Silicon Rush Proposal

idkWhatWe're Doing

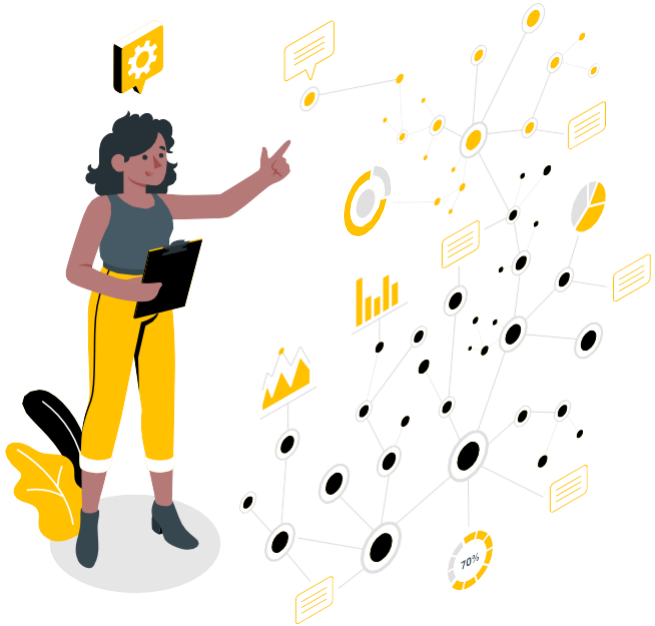
M Aswartha Reddy, 1RV21CS076, RVCE
Shishira M Iyar, 1RV21CS154, RVCE
D K Bharath Reddy, 1RV21CS032, RVCE
Pulkit Dhamija, 1RV21CS118, RVCE

PES UNIVERSITY
CELEBRATING 50 YEARS

IEEE COMPUTER SOCIETY
PES University Student Branch Chapter

Problem Statement

Smart Home Infrastructure



Problem Statement

- Many people who either live alone or in isolated locations, pose the threat of home thefts / intruders.
- They have no way to know if a door has been opened when no one is home
- The elderly or the disabled often depend on others for help, such as turning ON/OFF lights, fans especially when they are about to sleep or when they wake up in the middle of the night.
- We can enhance our quality-of-life by automating repetitive tasks be it turning ON the geyser in the morning or mosquito repellent devices like All Out or Good Knight at a pre-set schedule.

Solution

01

Security

02

Safety

03

Quality of Life Enhancements

04

Accessibility

05

Easy to use and User Friendly

06

Easily Scalable

Solution Appendix

1. Security

- Get notified on the app if an unknown person is detected around the home.
- Watch a live stream from camera on a browser or the app.
- Get emails of video from camera if any motion is detected.
- Get on notified on the app if door is opened.
- Open CV recognizes faces and opens the door

2. Safety

- Get notified on the app if smoke or gas is detected.
- Turn ON light in the night when motion is detected. This is helpful especially for the elderly when the wakeup during the night.
- Remotely lock and unlock the door from the app. This allows keyless entry, thus limiting the spread of the deadly Coronavirus.
- This keyless entry can be used to remotely open doors so that delivery agents can drop packages safely and securely even when the user isn't home.

Solution Appendix

3. Quality of Life Enhancements

- Occupancy awareness can be used to turn ON/OFF lights automatically depending on whether the user is home or not. This helps save a lot of electricity.
- Control appliances remotely from the app.
- Touch switches to control appliances without the app.
- Set schedules to automatically turn ON/OFF appliances. E.g. Turning ON/OFF geysers in the morning, so the user has hot water ready to use as soon as they wakeup.

4. Accessibility

- All home appliances can be controlled from a mobile application.
- Low cost and hence accessible to all fields of society.

Solution Appendix

5. User Friendly

- Easy to use for people of all ages.
- Voice button allows them to control the appliances by voice commands.
- Easy to navigate and learn about the working of the app even for uneducated people.

