Parshvanath Charitable Trust's

A. P. SHAH INSTITUTE OF TECHNOLOGY

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(Religious Jain Minority)

Title: An Intelligent Home Automation System For Specially Abled.

Group no : 04

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Contents

Abstract

- In this Digital-Era, Security and Automation is one of the utmost requirement for a home.
- This Project aims to develop a system to assist deaf people by providing them with various automation facilities in their home and secure their house by identifying faces and grant them access using a Face Detection system at cheaper rates.
- To implement a Matching and Decision making Recognition System, Image processing tools and algorithms are used.
- To Automate, various cost efficient IOT Components are used that communicates with a Cloud Server and an Application secured with one step authentication.

Introduction

- Investing in a System that Secures and Automates a home is desideratum that eases your lifestyle with the smart devices via Internet.
- Automation can simply mean the task of controlling electric appliances i.e; ON or OFF, either remotely or in close proximity.
- Security also becomes one of the main constraint in today's world.Providing security with the help of face recognition and automating doors to unlock when recognized is also attractive security feature.

Literature Review

Sr No	Author	Methodology	Merits	Limitations
1	Matthias Mielke & Rainer Bruck (IEEE Conference, 2016)	Mesh-Network to notify over Bluetooth to smart watch & event indication by vibration for people experiencing Hearing Loss	Wireless notification system smartwatch used for Indoor & Outdoor notification using sink node i.e; stationery & mobile sink node for watch or phone.	Low Energy consumption using bluetooth introduces a delay for packet delivery. Also short range because bluetooth coverage is short distance ranging 5-10m.

Sr No	Author	Methodology	Merits	Limitations
2	Dwi Ana Ratna Wati, Dika Abadianto (International Conferences on Information Technology and Electrical Engineering, 2017)	MyRIO is used and is connected to computer with wifi Face Detection and Recognition can be implemented using MyRIO as a main controller.	Wifi Enabled services and intelligent approach towards learning controls.	To detect face it must be positioned at 240 cm or less than that. Distance more than 240 wont be detected. Various accessories can be difficult to detect face. I.e; slight change in face features.
3	T Archana, T. Venugopal (International Conference on Green Computing and Internet of Things, 2015)	Comparison between two face recognition approach in PCA & Template. Along with comparison advantages and important factors of two approaches.	With the comparison analysis stated Template matching strategy is efficient than PCA.	On Frontal view recognition is accepted but factors are: 1. Facial Expression 2. Change in plane 3. Illumination. 4. Rotation of head

Sr No	Author	Methodology	Merits	Limitations
4	Shopan Dey, Sandip Das, Ayon Roy (IEEE Conference, 2016)	Using IOT Control home automation through interconnection software-PHP point to point web socket. Amazon cloud server for socket connection. Equipments used:Pi relay, sensor-humidity & temperature.	To operate or control various equipments, machinery & other electrical & electronic appliances remotely.	If maintenance is not taken care of properly software and appliance i.e; hardware synchronization can be influenced.
5	Yashwanth Sai, Vijai Chandra Prasad, Niveditha, Sasipraba, Vigneshwari & S.Gowri (IEEE Conference, 2017)	PCA algorithm is used for face recognition & take the dimensions of face messages and convert to grayscale. High prevalent CCTV cameras for intruders.Uses Raspberry PI & camera modules and sensors alerting users through email or mobile notification sms 7 generate log of default entry & exits.	Uses simple SMP Pi camera instead of high surveillance camera. Uses wifi adapter for connecting smart system to local computer. Log generation done with simple code when face is detected by the camera.	An authority is required to be present to do surveillance to watch the activities.

Problem Statement

- Security has been a serious issue faced by people over the last years. Not only Security but the unavailability of resources to control everything in the house remotely is also a problem.
- Automating and Securing homes using cost efficient equipments and technologies is very complicated.
- With so many Minds developing systems to cover all these constraints none of them are affordable to a specially abled.
- A System is needed to efficiently Automate and Secure the dwelling of such mass at affordable rates.

