EE536 IoT Systems Projects

May 2023

All systems must keep track of long-term history. Records must be kept as CSV file(s). Displays must be shown in Node-RED. The sensor values must also be shown in a plot.

S No	Title	Description	Team
1	Person counter	There are 4 rooms. You need to keep track of the usage of each room. A sensor is present in each room. The capacity of each room is 10. A warning must be displayed at the control room if the capacity is exceeded. Test cases: 1) a quiet week with few visitors, 2) a busy week with lots of visitors.	Anand + Harsh
2	Bell detector	Detect the sound of a bell. Only one particular sound has to be detected. Sensor is connected wirelessly to the computer.	
3	Home automation 1	Turn on/off lights, humidifier and fans based on luminosity, humidity and temperature. Users must be able to enable an “eco” mode. Compute estimated energy charges to be paid. There are 5 rooms in the house. Test cases: 1) Summer profile 2) monsoon profile 3) winter profile Billing for both eco and normal mode.	Jai + Ayush
4	Home automation 2	Use a tree topology network for home automation. Two NMCUs act as base stations and as clients.	Gaurav + Romit
5	Smart parking	A smart parking lot will have sensors in each parking slot. Cars enter and leave the parking lot. When a car enters, it must be	Asutosh + Kashyap

		displayed which slots are currently available. If parking is full, the car has to wait in the queue. Test cases: 1) Busy day 2) quiet day. Determine the average wait queue length. Use samples from exponential distribution for parking time and uniform distribution for car arrival.	
6	Patient monitoring	An ICU has 10 beds. Each bed has a sensor suite. A nurses' station is monitoring the patients. The information of each patient has to be summarized and shown. If an emergency happens, a warning must be displayed for the correct patient. Test cases: 1) ICU during pandemic and 2) ICU during normal period. Use multivariate normal distributions to generate the sensor data.	Prakash + Sashwat
7	Smart streetlights	A row of streetlights should operate automatically, based on luminosity sensors. After midnight, every alternate light is turned off to save energy. This is done as: on even dates, odd numbered lights are turned off after midnight. Vice versa for odd dates. Test cases: 1) Long days 2) short days	Archit + Utsav
8	Electricity billing 1	Sensors in 5 houses keep track of electricity usage. A central controller keeps track of energy usage. In the end, a bill is generated.Consumtion is with respect to peak period and non-peak period. Test cases: 1) Long peak period 2) Short peak period	Raunav + Akansha
9	Electricity billing 2	Smart meter reader that auto reads for each apartment block. When employee comes near a bank of meters, the data from the meters is	Sandhya + Madhumita

		automatically displayed. Should work for 2 or 3 meter banks.	
10	Smart appliances	Fridge: keeps track of milk, eggs, butter. Washing machine: sends a message if the wash cycle is over. Home controller: displays summary to the home user Test cases: User can enable or disable auto-ordering of items in the fridge.	Priyanka + Payal
11	Transportation 1	Smart signboards display speedlimit, road blocks based on sensor data. Multiple alternate routes must be present.	Shubham + Rizwan
12	Transportation 2	Sensors in vehicles provide info about lane change, collision, and emergency vehicle approaching. Test cases: bumber-to-bumper traffic, highway traffic	Dharmender + Anuj
13	Instrumentation	This is to realize a simple Raspberry Pi-based bluetooth interface for remote control of scientific devices. Siddhartha and I had a chat, and we think this is doable over a short time scale. Basic idea is to send SCPI commands over bluetooth from a base computer unit to a remote Raspberry Pi that is connected via USB, Ethernet and/or RS232 to two/three devices like oscilloscopes, power suppliers etc. that are remote controllable via SCPI commands.	Mahima + Sandeep