FIT5140 – Assignment 3b

TiPiggy

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Table of Contents

1. Project Description 2
2. System Architecture 2
3. Circuit Diagram 3
4. Database Design 4

Table of Figures

Figure 1: System architecture 3
Figure 2: Circuit diagram 4
Figure 3: Database design 5

1. Project Description

Restaurants nowadays use tip boxes to collect tips from their customers and some restaurants also use their website on tablets to get customer feedback. It becomes a task to count the coins at end of each day and track the feedback. This IoT project is aimed at helping restaurants to collect and track tips and receive the feedback from customers easily with just simple clicks. This application distinguishes coins dropped in tip box with motion sensors and customer feedback through touch sensors and the data will be updated in iOS application through real time database on firebase. This data will be then used by the application to display it to the client. Most importantly, the application has the comparison function for restaurants to calculate the total amount of tips and comparing with other restaurants in each time period, which is helpful for restaurants to analyse the condition of business and make business strategies change dynamically.

The prototype for this model consists of a tip box, with three touch sensors for capturing customer feedback as Good, Medium or Bad based on their experience by just tapping on the respective slots. And, two slots used for inserting $1 and $2 coins respectively as tip for the restaurant. These coin drops will be captured using two motion sensors placed inside the box. All these sensors are connected to the raspberry pi through which data will be uploaded to firebase and used on the client side in iOS application. In the iOS application, restaurant owner can view his restaurants tip for present day and the current month on the dashboard, view feedback for all his restaurants, and compare with other restaurants easily.

2. System Architecture

- The IoT project is created with Raspberry Pi 3 that connects with 2 motion sensors and 3 touch sensors and Node JS that implements the server side of project.
- Firebase provides the real time storage database that data can be sent from server side and fetched to iOS application.
- The iOS application is created by the version of Swift 4.2 on XCode 9.0, which can be used above the version of iOS 7.
- The two devices (Raspberry Pi and iOS application) need to connect to the Internet.

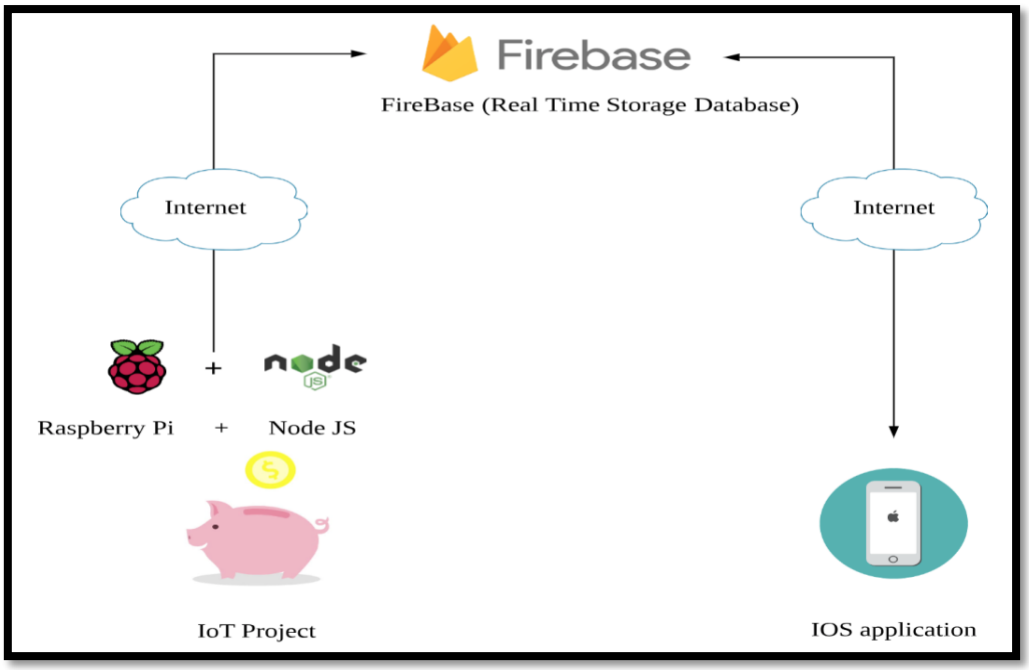

Figure 1: System architecture

3. Circuit Diagram

The circuit diagram for this application has been sketched. The hardware used to build this application are:

1. 1 Raspberry Pi 3
2. 1 Bread board
3. 1 5V power supply
4. 3 Touch sensors
5. 2 PIR motion sensors
6. 22 male to female wires