Project Scope

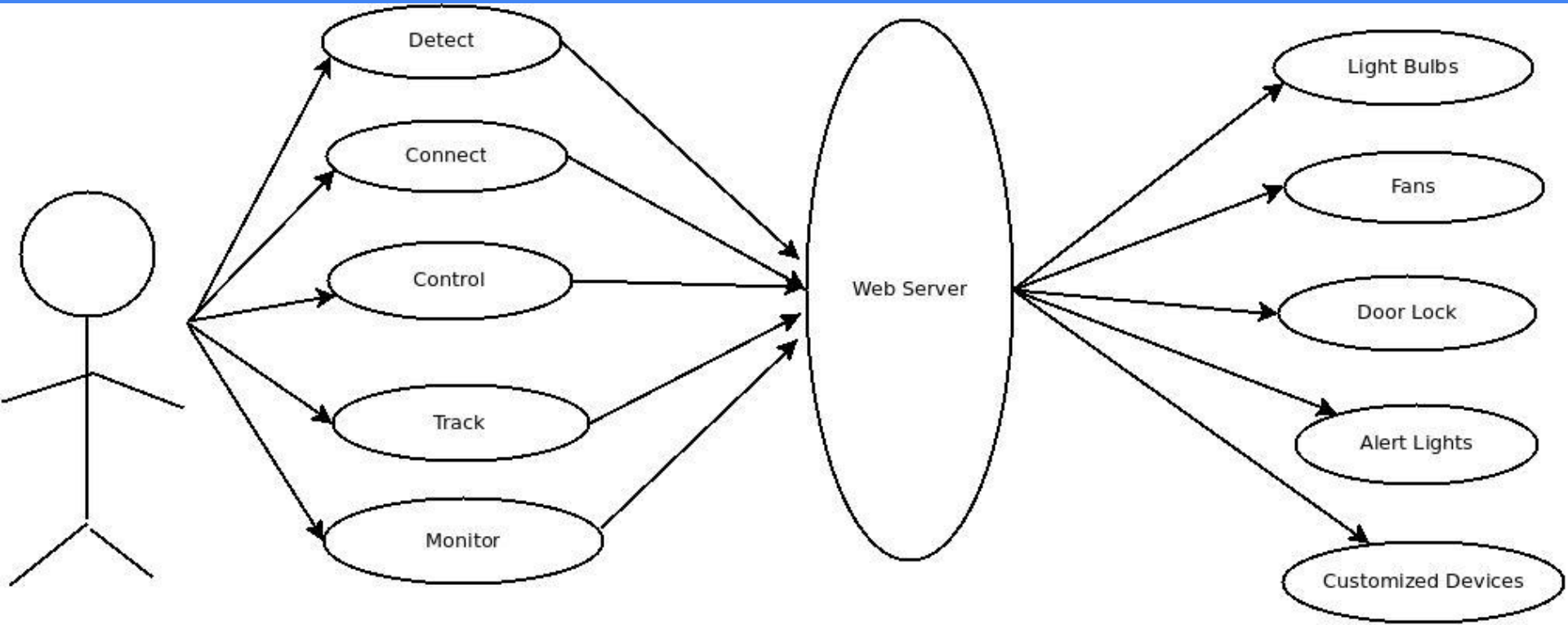
- This Project aims to Automate and Secure home using Smart IOT Components.
  - The Main Door is equipped with a smart security system that works on facial recognition system designed to unlock the door only when a recognized face is detected.
  - Automation System via an app using which he/she can control appliances remotely via Internet by use of Wifi adapters installed in the system which will communicate with a Cloud Server.

- Logs of main Door will be recorded and user will be notified for each entry on the Application installed on the smartphone.
- In case of fire or gas leak using various sensors and emergency lights so the deaf can see the alert.

