

Automatic Parcel Collecting And interacting Door (Smart Door)

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ABSTRACT: What if no one is home and a visitor rings your doorbell and you need to collect an urgent parcel. Do not worry smart door will interact with them and collect the parcel. Using this Smart Door the owner of the house can interact with a visitor and can even accept a parcels. All the operations are controlled by Raspberry pi3, When a visitor rings the door bell the camera which is placed next to the bell will instantly click a picture of the visitor and send it to the owner of the house using Wifi. The owner will receive a notification on the phone, the owner can then call the door and speak to the visitor via a speaker. Now what happens if the owner needs to collect a parcel from the visitor? We can design the door in such a way that it will have controlled compartments on it which will be controlled by the owner using the phone.

KEYWORDS: Smart Door, Raspberry pi, Python, GSM module, Compartments, Servo motor.

I. INTRODUCTION

In an advancing world, everyone are looking for inventions which make their work easier and not tedious. Have you ever been in a situation where you were supposed to collect an important parcel from a postman but the postman arrives at your door when you are not present and then you need to take time out from your busy schedule go to the post office and collect it. Well all this can be avoided if we make our regular door a smart door which will interact with the visitors.

II. MATERIALS AND METHOD

Parts required-

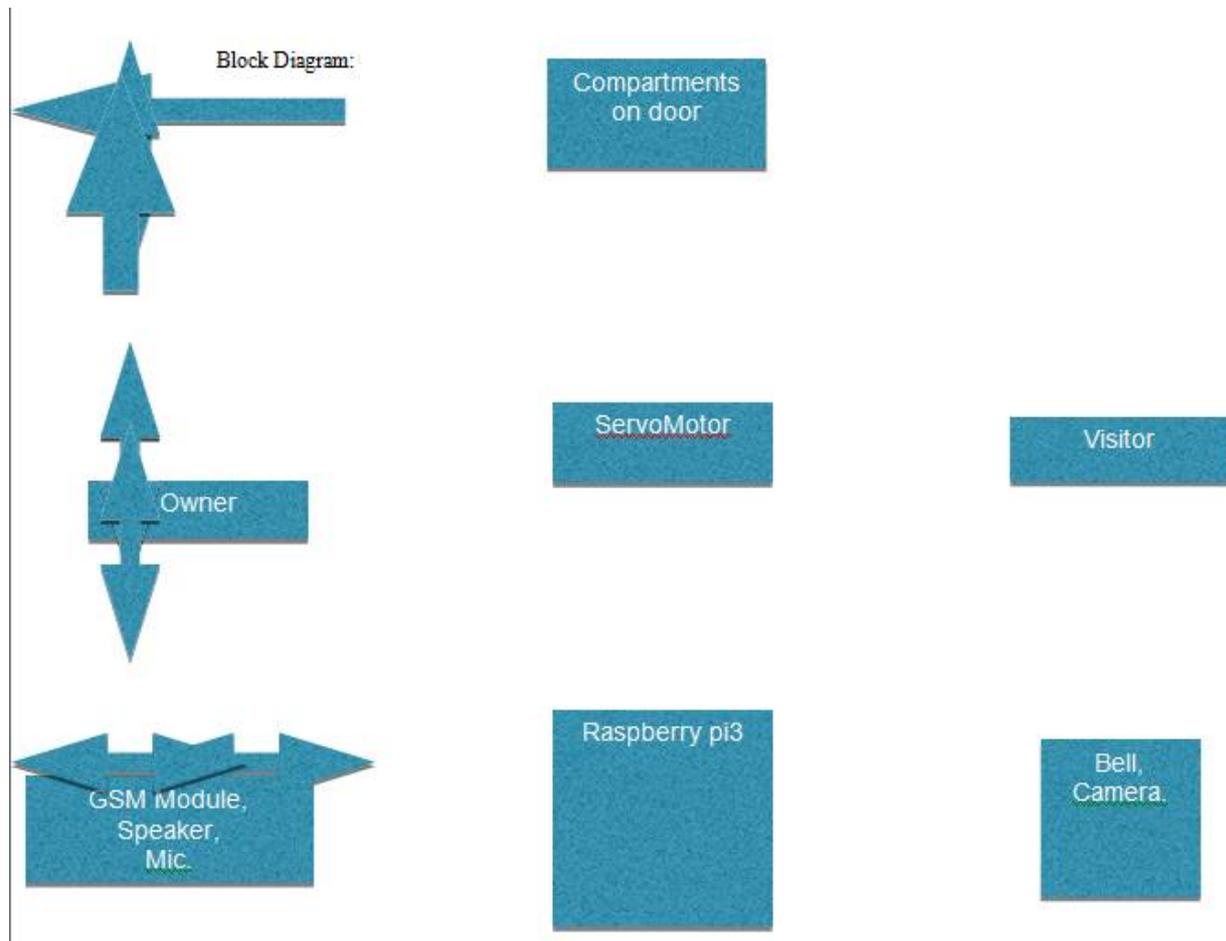
1. Raspberry pi3
2. Servo Motor
3. GSM module
4. Mic
5. Speaker
6. SIM card
7. Bell

We connect Bell, Servo Motor and GSM module to input/output ports of raspberry pi. Mic and Speaker is connected to the GSM module, mic's positive wire is connected to mic_p port of GSM module and negative wire is connected to mic_n port of GSM module. For speakers the positive wire is connected to spe_p and negative is connected to spe_n. Sim card is inserted in GSM module [9]. You can refer the block digram for further simplification.

