**SMART BILLING USING INTERET OF THINGS (IOT)**

Project Report submitted to

SRM University

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Lastly, I would also wish to express my thanks to my mother , for her constant guidance and support ensuring the smooth completion of this Industrial report as well as his colleagues who helped me apply and stay back during the vacation for training here.

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INTRODUCTION

The Internet of Things (IoT) is a computing concept

that describes a future where every day physical objects will be connected to the Internet and be able to identify themselves to other devices. The term is closely identified with RFID as the method of communication, although it also may include other sensor technologies, wireless technologies or QR codes.

The IoT is significant because an object that can represent itself digitally becomes something greater than the object by itself. No longer does the object relate just to you, but is now connected to surrounding objects and database data. When many objects act in unison, they are known as having "ambient intelligence."

S m art - Billing

*By Vatsalya Singhi*

*Affiliated to IoTA(Internet of Things Alliance)*

**Introduction**

**Smart Billing** is an Innovative, Life-changing project which will help in making the billing hassle free and more efficient. To implement a smart billing system for campus canteens and shops thus reducing manual effort required for billing and ruling out human errors in the process

**SRM Campus Extension**

Smart Billing showcases an aspect of internet of everything (IoE) by implementing automated billing in various parts of our campus. IoE aims to connect everything to the internet and benefit everyone by doing so. In Smart Billing System, I’ve connected the customers, business owners and their product specifications. This is essential as it improves customer experience and business owner’s efforts with minimum set-up cost by the owners. This novel solution will be implemented in the Cafeterias and other food outlets in and around campus like Java Green and Stationery stores .

**Functionality and Usefulness**

To implement a smart billing system for campus canteens and shops thus reducing manual effort required for billing and ruling out human errors in the process

**Components Required**

* Raspberry Pi ,
* 16\*2 lcd screen display,
* Breadboard,
* Few jumper cables,
* Two 10K ohm resistor
* Usb mini lan card,
* Ethernet cable,
* Usb cable,
* Sd card reader,
* One pendrive.

All the above components can be bought from, https://[www.amazon.in](http://www.amazon.in/)

**Software & Libraries Used**

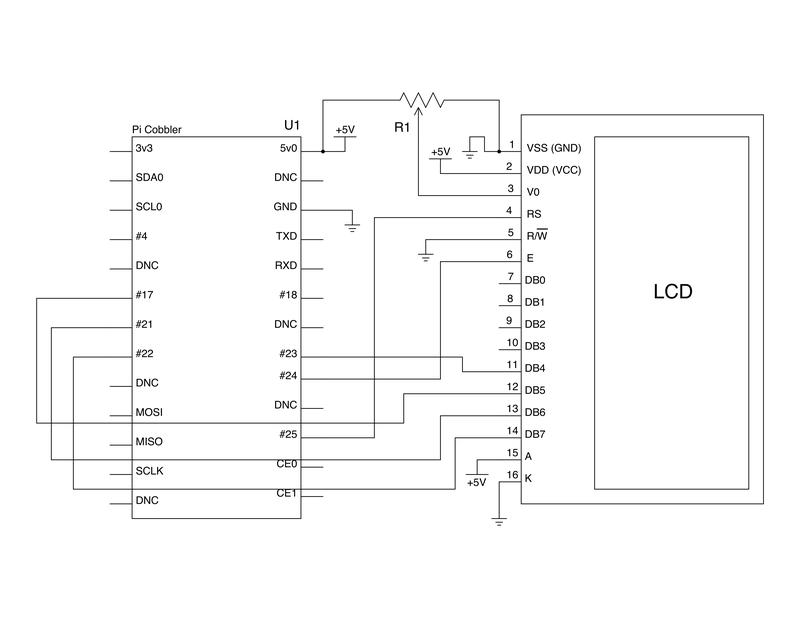
Win32DiskImager- Used for writing Raspbian OS onto the raspberry pi