➢ Limitation:

- The intelligent system can only control Fans, Lights of the room, however it does not promise to control other applications like Refrigerators, Coolers, Televisions etc.

Use-Case Diagram

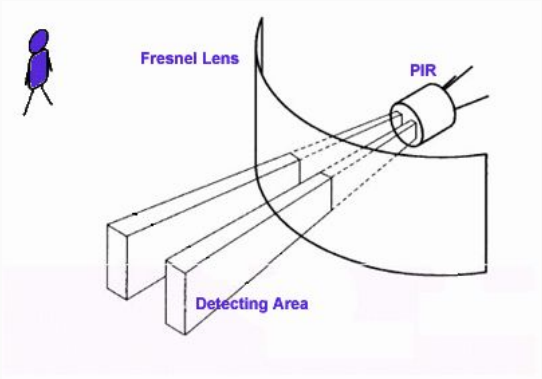


Technology Stack

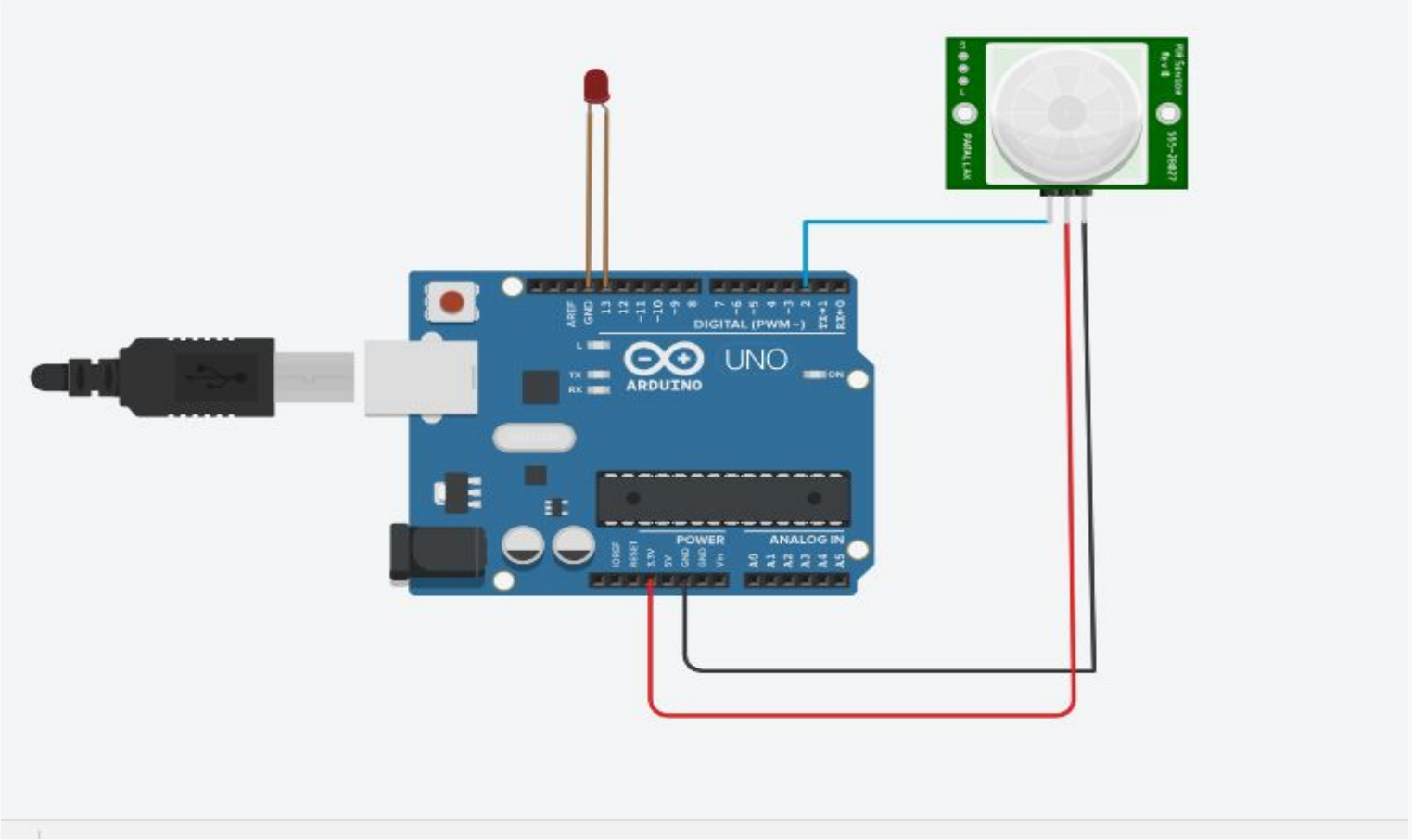
Hardware	Software
PIR Sensor	Arduino IDE
Arduino UNO	ThingSpeak server
NodeMCU	Python & TensorFlow
Relay & sensors	C#
Wires	Android & Xamrin
LEDs	Cordova
Servo motor	Web Development Languages
Latch system & Camera sensor	Azure cloud & Microsoft cognitive services & MySQl Database

