PROBLEM STATEMENT:

Energy Audit for Households

Industries and big buildings are usually energy efficient as energy audits are regularly conducted and measures are taken to reduce the energy wastage. However, it is not true at the household levels. Most households wouldn't go down the energy audit route (for various reasons) to assess the energy efficiency and energy usage of their homes. Hence it is proposed that ML based models are built which can be used to build energy consumption profiles and identify probably areas where the energy is getting wasted for a household.

TEAM DETAILS:

NUMBER OF MEMBERS: 4

TUSHAR RAJ VERMA

ROLE IN THE PROJECT:
Deep learning and model development

SRISHTI AGRAWAL

ROLE IN THE PROJECT:
Deep learning and model development

NEHA GOEL

ROLE IN THE PROJECT:
Worked on Internet of Things

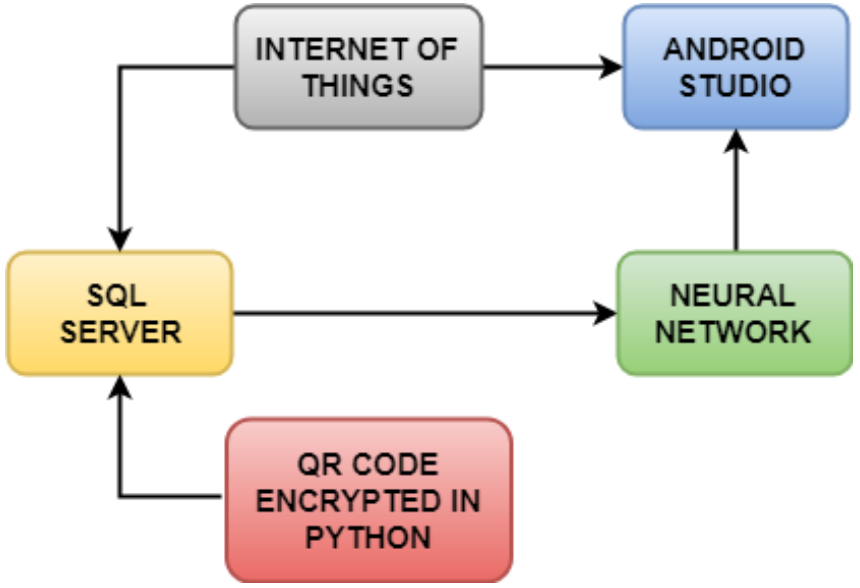
URVASHI CHAUDHARY

ROLE IN THE PROJECT:
Worked on the development of mobile Application

IDEA OF APPROACH:

To find power consumption of each appliance, we first need details of appliances, which are available at the base or back of the appliance. But, as there will be least participation of users, each device will be allotted a **QR-Code** encrypted in python. This QR-Code will be scanned by our app and after scanning it will store the decrypted details. **Current-Sensor** will be used to calculate the time of consumption on daily basis, by setting the code for actual timer.

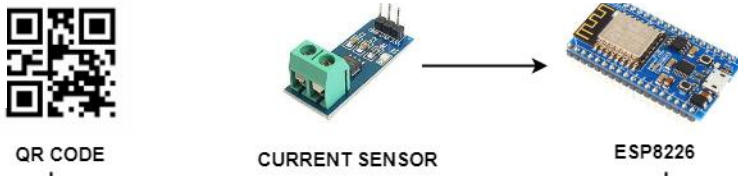
TECHNOLOGY STACK:



H/W & S/W DEVICES:

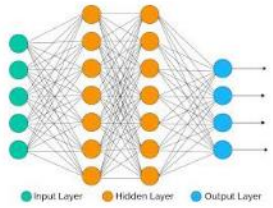
QR-CODE: These slips will be pasted to the appliance user need review and wants to monitor it. These are unique code which will be storing information of the appliance for which it is coded. Its data bits are required in calculations.

