Project Scope

Project name: Assignment 2 – Intruder Counter Project
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Project Justification

For this project, it is created to able to calculate how many intruders a IoT motion sensor can detect. To consider that there is an intrusion, the sequence of the motions has to be “Long Short Long Long”.

Project Objectives

The objective of the project is to able to calculate the total number of intruders and display the values to user in the client side, web page. Besides that, able to let users to use the application to switch the LED and motion sensor on and off. Users are able to view the total number of motion detected, total number of long motion, total number of short motion and the total number of intrusions. Lastly, a reset button is able to let users to reset all the motion values.

Project Scope Description

Function of the project

- LED on/off
  Users are able to click the on or off button to switch the LED on and off.

- Motion sensor on/off
  Motion sensor can be on or off when users click the on or off button in the client side.

- Total number of motion detected
  Display to user the total number of motion which detected by the motion sensor in the client side.

- Total number of long motion
  Display to user the total number of long motion which detected by the motion sensor. A motion is counted as long motion when it is more than 5 seconds.

- Total number of short motion
  Display to user the total number of short motion which detected by the motion sensor. A motion is counted as short motion when it is less than 5 seconds.

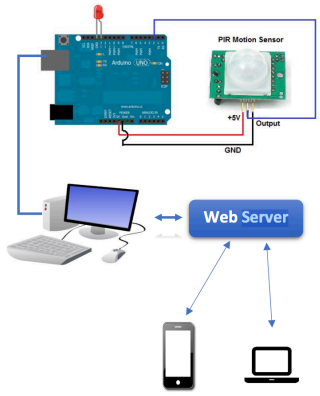
- Total number of intrusion
  Display to user the total number of intrusion which detected by the motion sensor. To consider that there is an intrusion, the sequence of the motions has to be “Long Short Long Long”.

- Reset
  The reset button is able to let user to reset all the motion values in the client side.

Hardware Components

- Arduino board
- LED
- USB A
- Motion sensor
- Jumper cable

Besides that, in order to make the project work, connect all the hardware components together. Follow the image below to connect all the hardware component.



Software Components

- Google Firebase
- Johnny-Five
- Arduino IDE
- Node.js
- HTML/CSS

The server side contain codes, Node.js, that trigger hardware components to perform functions if users make some actions. To able to connect the client side and the server side, Google Firebase is used as a communication platform to transfer data from client side to server side or vice versa. With Google Firebase, if users accidentally have closed the web page, the data in this project will not be lost as they have already been stored in the Google Firebase.

How the application works

The intruder counter will increment by 1 when there is a sequence of motion “Long Short Long Long”. If the motion sensor has detected a motion that is more than 5 seconds, the motion will consider as a “Long” motion. If the motion sensor has detected a motion that is

less than 5 seconds, the motion will consider as a “Short” motion. If the sequence is not “Long Short Long Long”, it will not calculate as an intruder.

For the client side, a web page, there is a section which let users to switch the LED on and off. Users will just need to click the ON the button below the LED Controller to turn on the LED and click the OFF button to turn off the LED. Besides that, buttons below Motion Controller are used to switch the motion sensor on and off. Once users click on the ON button, the motion sensor will start to detect if there is a motion in the surrounding. Motion more than 5 seconds is a long motion. Therefore, the long motion counter will increase by 1 and display below the Long Motion label. Same goes to motion below 5 seconds, short motion. Below the Motion Detected, it will display the total number of motion detected by the motion sensor. Intruder Counter is added below to display total number of intrusion. If the users click the Off button, it will stop the motion sensor and the value of Motion Detected, Long Motion, Short Motion and Intruder Counter will not be changed. Last but not least, a Reset button is used to reset all the motion values so that users can restart the motion sensor to detect the surrounding motions.

Project Constraints

- Motion sensor
  Perform this function in an environment with less movements so that the motion sensor can detect motions more accurately.

- Hardware components
  All hardware components are needed to perform all the function such as switching LED and motion sensor on/off. Defect hardware components are unable to perform action as expected.

- Software components
  For this assignment, socket.io is replaced by firebase. Without firebase, the motion values will not be passed from server side to client side or vice versa. When users want the board to perform an action, firebase is used to pass the action from the client side to the server side. Only Johnny-Five can be used to connect the Arduino board. To able to make the Arduino board works, StandardFirmataPlus is needed to run before running all the codes.

- Google Firebase
  Due to firebase is needed to be used only if we have signed in to Google, an email account is created to able to let all the team members to use the firebase. Besides that, Monash email account is not able to use firebase as it may be only recognised gmail account.