Implementation

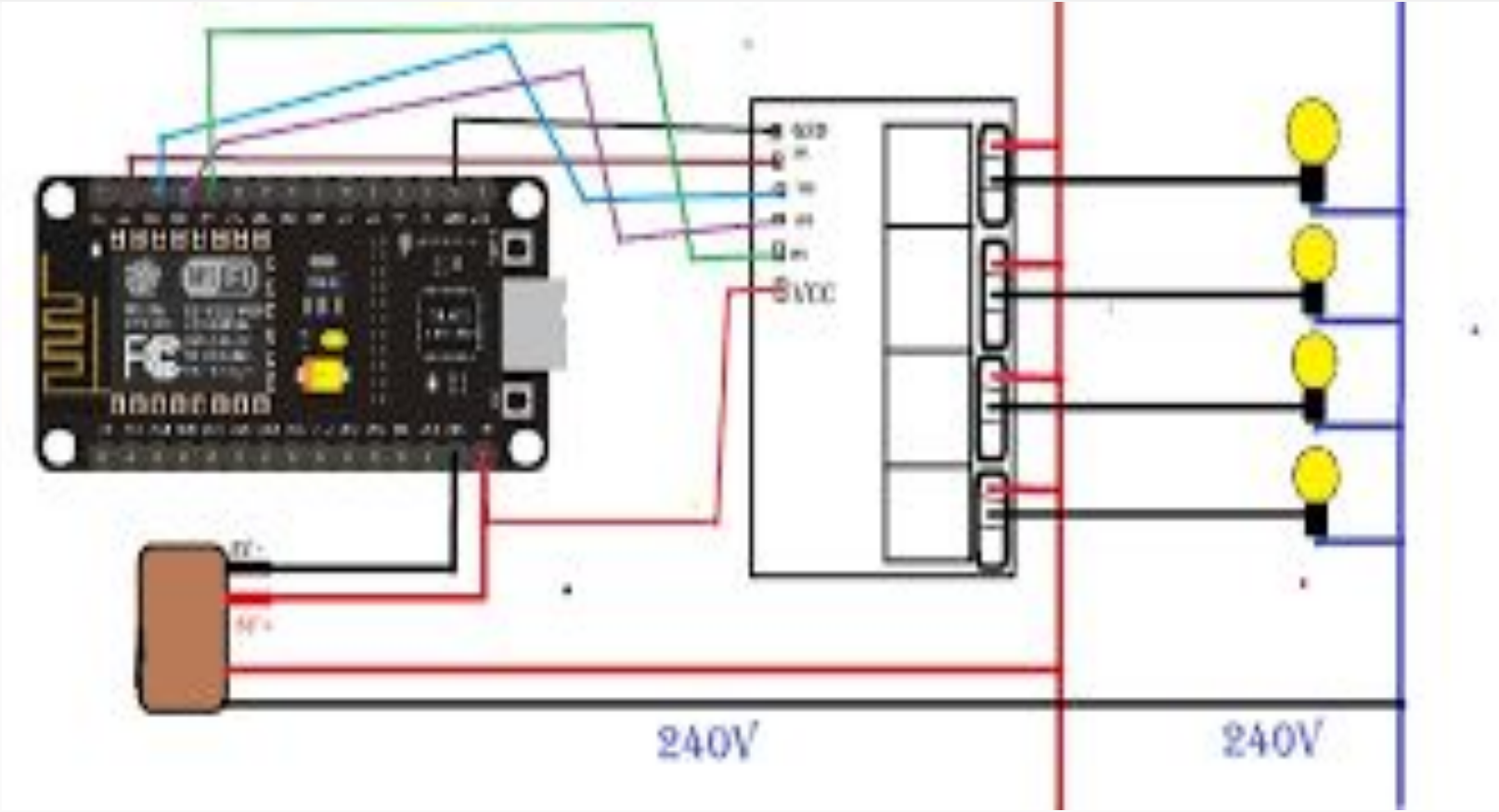
- A **passive infrared sensor** (**PIR sensor**) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view.
- We are using pir sensor to automate the room's light without switching it on or off.