Xming -Used for working in GUI mode and integrate with private cloud

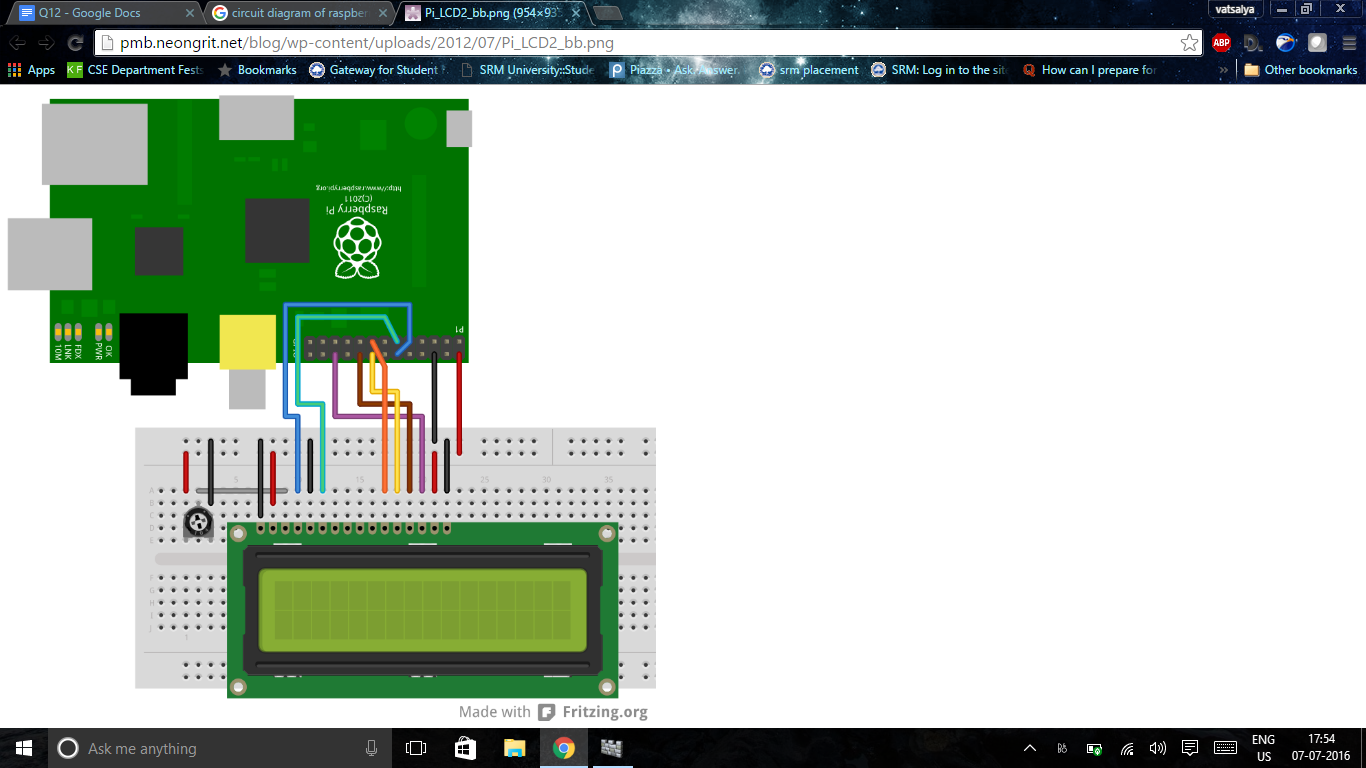
Adafruit\_Python\_CharLCD - Package used for controlling the lcd screen

Hostinger services - Used for data collection and retrieval accordingly

**Block Diagram ( Draw.io )**



**Circuit Diagram ( 123D )**



**Algorithm**

1. **Assign IP address to raspberry pi:**
   1. Open command prompt and find the ip address of the system by typing the command: **ipconfig**.
   2. Using win32diskimager write the raspbian.img image file onto the sd card.
   3. Enter the sd card into raspberry pi and connect it to system.
   4. Find the ip address and and remove the sd card.
   5. Using sd card reader change **cmdline**.txt file by entering a ip address of its own.
   6. Eg. if the ip address is 192.168.70.254 then enter “ ip address: 192.168.70.X” , X being any number from 0 to 255.
   7. Make sure to have 2 lines used for this and save the file.
   8. Reinsert sd card and connect the raspberry pi to PC.
2. **Open and use Graphic User Interface (Alternate to using command prompt):**
   1. Open Putty and enter the ip address of the device.
   2. Run **Xming** in background.
   3. To use GUI interface enable X11 forwarding and click on “Open”.
   4. A command prompt of raspberry pi will open where username and password will be asked.
   5. By default the values are username : **pi**  and password: **raspberry** .
   6. Type “**startlxde**” on command prompt to start GUI.
3. **Configure the Raspberry Pi:**
   1. Configure the raspberry pi by updating it using **sudo apt-get update** command and install required **Adafruit\_Python\_CharLCD** from github and RPi.GPIO libraries .
   2. After installing these libraries and files try to run a example by migrating inside file and running python code using : **sudo python filename.py**
   3. Create a new directory inside Adafruit\_Python\_CharLCD folder and name it “project” with a file named xyz.py.

