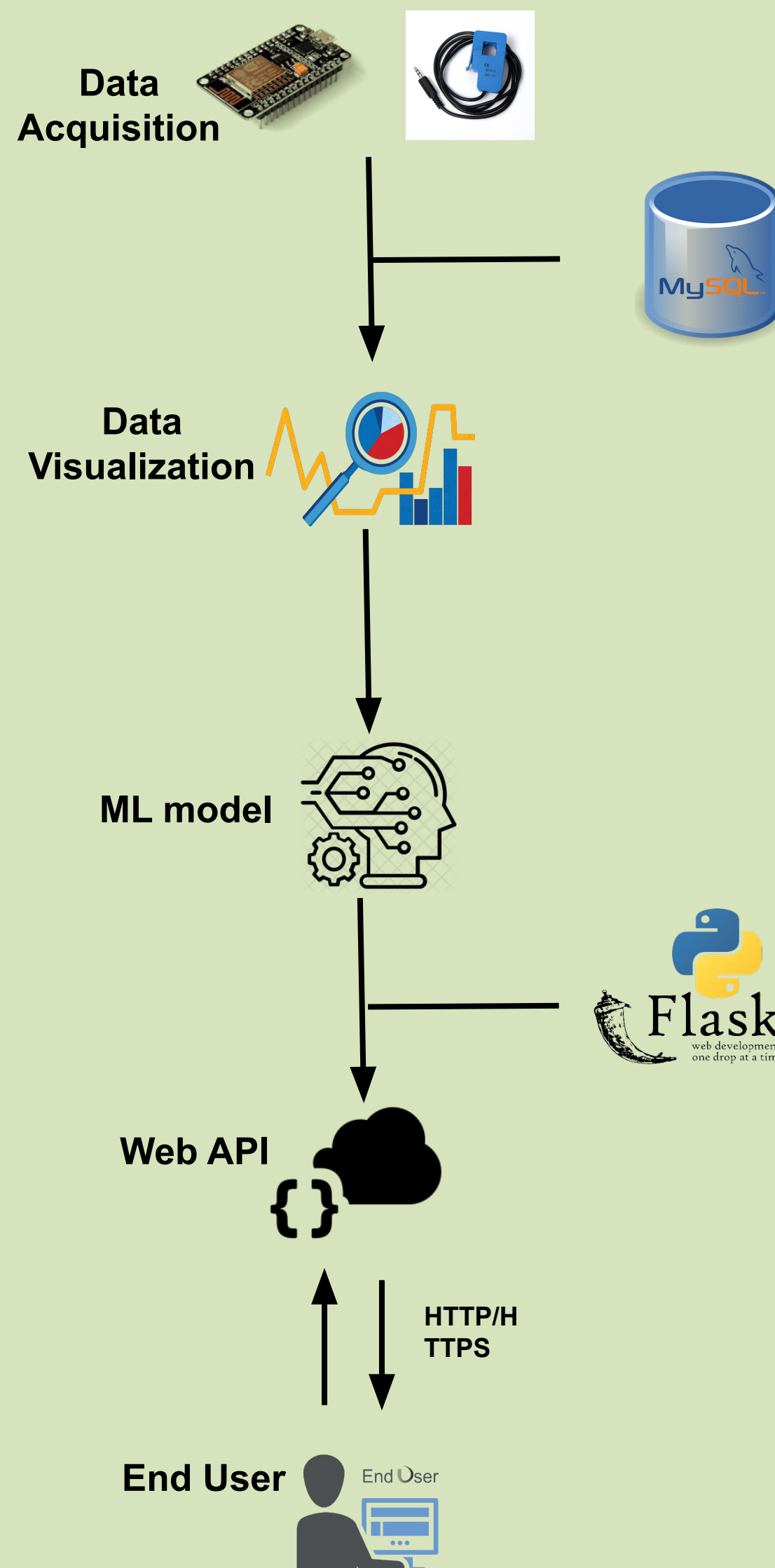
Contributions

This project helps in bridging the gap between electricity demand and supply analysing the consumption patterns and forecasting for future days.

Literature survey

- Gathering pertinent information to the problem statement.
- Existing architecture for managing and monitoring
- Usage of machine learning to detect anomalies and forecasting

Methodology

Data Acquisition

MySQL

Data Visualization

ML model

Flask
web development,
one drop at a time

Web API
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HTTP/H
TTPS

End User

Results

Data acquisition for different sensor nodes are demonstrated and stored in database using cloud services. Deep Learning models were implemented to provide forecasts with accuracy of 95%

Optimization details

Hardware- Introduction of sleep mode in ESP32 helps in increasing battery life with less current consumption (0.8mA), at the sensor node.
Software- Hyper parameter tuning yielded better optimization of the model increasing accuracy by 15%

Conclusions

Due to the global warming and the increase of energy use, efficient energy consumption is the main research issues these days. The proposed energy monitoring framework can help efficiently manage usage of energy.

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