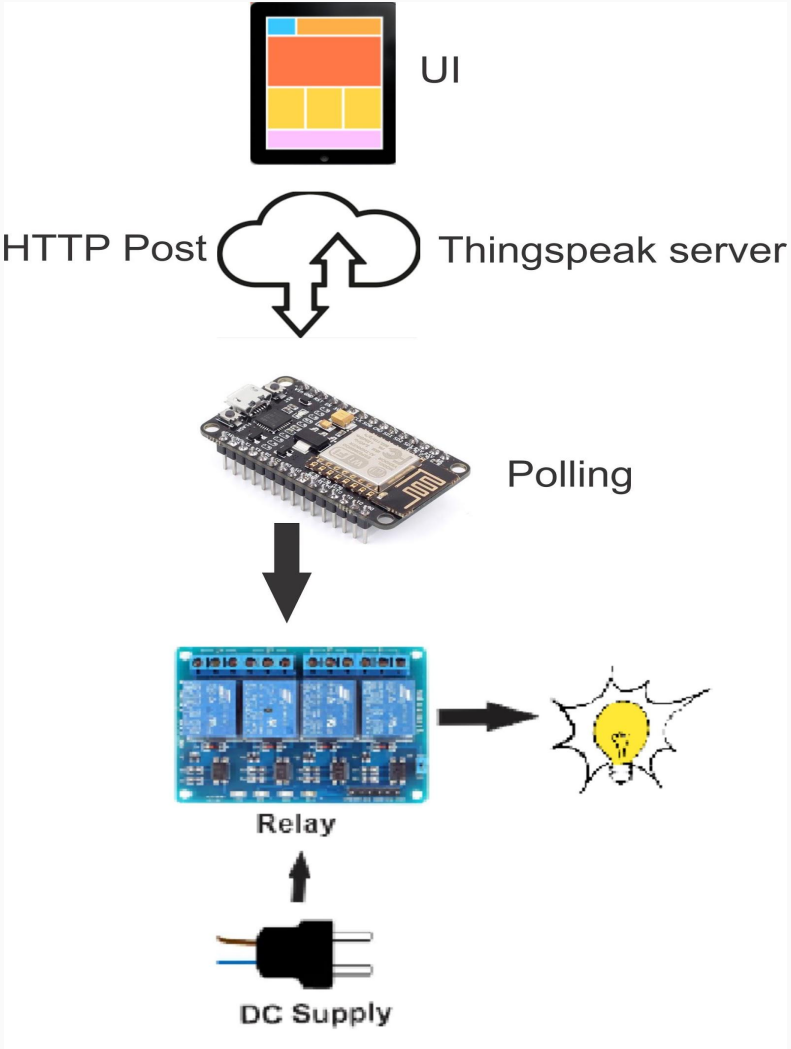
PIR Circuit diagram



Node MCU and Relay Connectivity circuit diagram



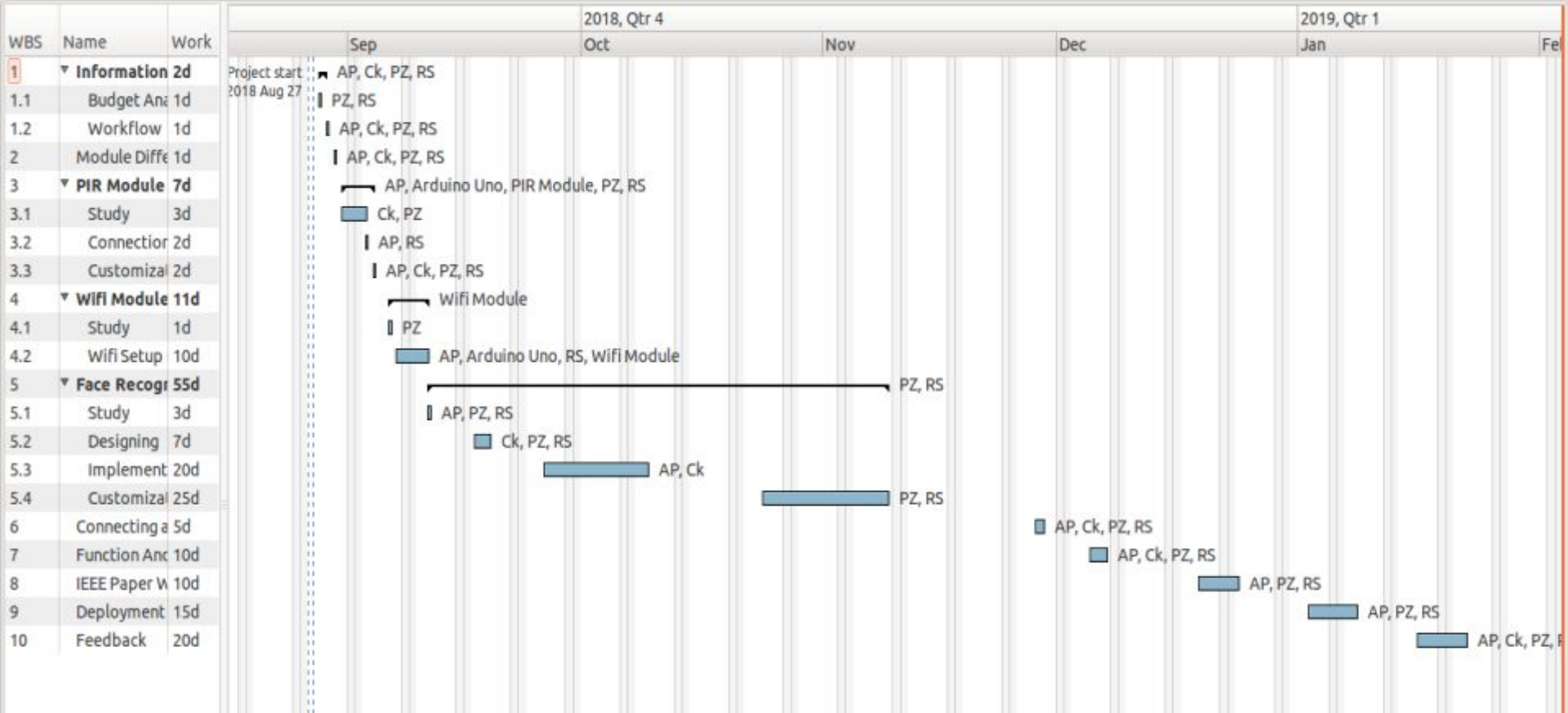
Architecture



Project-Plan

WBS	Name	Start	Finish	Work	Duration	Slack	Cost	Assigned to	% Complete
1	**Information Gathering**	**Aug 28**	**Aug 29**	**2d**	**1d 2h**	**104d 6h**	**0**	AP, Ck, PZ, RS	10
1.1	Budget Analysis	Aug 28	Aug 28	1d	4h	105d 4h	0	PZ, RS	0
1.2	Workflow	Aug 29	Aug 29	1d	2h	104d 6h	0	AP, Ck, PZ, RS	0
2	Module Differentiating	Aug 30	Aug 30	1d	2h	103d 6h	0	AP, Ck, PZ, RS	0
3	**PIR Module**	**Aug 31**	**Sep 4**	**7d**	**2d 4h**	**100d 4h**	**0**	AP, Arduino Uno, PIR Module, PZ, RS	70
3.1	Study	Aug 31	Sep 3	3d	1d 4h	101d 4h	0	Ck, PZ	0
3.2	Connections	Sep 3	Sep 3	2d	1d	101d	0	AP, RS	35
3.3	Customization and Imp	Sep 4	Sep 4	2d	4h	100d 4h	0	AP, Ck, PZ, RS	35
4	**Wifi Module**	**Sep 6**	**Sep 11**	**11d**	**3d 4h**	**95d 4h**	**22,000**	Wifi Module	0