Enter appropriate code and and save the .py file.

1. **Write the Code:**
   1. Create a new account on free online database sites like **hostinger** and create php files to send and receive data from database.
   2. Make suitable connections between raspberry pi and lcd screen using jumpers,ethernet cable, usb cable and power supply.
2. **Run the Code:**
   1. On running, the raspberry pi should be able to send and retrieve data from the cloud and display it to the user on lcd screen.
   2. The user can then send back new product detail and it price that will be stored in the cloud.

**Final Code**

from time import sleep

import urllib

from urllib2 import \*

from Adafruit\_CharLCD as LCD // import package

import RPi.GPIO as GPIO

import logging //import to check of errors

**from urllib2 import urlopen //**import to access the database

lcd\_rs = 25

lcd\_en = 24

lcd\_d4 = 23

lcd\_d5 = 17

lcd\_d6 = 21

lcd\_d7 = 22

lcd\_backlight = 4

lcd\_columns = 16

lcd\_rows = 2

lcd=**LCD.Adafruit\_CharLCD**(lcd\_rs,lcd\_en,lcd\_d4,lcd\_d5,lcd\_d6,lcd\_d7,lcd\_columns,lcd\_rows,

lcd\_backlight) //Pin values

myDelay=10

def post(): //Post data

print("enter name,price,code")

x=**raw\_input**("enter name")

y=**raw\_input**("enter price")

z=**raw\_input**("enter code in integer format")

mydata={ ('name',x) , ('price',y), ('code',z)}

mydata=urllib.urlencode(mydata)

path="<http://vatsalya.esy.es/sendtodatabase.php>"

try:

**req=urllib2.Request(path,mydata)**

**resp=urllib2.urlopen(req)**

print(resp.read())

except IOError:

print(“exception handling”)

def get():

print("product details")

path=’<http://vatsalya.esy.es/recieve_data.php>’

page=**urllib.request.urlopen**(path)

print(page.read())

lcd.clear()

lcd.message('data %s' % (page.read() ) )

sleep(int(myDelay))

If \_\_name\_\_==”\_\_ main\_\_”:

try:

post()

get()

except:

print("exception")

logging.error(e,exc\_info=True)

**Code for receive.php //**connecting to database and receiving data

<?php

define("DB\_HOST", "mysql.hostinger.in");

define("DB\_NAME", "u836104130\_dataa");

define("DB\_USERNAME", "u836104130\_vatsu");

define("DB\_PASSWORD", "qwerty");

// Create connection

$conn = mysqli\_connect(DB\_HOST,DB\_USERNAME,DB\_PASSWORD,DB\_NAME);

// Check connection

if (mysqli\_connect\_errno())

{

echo "Failed to connect to MySQL: ".mysqli\_connect\_error();

}

if (!$conn) {

die('Could not connect line 9');

}

$sql = "SELECT \* FROM price\_check";

$result = mysqli\_query($conn,$sql);

if (mysqli\_num\_rows($result) > 0) {

// output data of each row

while($row = mysqli\_fetch\_assoc($result)) {

echo "name:" . $row["name"]. " price:" . $row["price"]. " code" . $row["code"] ;

echo nl2br("\n");

}

} else {

echo "0 results";

}

echo $sql;

if (!$sql) {

die('Could not connect line 15');

}

if (mysqli\_query($conn, $sql)) {

echo " All record received successfully";

} else {

echo "Error: " . $sql . "<br>" . mysqli\_error($conn);

}

mysqli\_close($conn);

?>

**Code for sendtodatabase.php** //connect to db and send user input

<?php

define("DB\_HOST", "mysql.hostinger.in");

define("DB\_NAME", "u836104130\_dataa");

define("DB\_USERNAME", "u836104130\_vatsu");

define("DB\_PASSWORD", "qwerty");

$conn = mysqli\_connect(DB\_HOST,DB\_USERNAME,DB\_PASSWORD,DB\_NAME);

// Check connection

if (mysqli\_connect\_errno())

{

echo "Failed to connect to MySQL: ".mysqli\_connect\_error();

}

if (!$conn) {

die('Could not connect line 9');

}

$sql = "SELECT \* FROM price\_check";

$result = mysqli\_query($conn,$sql);

if (mysqli\_num\_rows($result) > 0) {

// output data of each row

while($row = mysqli\_fetch\_assoc($result)) {

echo " name: " . $row["name"] . " price: ". $row["price"]. " code " . $row["code"] ;

echo nl2br("\n");

