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| To be filled by Student | | |
| **Course** | Real Time Embedded Systems (EEE446) | |
| **Instructor** | Syed Abbas Ali Shah | |
| **Project Title** | Activity Recognition of Aged Person and Controlling of Fan using Webpage and Analyzing room environment using ThingSpeak | |
| **Project Proposal Summary** | In this project, we will design and implement sensors based controlled platform to recognize the old-age person activities and control the home appliance accordingly. The sensors should be installed on various daily use things, based on sensor combined parameters recognize the activities, and control the appliances such as light and fan. All the data should be stored on ThingSpeak cloud with timestamp to visualize the activities, sensors data, and actuators (appliances) status. The project should also provide a web-page based control to the Guardian to check the status of activities and sensors, and remotely control the actuators. | |
| Recommendations by Instructor | | |
| Range of Complex  Problem Solving | Range of Conflicting Requirements | * Sensors placements to recognize at least four different activities such sitting on chair, sleeping on bed, and walking etc., * Sensors for environment status monitoring such as Temperature, and Humidity * Control of actuators based on activities for efficient utilization of energy resources * Cloud Server architecture for maintaining the history data * Port-forwarding and web-page based interface for remote monitoring of the old-age people activities and control of the home appliances * Work as a team, and efficiently communicate the concept, design, and results both orally and as a report. |
| Depth of Analysis Required | * Performance comparison of accuracy of the recognizing activities * Real time visualization of Reponses of sensors (temperature and humidity), and actuators (fan and light ON/OFF status) with timestamp on ThingSpeak and local developed sever on NODEMCU * GUI with less than 1 second delay of control the actuators, update the data with different sampling frequency requirements on real-time visualizing web-page * Display of Cloud Storage data for future use and analysis |
| Depth of Knowledge Required | * Integration of various embedded systems specifications sensors, actuators, and microcontroller * Embedded controllers Ports and Interfaces (Digital, Analog, Serial RS232, I2C) * Basic concepts of signal processing, signal types, and analog-to-digital conversion sampling and quantization * Interfacing of High-voltage (220V) actuators * IP-addressing, public and private(non-routable) IPs, Port forwarding for non-routable IPs * WiFi based wireless networking * Web programming, Client-Server Concepts, HTTP and TCP Protocols, Cloud Storage * Hardware Design, C-based Embedded Systems Programming, and physical implementation |
| Interdependencies | * **Sensors:** Ultrasonic Sensor (Digital), Temperature and Humidity Sensor (DHT11 with I2C interface) * **Actuators:** 220V light-bulb and fan, relays,and leds * **Wireless Communication and Networking:** WiFi Module (NodeMCU) * **Embedded Systems Controller:** Aurdino UNO, Arudino Nano * **Programming Languages:** HTML, Javascript, C-based controller programming   All above mentioned components acts as a subsystems and work independently. However, in the proposed system they will act and coordinate as a single system to provide the desired results. |
| Range of Complex Problem Activities | Range of Resources | * Persons from whom data to be collected * Hardware Components: (Ultrasonic sensors:2, DHT11:02, Light:01, WiFi Module (NodeMCU:01), Relays, Resistors, Arudino Controller) * Modern Tools: Arduino IDE, HTML, JavaScript * Literature review from different online resources |
| Level of Interactions and Innovations | * The project use the innovative idea of electrical and computer engineering with high social impact. |
| Consequences of Society | * The projects involves the daily activities and behavior of a person so it may cause the privacy leakages. So, the data should be collected and shared with consents. |
|  | Familiarity | * The project deals with a new, unfamiliar area for electrical engineers. Necessary to document and communicate how principle-based approaches address the project requirements |