Current Sensors: This is a small chip sensor which is used to sense current .The logic applied in calculating the time of appliance in running state is implemented and fulfilled by this sensor as If the D_{out} pin is start sensing current then a timer is set and when current stops flowing the timer stops and storing the value in counter the timer resets and this process continues for a day.



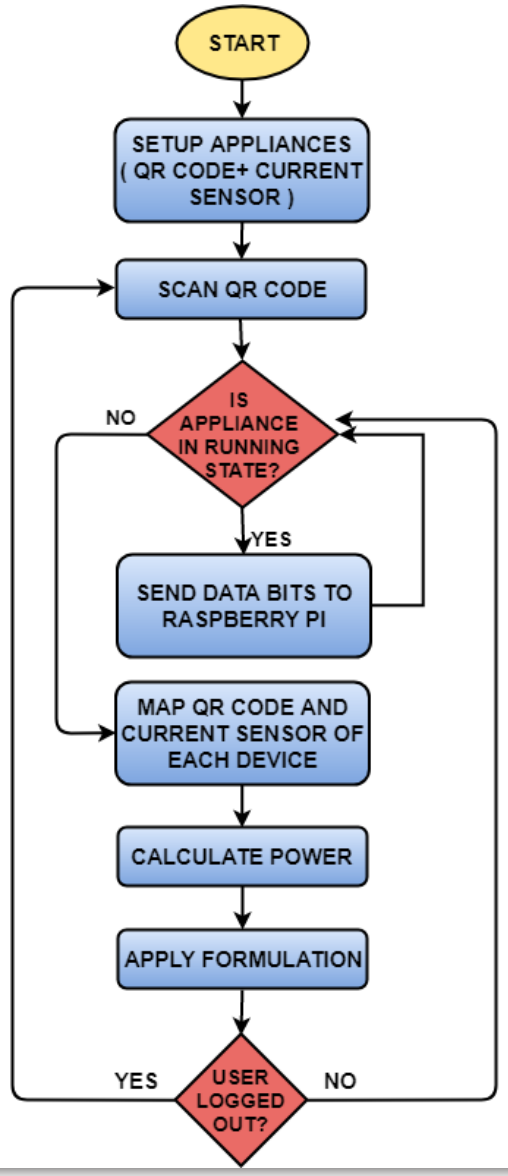
Microcontrollers: The usage of conducting a node system with network sharing is done by embedded studies using components as-esp8266, ICs, jumping wires etc. Its application will make our device compact.

Raspberry pi 3B+: The usage of raspberry pi is responsible for transferring signals from sensors to database and then reflecting to the app. This is core central point to store values and deploy it in GUI. This device will also be responsible for coding as well as software working. The data bits coming from current sensor and QR-code decryption will be channelized and will be used in formulation and simulation of code.



Neural Network Simulations: The prediction of monthly bill will be our application's key feature. By training our model by fitting formula and then taking real time values from our application will be served in our input layer and by applying forward and backward propagations we will be predicting accurate monthly bill.

FLOWCHART:



ALGORITHM:

Step-1: Apply basic setup on **appliances (A [1....n])**, where n is total number of appliances, as **QR-CODE (Q [A [1....n]])** on appliances and **Current Sensor (C[A [1....n]])** also on appliances.

Step-2: Scan **Q [A [1....n]]** and store in database server.

Step-3: for each i in **A[i]** is in running state.

Step-4: Send data bits of **C[A[i]]** to raspberry pi and set timer till **A[i]** is running.

Step-5: if **A[i]** is now in off state goto step-7.

Step-6: else perform code for timer increment.