}

} else {

echo "0 results";

}

if (!$sql) {

die('Could not connect line 15');

}

$valueone = $\_POST['name'];

$valuetwo = $\_POST['price'];

$valuethree = $\_POST['code'];

$sql = "INSERT INTO price\_check (name,price,code) VALUES ('$valueone','$valuetwo','$valuethree')";

if ( mysqli\_query($conn,$sql) )

{

echo " New record created successfully";

}

else {

echo "Error: " . $sql . "<br>" . mysqli\_error($conn);

}

mysqli\_close($conn);

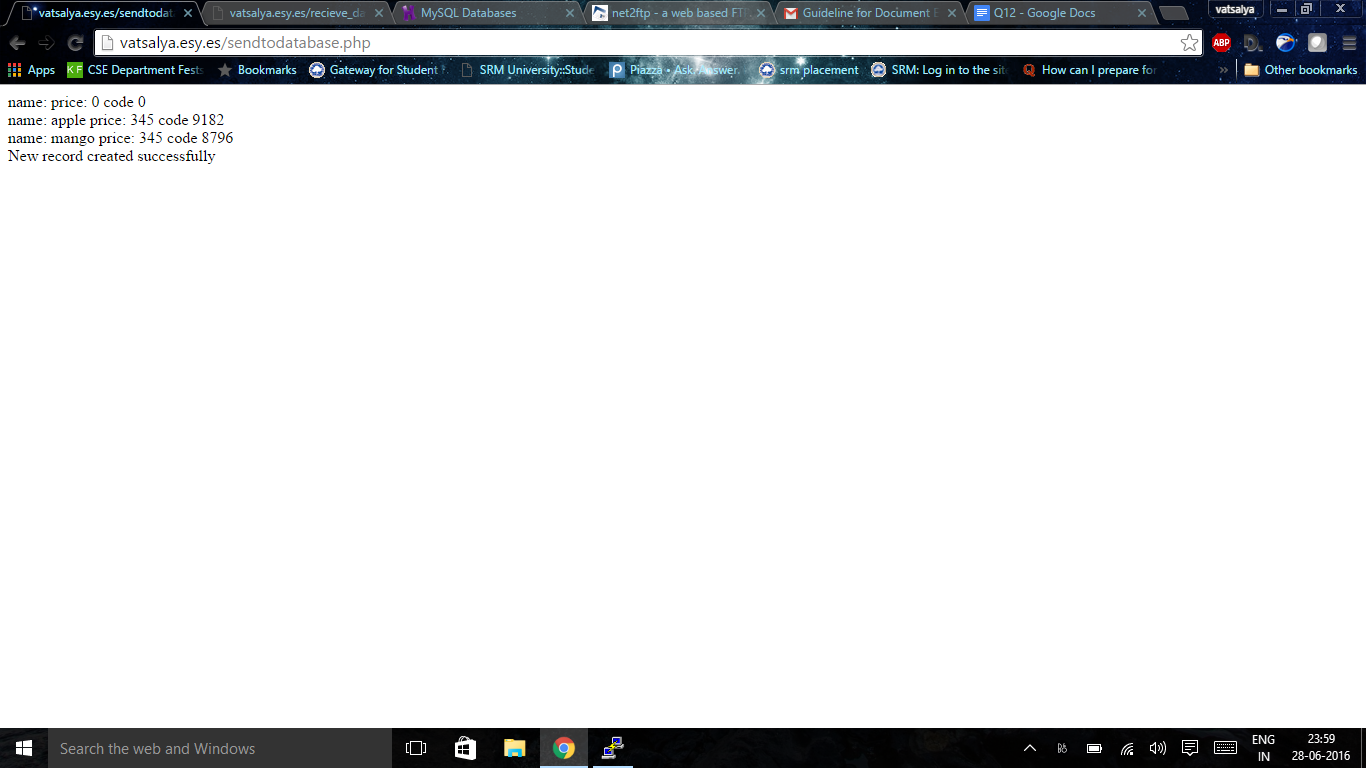
?>

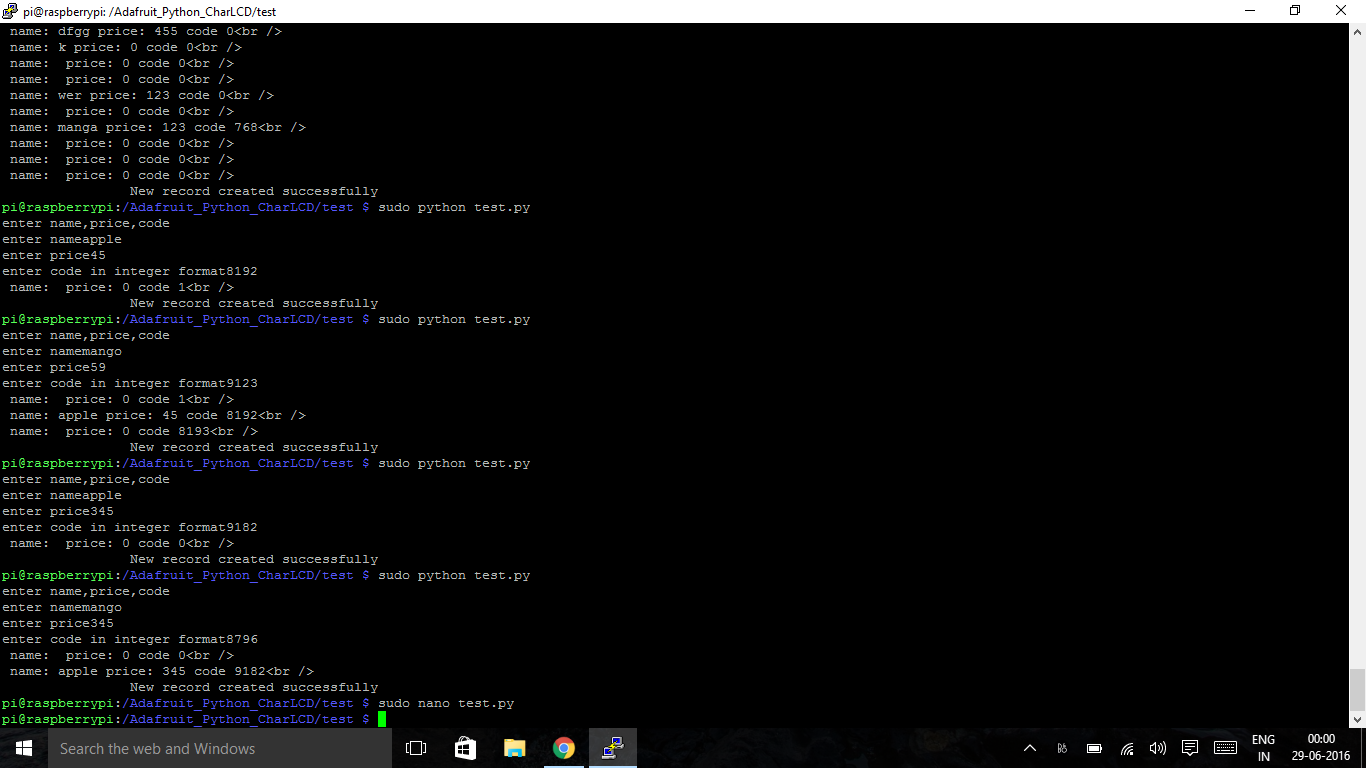
**Snapshots**

Main connections



**Screenshots and Project design**





**FAQ**

1) Can the LCD screen be modified with a additional modules to make the performance better?

A) Yes, You can add Cam Pi to scan the QR Code and take inputs through a touchscreen.

2) How do I configure the Lcd Screen with Raspberry Pi?

A) Refer the links provided.

3)Can I display the display wirelessly?

A) Yes it is possible, you will need to connect the raspberry pi to a local network.

**Issues**

● Connecting the raspberry Pi to the internet. Refer to instructables tutorial.

● Setting up and connecting to the hostinger server.Refer to the Handout provided.

● Incase of Wiring error refer YouTube and instructables .Refer to the link provided in the references.

**References**

Configuration of raspberryPi

<http://www.instructables.com/id/How-to-connect-a-Raspberry-Pi-to-a-Wi-Fi-network/>

<http://www.instructables.com/id/Ultimate-Raspberry-Pi-Configuration-Guide/>

Setting Up Hostinger

[https://www.youtube.com/watch?v=He-Hz7cbFwM](%20https://www.youtube.com/watch?v=He-Hz7cbFwM)

Virtual Setup and rectifying Setup query

[www.Fritzing.org](http://www.fritzing.org)

For reference, I’m very thankful to my superiors and Head faculty for preparing such

an informative Handout.

**GitHub**

https://github.com/Vatsalya-singhi/raspberryPi