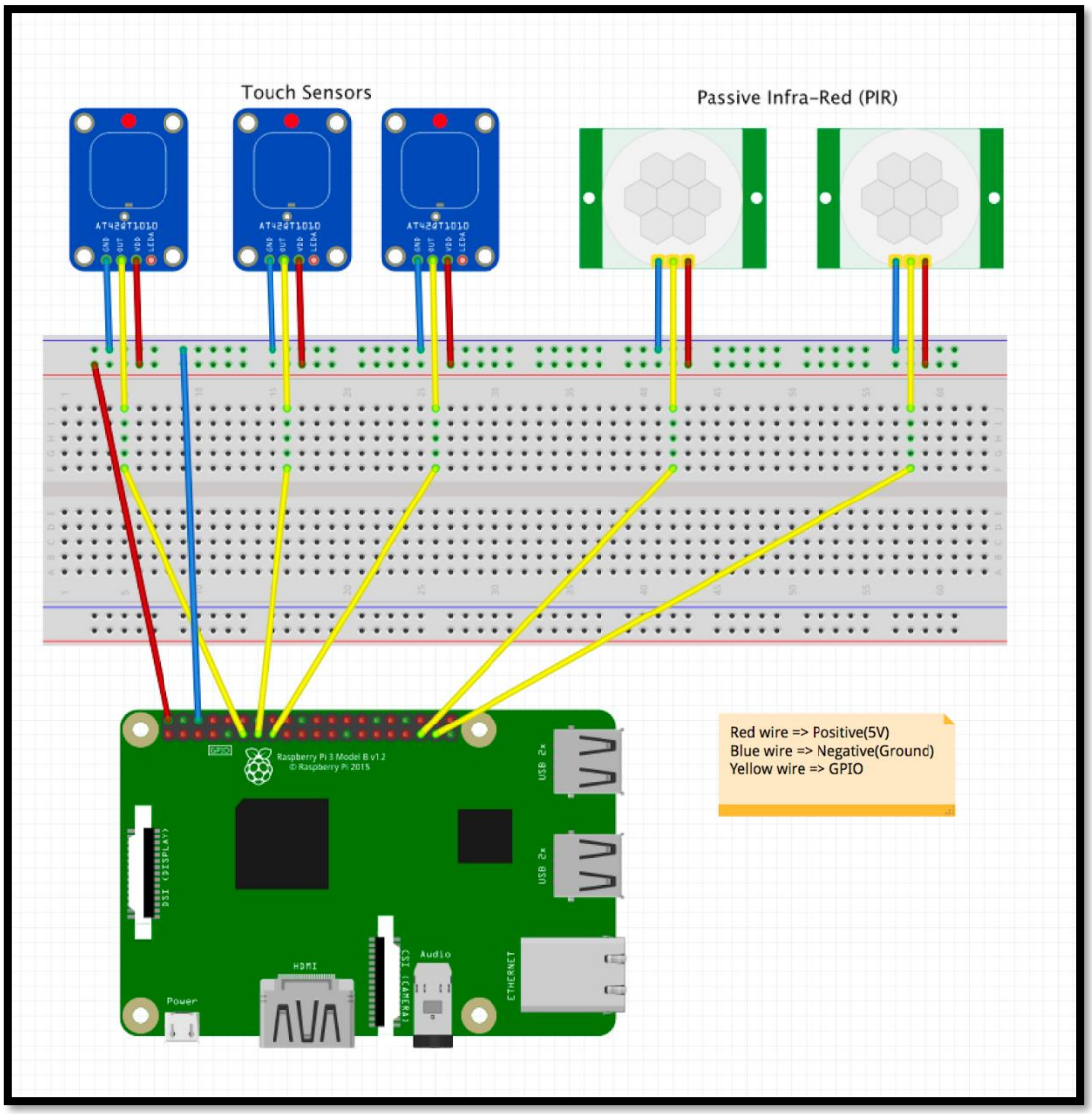

Figure 2: Circuit diagram

This raspberry pi is more like a terminal that can use a certain account to login. After login, the data collected by raspberry pi will automatically get uploaded to firebase Realtime database.

4. Database Design

We distinguish each user's node by using their user ID as the root node. Under that node, is the restaurant's name and date. So it is really comprehensive for anyone who need to go through this database.
It is also scalable, Under each user, we have sub-node for each restaurant the user owns. On the iOS end, the application can easily fetch all the detail data about a user and his restaurant. If there is a new user registered, a new node will be generated by user's ID. A sample structure of this database has been depicted in figure below.

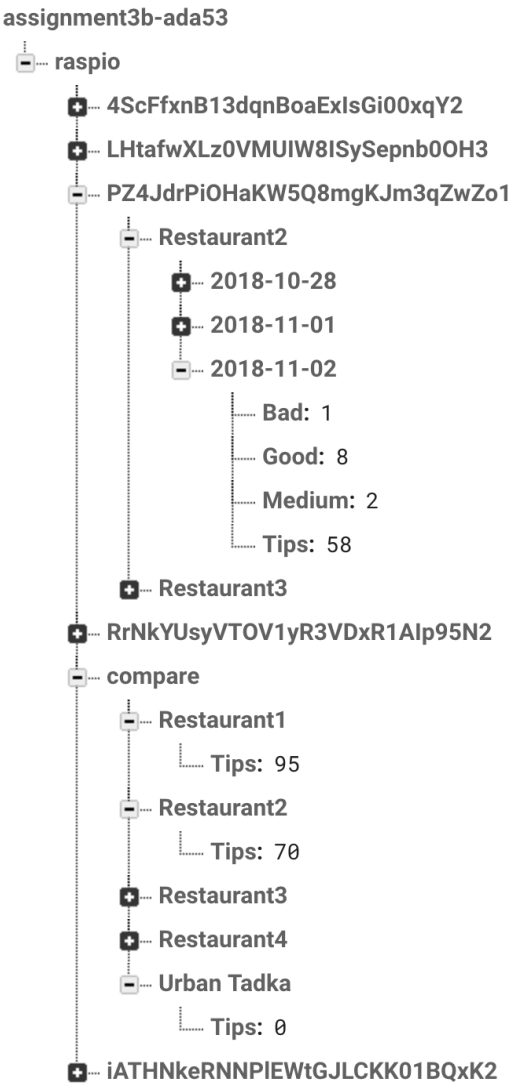

Figure 3: Database design