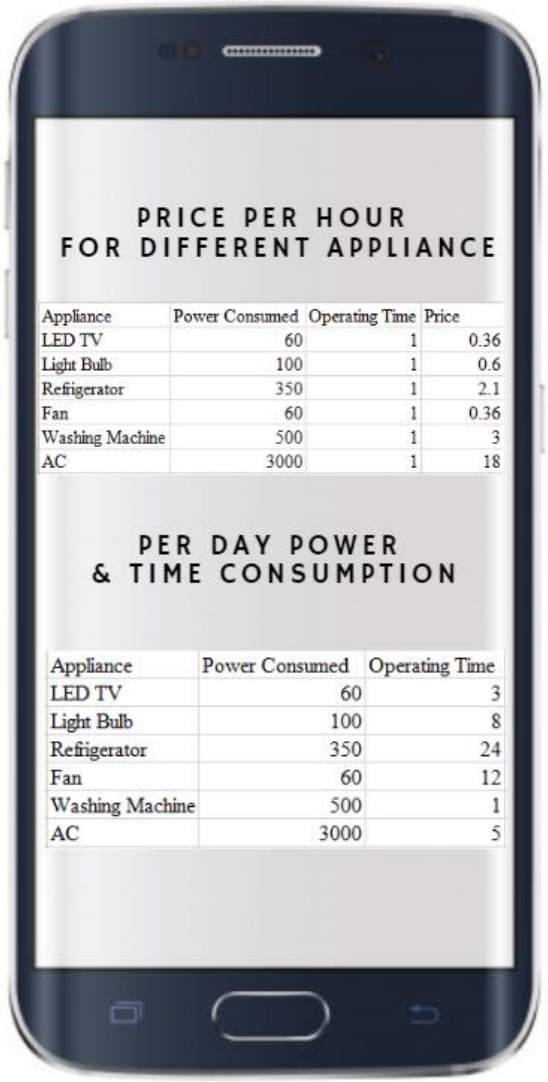
Step-7: map **C[A[i]] <->Q[A[i]]** and get the actual reading for time and power.

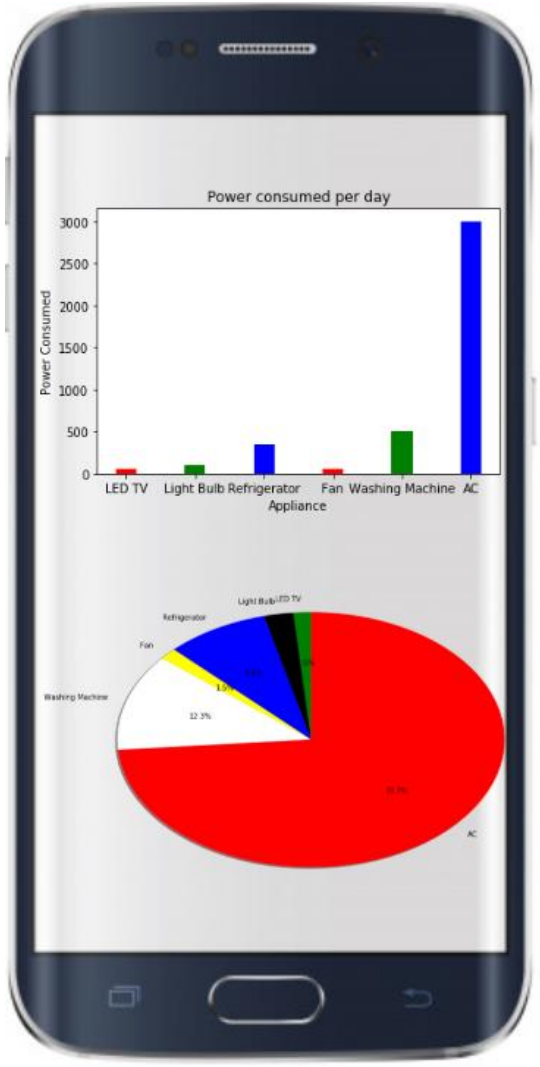
Step-8: Apply formulations in code using time and power for power-consumption and Cost intrudes of **A[i]** and deploy it on mobile app.