4.1	Study	Sep 6	Sep 6	1d	1d	98d	0	PZ	0
4.2	Wifi Setup Connection	Sep 7	Sep 11	10d	2d 4h	95d 4h	22,000	AP, Arduino Uno, RS, Wifi Module	0
5	**Face Recognition**	**Sep 11**	**Nov 9**	**55d**	**43d 4h**	**52d 4h**	**0**	PZ, RS	0
5.1	Study	Sep 11	Sep 11	3d	1d	95d	0	AP, PZ, RS	0
5.2	Designing	Sep 17	Sep 19	7d	2d 2h	89d 5h	0	Ck, PZ, RS	0
5.3	Implementation	Sep 26	Oct 9	20d	10d	75d	0	AP, Ck	0
5.4	Customization	Oct 24	Nov 9	25d	12d 4h	52d 4h	0	PZ, RS	0
6	Connecting all Modules	Nov 28	Nov 29	5d	1d 2h	38d 6h	0	AP, Ck, PZ, RS	0
7	Function And Security	Dec 5	Dec 7	10d	2d 4h	32d 4h	0	AP, Ck, PZ, RS	0
8	IEEE Paper Work	Dec 19	Dec 24	10d	3d 2h	21d 5h	0	AP, PZ, RS	0
9	Deployment and Patent	Jan 2	Jan 8	15d	5d	10d	0	AP, PZ, RS	0
10	Feedback	Jan 16	Jan 22	20d	5d		0	AP, Ck, PZ, RS	0

Project Plan(Gantt Chart)



Conclusion

In this project the main focus is on controlling and processing the operation of various electrical appliances, Indication and Alert lights aiming to help the specially abled people.

The working model focuses on Automating the home ie; making it Smart, and providing it Security features at economical and efficient rates.

References (Home Automation)

[1] Matthias Mielke & Rainer Bruck “A home automation based environmental sound alert for people experiencing hearing loss.” IEEE Conference 2016.

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[5]Muhammad Asadullah, IEEE student member, Khalil Ullah, IEEE member “Smart Home Automation System Using Bluetooth Technology” IEEE 2017.

References (Face recognition)

[7] Dwi Ana Ratna Wati, Dika Abadianto “Design of Face Detection & Recognition System for Smart Home Security Application” IEEE 2017.

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[10] Mohammadjaved R. Mulla, Rohita P. Patil, Dr.S.K.Shah “Facial Image Based Security System Using PCA” IEEE 2015.

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