INTRODUCTION

The major factor which plays a crucial role in the success of any enterprise is the publicity methods used by the company to reach the common people. Considering the scenario of India, we witness a new enterprise starting up or even a new shop opening up in our locality on a daily basis. Some of these manage to make huge profits and the rest suffer losses, which finally compels the businessman/entrepreneur to close down his/ her company. It has come to light by various surveys that one of the major shortcomings of the so called ‘failed organizations’, which incur huge losses is the ineffective techniques used by them to reach the customers (AMIT, 2001). Had there been a cheap and effective way to publicize their brand name or their product, they would not have suffered severe losses and their story would have been different.

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Gone are those days when ‘publicity’ was defined by the ability of a company/enterprise to spend their money on hoardings, banners, pamphlet or even on advertisement for Television (http://www.internetmarketingjournal.org/social-media-india). In this era of modernization and the utilization of latest technology in every field, the advancements in the publicity sector can be observed. Social media has given wings to the publicity process as petrol does to a diminishing spark. Nowadays, the number of followers of a company or the number of likes on the page of the company defines how reputed a company is. More the followers of a company on twitter, the more famous the company becomes (Fujitha, 2003).

Limitations of Social Media has been redefined in the recent times. Twitter/Facebook have not just limited its boundaries to sharing pics or posting a status but it has also become a professional platform used by companies/enterprises to connect to their customers and this is where the secret of the ‘Effective Publicity Methods’ lies in Samir Balwani.

With more and more companies using the social media platform to publicize their brand, the day is not far when this method will reach the point of saturation. The twitter wall getting flooded by the advertisements of various companies will only serve to annoy the user/customer rather than to beat the purpose of the company.

It is in the nature of a human being to get attracted towards the schemes in which they get freebies or in which they see their profit. Keeping both the scenarios in mind, i.e., of the saturation stage of social media platform and the nature of human being, we have come up with the idea of ‘Social Media Vending Machine’ (Lazer and Kelly, 1973). This machine will provide a free goodie to the customers provided they like and comment on the company’s page.

**GOALS OF DESIGNING THE SOCIAL MEDIA VENDING MACHINE**

**Brand Publicity:** The main motive of designing this machine is the brand publicity of the entrepreneur/enterprise. Instead of spending huge sums of money on publicity methods like hoardings, banners and advertisements, the enterprise has to spend a nominal amount of money (as compared to other publicity methods) for installing the machine.

**Cheap and Affordable:** The machine is basically designed for the commonwealth and in turn is made cost effective and user friendly. The cost of the basic components involved in the formulation of the machine is nominal which makes it readily available to everyone around the globe.

**Social Aspects:** Promoting widespread awareness of any initiatives taken up by NGO’s or any other organization is one of the many social aspects that this machine takes into consideration.

**Portability:** Portability is the main factor for any product, considering that this product weighs less and is easy to handle. We can transport the machine from one place to another without any difficulty.

**Ease of Use:** Every customer wants access to any machine easily. Keeping that in mind this machine has been designed to be very easy to operate, you just have to follow a few instructions and you will be served with a free goodie.
Energy Consumption: The main aim of this product is to be cheap that’s why we are using raspberry-pi in our machine since it consumes very less power as compared to a laptop or a computer.

PROJECT LAYOUT

The following hardware components and software languages will be used in the making of a Social Media Vending Machine:

- Raspberry-pi
- IR sensor
- Wi-Fi adaptor
- Motors
- Springs
- SMPS (Switched-Mode Power Supply)
- Switching Circuit
- Python language and PHP for coding.
- Solid Works

Figure 1 describes the block diagram of the machine. It shows the hardware components which constitutes the vending machine.

Raspberry-pi directly or indirectly controls the functioning of all the other components like display, keyboard, IR sensor, voltage regulator and motors. SQL Server, connected to the raspberry-pi, stores the secret code and information of the customer who tweets on the company’s page. When the customer obtains the goodie, the entry of that customer is automatically deleted form the SQL database.

Figure 2 describes the stepwise procedure in layman’s term on the usage of the machine by a common person.

DESIGN APPROACH AND DETAILS

We will have to take care of the following things for designing the Social Media Vending Machine:

1. Connecting Raspberry pi to the laptop using Wi-Fi.

2. Developing a python code using Temboo Python and Tweepy to take the details of the customer commenting on the Twitter page and sending the message to him/her.
3. Developing a code to save random codes into the SQL server.
4. Connecting motors and IR sensor to the Raspberry-pi
5. Driving motors using voltage regulator (NPN Transistor) and SMPS (switched-mode power supply).
6. Developing a python code for Raspberry-pi to control the motors, IR sensor and dispense the goodie when the secret code is fed into the raspberry-pi.