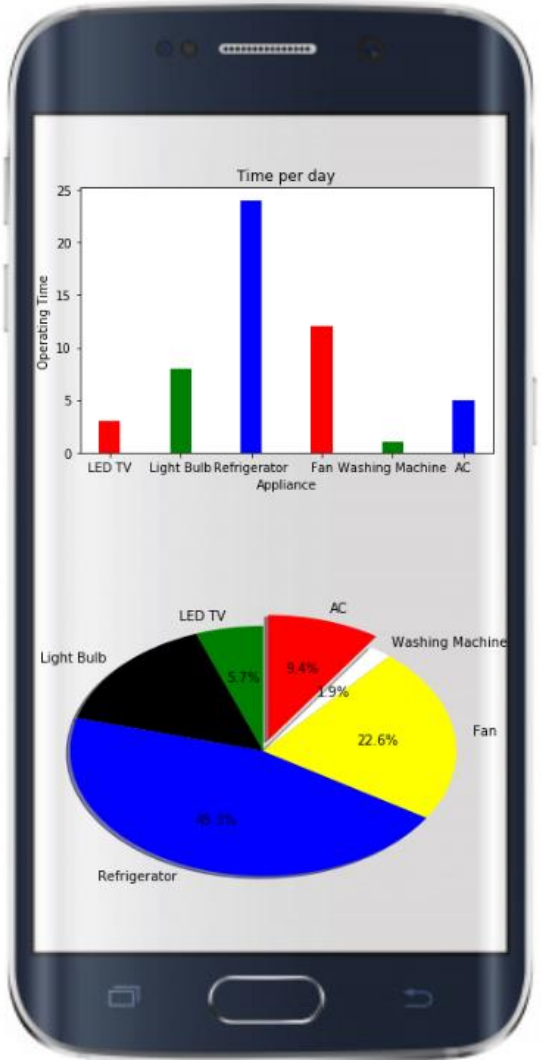
Step-9: Repeat step-3 till user is logged-in.

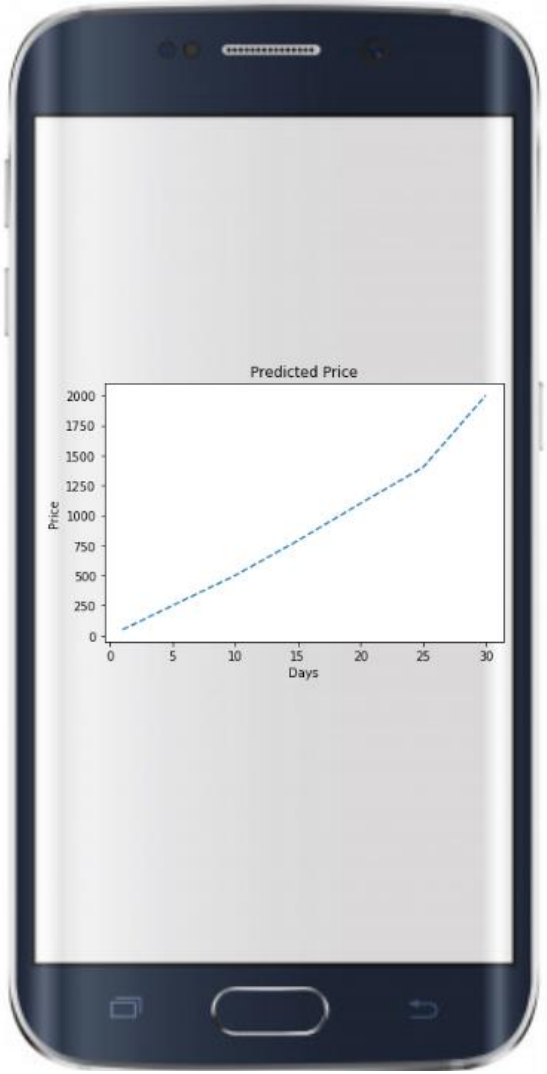
Step-10: Go to step-1 if user logout.