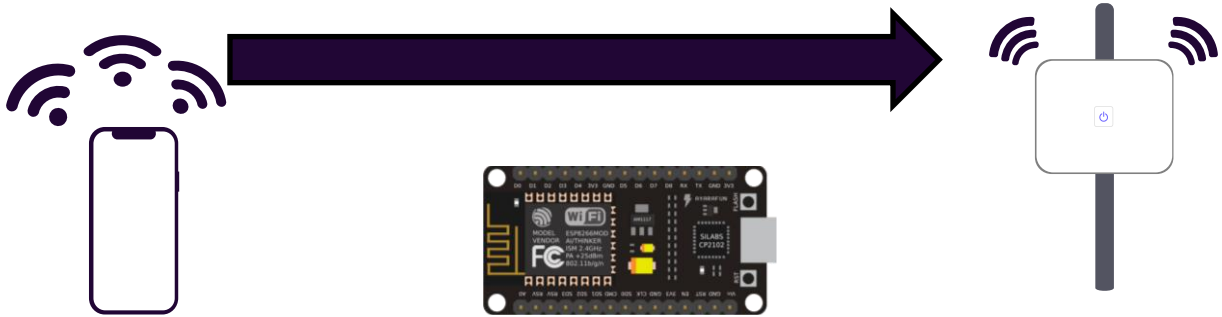
6. Easily Scalable

- Can be customized as per the user's requirements.
- Appliances can be added or removed as and when required.

How our Solution Works

1. MAC Address Detection

- These days almost everyone carries a smartphone with them.
- These smartphones constantly emit Wi-Fi packets to look for already known access points.
- These packets contain a source and destination MAC address.
- We can look at the source MAC address to identify the smartphone and hence the person.



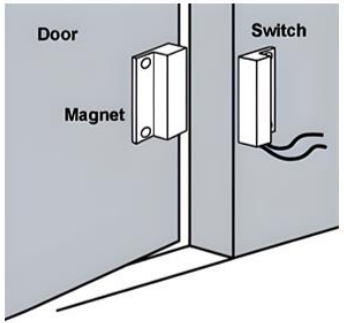
How our Solution Works

2. Security Camera

- To local web server in MJPEG format
- Can be viewed on a browser or the app.
- If any motion is detected, it is recorded, saved locally and then, a copy is emailed.
- Open CV to detect recognized faces and automatically open the door, alert on the app if face is unrecognizable.

How our Solution Works

3. Sensors



Reed Switch Detects Door State

MQ-2 Sensor Detects Smoke And Gas

PIR Sensor Detects Motion

LM 35 Temperature Sensor

How our Solution Works

4. Touch Switch and Door Lock

Capacitive Touch Switch

Solenoid Lock To
Lock / Unlock Door

Requirements

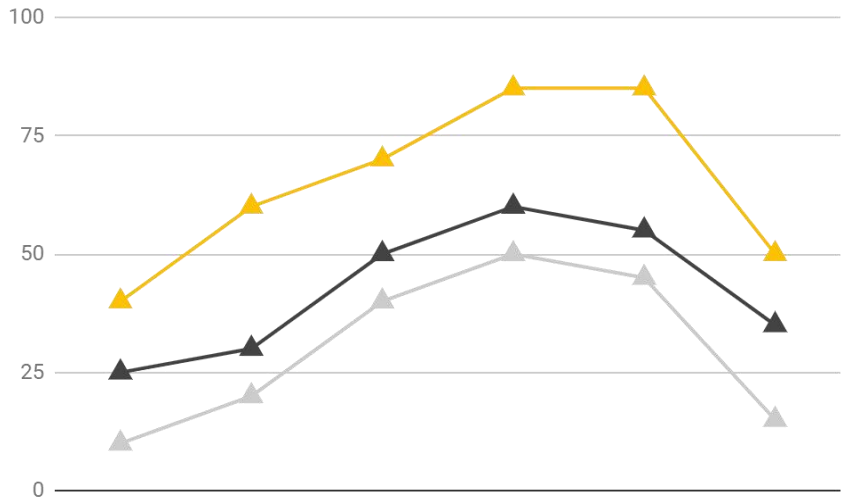
Software stack

- Kotlin for Android Studio
- Arduino IDE
- Firebase
- Python
- Motion Software

Hardware

- Sony Spresense
- Node-MCU (ESP-8266)
- ESP-32
- Raspberry Pi 3 B+
- Raspberry Pi Camera
- TTP-223 Touch Switches
- Reed Switch
- MQ-02 Gas Sensor
- Solenoid Lock
- PIR Sensor
- Jumper Wires
- Breadboard
- 5V / 12V Power Supply

Deployment



Old-Aged

Physically-Challenged

Working Parents

Our product is mainly aimed towards the benefit of old people

It can be scaled up as per the user's requirement easily.

Our product helps children monitor their aged parents at home. They can monitor them using the app and can make their lives easier.

Bibliography

- IoT Smart Home with Intruder Detection
- Android Controlled Home Automation by Sabin Adhikari, Sangam KC, Santosh Lamichanne, Urjala Bajracharya, 2017, A report on Home Automation using Android OS
- Home Automation using Arduino by Anirban Bhowmik, Sandip Kumar Das,Souvik Acharya,Tusharkanti Murmu 2018 IEEE 5th international conference, 2018