USE OF API IN THE DEVELOPMENT OF PYTHON CODE

API (Application Program Interface) can be termed as the set of permissions (protocols, routines and tools) which our software application grants from the host/source program so that the application can access the required information from the host program. In this project, our host program is Twitter. We are generating API to access the information of the customer (name, email-id, etc.) who tweets on the company’s page and in addition to this API’s are also used in this project for sending the secret code to the customer, the moment he/she comments on the company’s page.

GENERATING API USING TEMBOO PYTHON AND Tweepy: Tweepy is a Python Library used to access twitter API’s. This is used to run our program in an infinite loop, without which the user has to run the program every time a new user comments into the Twitter page of the owner of the vending machine.

As soon as our user comments on the Twitter page, his/her details will be stored in the SQL server using PHP language (Jayavardhana et al., 2014). Using Temboo and Tweepy, a security code will be sent either to the user’s his/her twitter inbox. When the code is entered into the vending machine by the user, the vending machine using Raspberry pi will run an algorithm to check whether the details entered are correct. If the details are correct then a goodie will be dispensed else an error message appears on the screen. IR sensor notifies the Raspberry-pi whether the goodie has fallen on the ground. If the goodie has been dispensed successfully, then the entry of that particular user will be removed from the database.

CONNECTING RASPBERRY-PI TO THE LAPTOP

Requirements
- Laptop (used for display and GUI)
- Mobile Phone to create a hotspot for connecting all the devices (Raspberry-pi, laptop and Mobile phone) altogether.
- Raspberry-pi

First of all, we need to edit the ‘interface file’ of Raspbian Operating System with the details like IP address of our mobile and laptop. Steps involved in the process are as follows:
1. Install raspbian operating system on a micro-sd memory card.
2. To access the hidden system files of the Raspbian operating system, open it in a Linux platform rather than a Windows one. We used Ubuntu for the same.

3. Go to terminal/command prompt of Ubuntu and type the following commands for editing interface file of Raspbian Operating System:

   1. `sudo nano`: `sudo` asks for the password of the user “root”. `sudo` asks for your own password (and also checks if you're allowed to run commands as root, which is configured through `/etc/sudoers` — by default all user accounts that belong to the “admin” group are allowed to use `sudo`).
   2. `cd media`: For getting access to the media directory (Which contains CD rom and Ubuntu system files)
   3. `cd ubuntu`: For getting access to the ubuntu system files.
   4. `cd (address of memory card directory)`: e.g. for us, it was `cd ad6203a1-ec50-4f44-a1c0-e63c3dd4c9202/`
   5. `cd etc`,
   6. `cd network`
   7. `sudo nano interfaces`: Nano is the text editor in python and `sudo` gives the administrator rights to the user.

   After the completion of step 7, a text editor will open. We will have to edit the file as per the Figure 3 described below.

   Now that we have edited the interfaces file we can establish the connection of Raspberry Pi to the laptop using Putty and Xming software.

**Requirements**

1. Putty for connecting Pi to the laptop (Putty provides SSH client).
2. Xming used as a display server for Microsoft Windows operating systems.

**Steps**

1. Enter the IP address of mobile, through which hotspot is created, in Putty.
2. In the Putty software, go to: SSH -> X11 -> tick the box X11 forwarding.
3. Finally, click on ‘Open’ option at the bottom right of the Putty window.
4. A new command prompt window will open, which will ask for username and password. Fill in the necessary details.
5. Run the Xming software.
6. Go to Putty command prompt and type ‘startlxde’ and hit enter to open a GUI for accessing the contents of the Raspberry-Pi.

   Figure 4 shows the screenshot of Putty software in which the IP address of the raspberry-pi is entered.
SETTING UP HARDWARE

The following steps are involved in the setting up of hardware:

**Step 1. Wi-fi connection to the raspberry-pi:**
The hardware connection is made by setting up the Wi-Fi connection to the raspberry Pi. Hotspot is created on the mobile phone so that the laptop, raspberry pi and mobile can be connected with each other.

**Step 2. Interfacing the Raspberry pi:** We have used Putty and Xming software. We have to put the particular IP address of the Raspberry pi in order to access it.

