Design and Analysis of IoT Systems Project Proposal
Group 2

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Population Tracking Alarm System

The project will have a user interface that displays the number of people detected entering a particular indoor facility. This is helpful in multiple real-world scenarios, especially during COVID when we need to restrict the number of people in indoor facilities. The project will provide notifications and alerts in case the number of people exceeds a predefined limit. With the use of an Ultrasonic sound sensor and a clock system, these will gather data on when, where, the trigger was activated and how many times this occurred. This data would then be sent to an MQTT subscriber and then be published and notified on the user interface.

Note that this application can be reversed when people leave a particular facility as well. This way our IoT system can keep track of the number of people inside a particular place in real-time. Possible expansion on extra hardware could include a buzzer, camera and lights.

Functional Requirements:

1. The system will use an ultrasonic sensor to detect the number of people in a facility
2. The system will keep track of the people entering and leaving a particular place
3. The system will display the number of people in real-time through a user interface/seven-segment display
4. The application will trigger an alarm or send notifications in case the number of people exceeds a certain threshold
5. The limit can be pre-configured based on users needs
6. The system will manage data transfer through a publisher-subscriber mechanism

Non-functional requirements:

1. The pub-sub mechanism will be handled through MQTT
2. The NodeMCU kit will be used with the ultrasonic sensor to provide data
3. The system must be able to attach to a battery if connecting to a power source is not possible
4. The system must provide over 90% accuracy of detection
5. The system must be user friendly and generic for multiple similar applications

The GitHub repository that will be used for this project will be:
https://github.com/TegSingh/IoT-Project-2021.git