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III. SCOPE OF RESEARCH

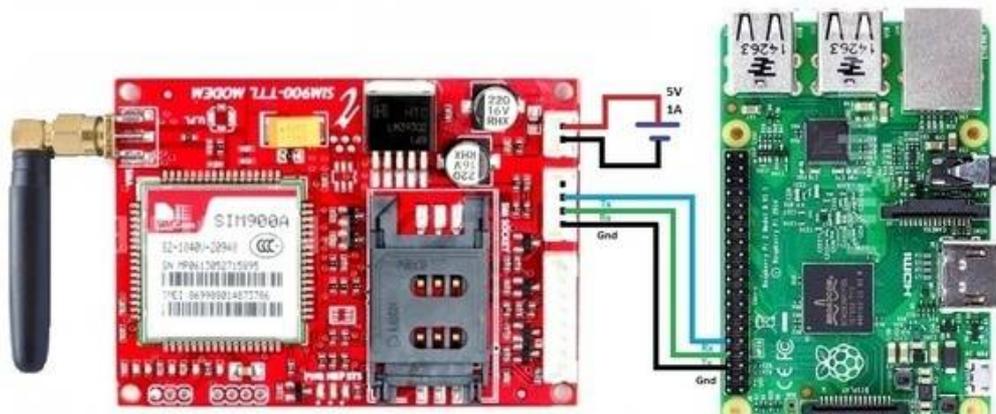
Till now we have planned to make a door which will interact with the visitor and perform some basic tasks, such as the door will accept the newspapers from a newspaper boy and milk from milkman. Later we can program the door to interact in a better way through video calling and we can add more compartments or design a door which can accept various different parcels such as cylinders. Later we can program the door in such a way that it can allow a temporary access in the house on owners command. The biggest task will be to apply artificial intelligence to it. This is a major step towards home automation and home security. No such doors are available in the market and introduction of such doors in home automation is one step forward.[1]

IV. PROPOSED METHODOLOGY AND DISCUSSION

All operations will be controlled by Raspberry pie 3 [8], A camera will be connected to the Raspberry pie which will be used to capture the pictures of the visitors[7]. Next step is how will raspberry pi come to know that the bell has rang, Raspberry pi and the bell has to be interfaced properly. The idea is to tap into the doorbell base's LED and have a script look for the LED blinking. If it finds it blinking, then someone is ringing the doorbell. We take a picture and email it as attachment. We can then set up a rule in Gmail to forward to a emailtosms service. When the owner gets the notification he/she can call the door. For calling we use a GSM module, Speaker and mic. There is more than one way to interface SIM900 GSM Module[6] with Raspberry Pi. Easiest way is to use an USB GSM Modem or to use a USB to Serial Converter along with the SIM900 GSM MODEM. There will be compartments on the door, whose movement is done by servo motor[5] which is controlled by raspberry pi. Connect the raspberry pi to phone using IP address[4]. The phone will send command to raspberry pi and thus will control the compartments on the door. The position of the servo motor is set by the length of a pulse. The servo expects to receive a pulse at least every 20 milliseconds. If that pulse is high for 1 millisecond, the servo angle will be zero; if it is 1.5 milliseconds, it will be at its centre position; and if it is 2 milliseconds, it will be at 180 degrees[3]. All coding will be done in python software[2].



(a) Interface between Bell and Raspberry pi. The idea is the following: to tap into the doorbell base's LED and have a script look for the LED blinking; If it finds it blinking, then someone is ringing the doorbell. We take a picture and email it as attachment. [12]