**Step 3. Connecting the digital IR Sensor:** Now, we connect the digital IR sensor to raspberry pi so that it can sense whether the goodie has fallen down and taken by the user.

**Step 4. Connecting the switching circuit:** Switching circuit is used to convert 3.3 V to higher voltage to run the motor. We are using this circuit because the output voltage we get from raspberry pi is 3.3 V but in order to rotate the motor we need at least 9 V. In the switching circuit we have used NPN transistors in which the emitter is connected to the ground and the base is connected to the raspberry pi which is giving an output voltage of 3.3 V and the third terminal of transistor, i.e., collector is connected to the one end of the DC motor and the other end of the motor is connected to the SMPS, i.e., to the 9 V. The common ground is connected between the SMPS and the raspberry pi. Similarly we have connected the 4 motors with 4 different transistors.

**Step 5. Attaching the spring to the motor:** The spring is attached on the top of each motor and the chocolate is put inside the spring so that when the motor will rotate the chocolate will comes forward and fall down. Each spring consist of 4 chocolates. When the user types his unique code in the machine the motor will rotate until the chocolate is taken by the user. The digital IR sensor will sense that the chocolate has been removed and again asks for the code to reinitiate the process.

SIMULATION OF THE MACHINE IN SOLID WORKS

Before making the actual machine. The prototype of the Social Media Vending Machine was designed in the Software called Solid Works. The following Figures 5, 6, 7, 8 and 9 show the simulation and design of the vending machine in Solid Works and show the different views of the machine. These diagrams will be very useful for the actual design and setting up of the vending...
machine which involves making of the wooden structure for the machine by the carpenter.

**ALTERNATIVES AND TRADE-OFFS**

**Wi-Fi versus LAN:** Unlike the unstable connection of Raspberry Pi to the laptop using the LAN Cable, the connection using WI-FI module is much more stable and hassle free with the exemption of using long wires as is the case with LAN connection.

Using Wi-Fi, we get the benefit of connecting the wireless display or laptop’s display unlike the case with a LAN where the laptop display needs to be connected with wires resulting in lengthy initialisation processes of interfaces which are usually time taking or even the subsequent changes of the IP addresses before and after the connection takes place. Likewise HDMI cables need to be used for connecting external display which may result in loose connections.
Raspberry pi versus Microcontroller: Weighing the pros and cons of both Raspberry pi and Microcontroller, we can observe that Raspberry pi is more technologically equipped and advanced. Microcontroller cannot work as a standalone units as well as its controlling options such as server access and the transmission of emails are cumbersome whereas Raspberry pi can operate as a standalone unit, transmits data fast and deals with complex actions with relative ease. Also the installation of an operating system such as Linux or Ubuntu is possible whereas it is not so in a microcontroller.

RESULTS

Figures 10 shows the basic hardware setup used for the testing purpose of the Social Media vending machine. Figure 11 displays the actual model of the machine which includes a wooden structure attached to which is motor and springs.

Figure 12 and 13, 14 show the simulation and working of the Python code for getting the details of the customer who tweets on the company’s page and sending the secret code to the user. The SQL database is getting updated with the secret code every time the new user posts on the company’s page.

Figure 15 and 16 show the python code running on raspberry pi successfully controlling the motor, which dispenses the goodie, when the customer feeds the secret code into it. The IR
sensor notifies the raspberry-pi when the goodie is taken by the user. After that, the entry of the particular user (who receives the goodie) is deleted from the database using the python code.

CONCLUSION

The Social Media Vending Machine consisted of the following parts:

1. Designing of Social Media Vending Machine (Programming Language to be used, Microcontroller, Sensors, SQL server).

2. Deciding upon the best and latest methods to be used for our machine.

3. Comparison of different methods and components to be used for the machine.

4. Developing Python codes for
   - Raspberry-pi
   - API generation (getting twitter feeds and sending message to the user).
   - Twilio (to run the program into an infinite loop)

5. Developing PHP code for updating SQL database with the secret code every time the new user posts on the company’s page.

6. Developing a framework (wooden structure for the machine) with the help of a carpenter.

7. Assembling all the hardware components and testing the Python and PHP programs.

In the fields of hardware and software, this machine is equipped with the state of the art technologies comprising of high levels of sophistication. If introduced in the Indian market, this machine will improve and further develop prospects in the fields of marketing and
technology in terms of innovation. Hence, these facts and figures validates this machine as a user friendly, cost effective and a revolutionary product in the world of embedded systems and technology.

REFERENCES

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