

Assignment 2 – Traffic Analyzer & Risk Analysis

FIT3140 Semester 1, 2018

This assignment will be completed as a pair with your project partner(s)

Due: Sunday 8th April, 11:55pm.
Worth: 5% of final mark.

IN A NUTSHELL

In this assignment, you will, in pairs, develop an application that counts the number of pedestrians walking through a door or a corridor. The server and clients have to communicate in real-time using cloud-based storage. Also, you will write a short document that describes, at a very high level, the goals of this project.

ASSIGNMENT COMPONENTS

- Traffic Analyzer App (i.e. source code)
- Project Scope
- Risk Register

INTRODUCTION

The traffic analyzer is an application that counts the number of pedestrians who walk through a gate or a corridor. Technically speaking, the number of times the IoT motion sensor detects a new person based on the following hypothetical assumption.

*“A set of four consecutive motions is considered as a new person if it has the sequence of:
Long Short Long Long”.*

Long and short motions are the motions that has length more or less than a threshold (e.g. 3 seconds) respectively.

The application has to use Google Firebase real time DB as a communication platform. In other words, the server, which is connected to the IoT kit, sends the motion sensor’s data to the firebase storage. The client, which is a web page app, has to listen to any update happens to the same DB.

For the server side, the following functions should be implemented:

- Get data from the motion sensor
- Send data (i.e. the motion object) to the Firebase DB
- Listen to commands
 - LED on/off
 - Assume that the LED light is a ceiling light, when the motion sensor detects a person walk pass the corridor, the "ceiling light" will turn on for 15 seconds which will give the person enough time to reach the end of the corridor.
 - If a new person was being detected within the 15 second period, extend the illumination for another 5 seconds.
 - Sensor on/off
 - Reset the DB. Only the server side has the privilege to delete all the records from the database. Hint: you can use the same channel or create another one for client to server communication.

The client:

1. Fetch old data from Firebase if exist.
2. Listen to new updates from the server (i.e. new data from the server).
3. Display out the following:
 - 1.1. Total number of long messages
 - 1.2. Total number of short messages
 - 1.3. Total number of visitors, which should be incremented by one if four consecutive motions have the sequence LSSL. You need to check old data as well (point 1.1).
4. Send Reset command to the server to reset the DB (i.e. delete all data)
5. Send LED on/off command to the server.
6. Send Sensor on/off to the server.

PROJECT SCOPE

This document represents a basis to *start* work on Traffic Analyzer Project. It is *not* a fully-fledged requirements specification, let alone a design document.

The document:

- should not require an expert in IoT, cloud providers, or Node.js or the details of low-level programming to understand; you should be able to hand this to a high-school IT teacher or a fellow computer science student not doing the unit and have them understand what you plan to do.
- should include, at the start, a one-sentence "vision" describing the project.
- should be reasonably self-contained - you don't have to go reading other documents, to grasp the contents of the document.
- should describe, at a high level, an outline of how the system will work (as best understood at this point).

- A detailed background for each tool you have used.
- should identify key attributes/constraints of the solution (such as platform/architectural issues).
- if and where appropriate, can use diagrams to depict how the working system will function. These may include UML diagrams (if you know how to draw them), screen mockups, or any other format you consider appropriate.
- should be no more than 5 A4 pages, including diagrams (don't pad just for the sake of padding).
- should avoid buzzwords. Vision is not "hype"¹.

Risk Register

One of the important tasks at the start of any project is thinking through different things that might go wrong and coming up with possible strategies for dealing with them – either to prevent things from going wrong or to fix things afterwards.

Write a 1 to 2 pages risk register that lists all the risks you think might impact on your project. For each risk, document the following:

- what is the problem or potential problem?
- how likely is it to happen?
- if it does happen, how severely would it affect the project?
- is there something you could do?
- if it does happen, what will your team do?

References:

1. [Risks of cloud computing](#)
2. [Top Ten Major Risks Associated With Cloud Storage](#)
3. [Week 2 Slide Set](#)

Assignment Schedule

Before the lab

Reread some of the lecture notes, and think over the material discussed, and think about how you might respond to the issues in the dot points.

In the lab week 5

First, you should discuss the project goals with your lab partner. On the basis of your collective preparation, figure out what you do know, what you're unsure about, and prepare a list of questions to ask the client, who will be represented by the demonstrator.

The pairs will then take turns asking questions of the demonstrator. This will continue until all the groups

¹ <http://en.wiktionary.org/wiki/hype>

are satisfied that they have sufficient information to complete the assignment.

Interview

The interview of this assignment will be conducted during lab week 6 after the interview.

SPECIAL CONSIDERATION

If a team member faces exceptional circumstances (serious illness or injury, family emergency etc) that prevent them completing the assignment, they may apply for special consideration according to the policy and procedure on the Faculty website:

<http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html>

WORKING AS A PAIR

You are expected to work as a pair on this and subsequent assignments, and contribute roughly equal amounts of work to each, and very close to equal amounts over the course of semester. In most cases, if this is followed, students will receive equal marks on coursework.