SAMPLE LAYOUTS:

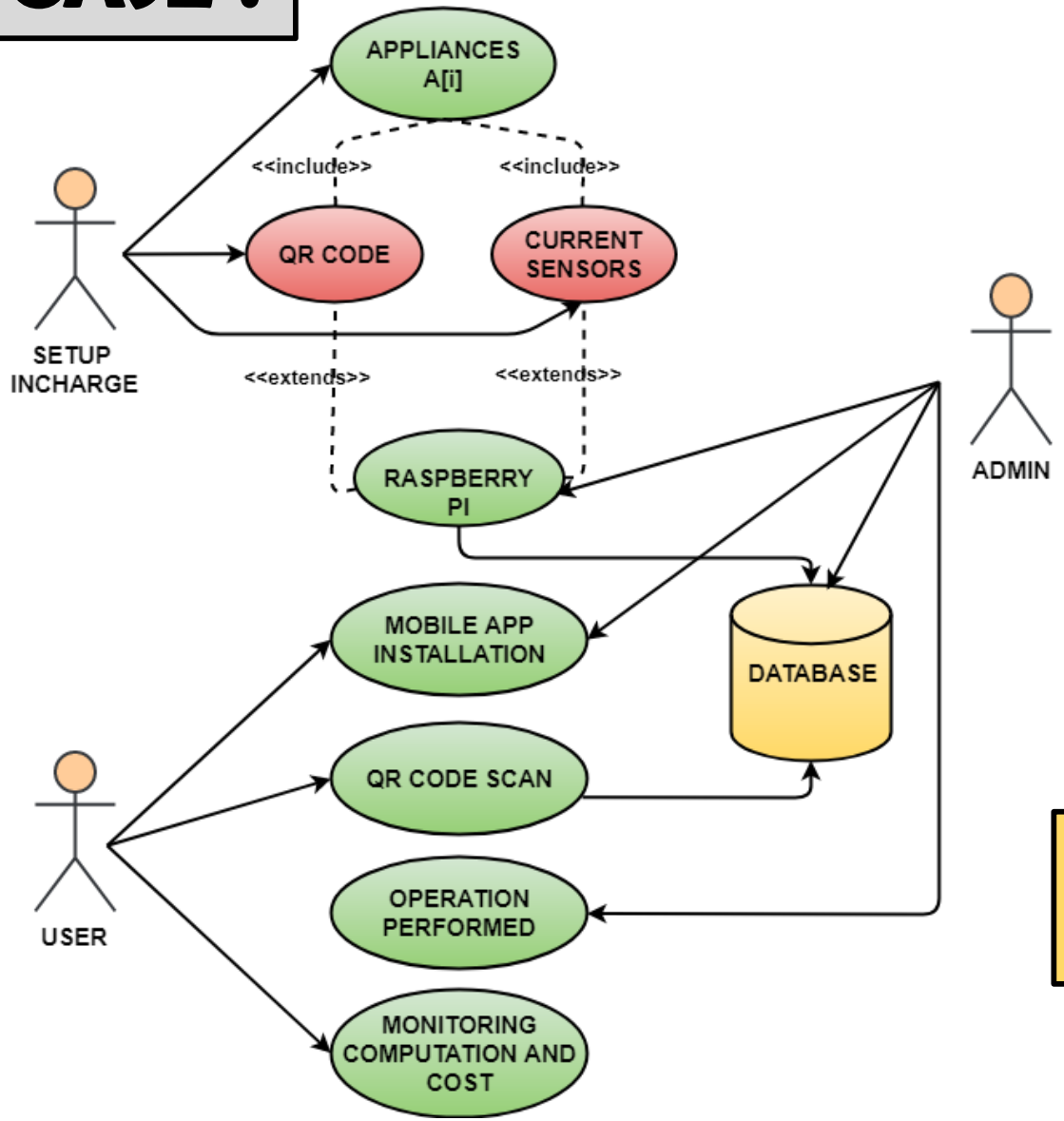








USE CASE :



ADVANTAGES :

- This will allow users to monitor the appliances and can effectively use them.
- It will save electricity by tracing the consumptions.
- The scalability or the usage of app will be maximum as QR code will be scanned once and if user logouts it must be scanned again user will be logged in.

PROTOYPE LINK:

https://www.youtube.com/embed/pBc_HifgAfY