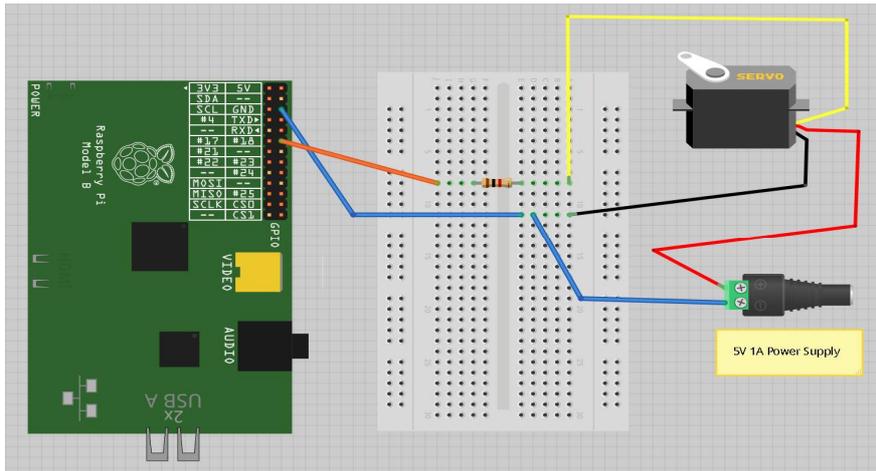


(b) Interface between GSM module and Raspberry pi. We need Raspberry pi, GSM module, 5V battery, Connecting wires, sim card. Insert a sim card in to the GSM modem and make the suitable connections as shown in the figure. A suitable factor that should keep in mind is that, the sim used in the module should have enough balance to send the sms and it should be kept in a place having appropriate range for that particular network. [10]

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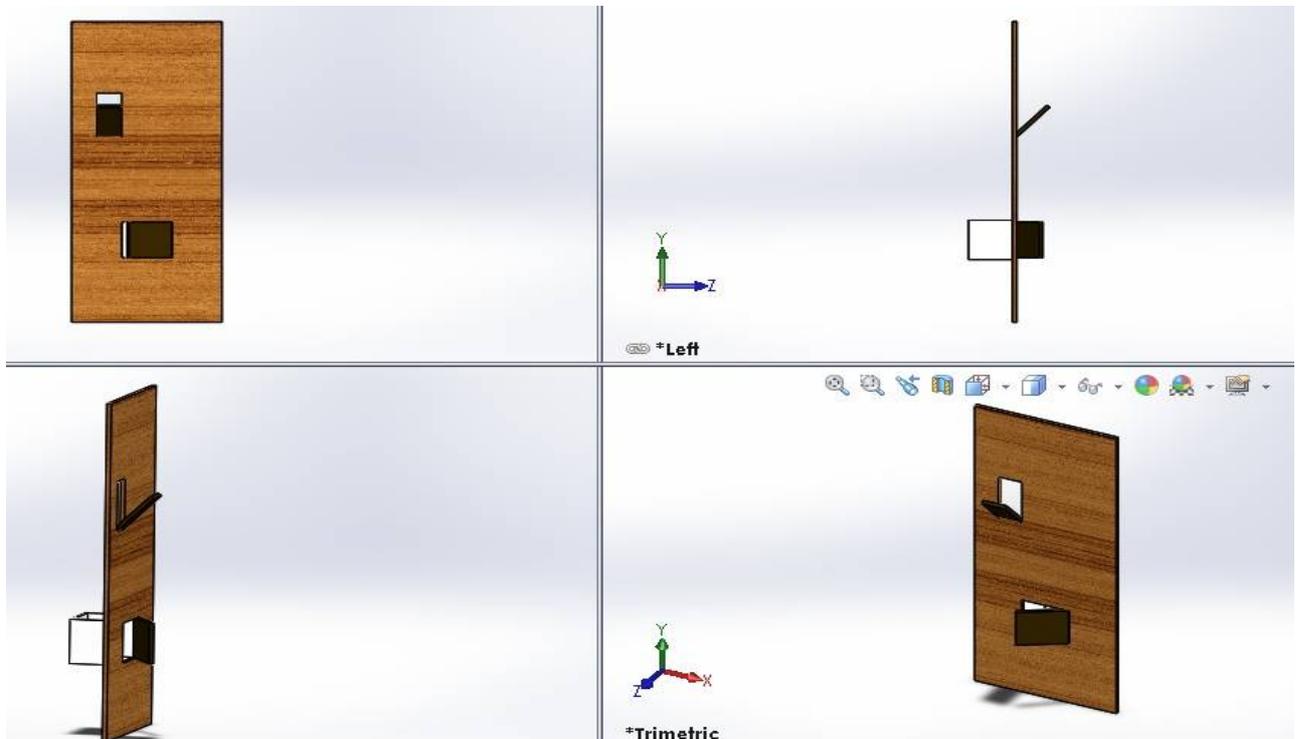
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(c) Interface between Servo motor and Raspberry pi. For this we need 5V servo motor, 1kΩ resistor, 5V 1A power supply or 4.8V battery pack. The 1kΩ resistor is not essential, but it does protect the GPIO pin from unexpectedly high currents in the control signal, which could occur if a fault developed on the servo.[11]

V. FINAL PRODUCT



Our final product will look like the figure above. The compartments on door are controlled by the owner through phone. The upper compartment is for newspapers and the bottom compartment is for any other parcel.

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V. CONCLUSION

Thus we see that it is possible to make a Smart Door which can interact with the visitors and accept parcels from the visitors when no one is at home. To make this door we need to use Raspberry pi 3 as our master controller, we use python to program the raspberry pi and control the door successfully. GSM module will be used to call and interact with visitors.

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