



USING PIR SENSOR & EMBEDDED GUI FOR ROBOT TO GUIDE SMART VISITOR

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ABSTRACT

The objective of this paper is to provide robot as a receptionist and it is developed by considering the task assigned to the robot receptionist for the simplicity of the system. The robot receptionist should ideally greets the visitor warmly, attend to the visitor's queries, satisfy them, and bid goodbye to the customer. A robot receptionist is conceived with the purpose of assisting visitors to a given site, providing a variety of information about the place and helping the visitors to reach any desired location within the premises.

In this paper PIR sensor is used to detect the human radiation and then the RF section to check the identity of the person(that is whether they are employee or visitor).For employees we will provide a different setup by using finger print sensor for identity,if the RF transmitter and receiver are matched then the process will proceed for employees as finger print verification.

1. INTRODUCTION

Robots are machines created by men in order to make their work easy and efficient. These robots are usually programmed to perform a specific task at a specific time. Although the robots are allowed to perform their work independently, the control always lies in the hands of human beings. When the robots are allowed to think of their own and to take decisions then it is known as autonomy of robots. In present human receptionists are guiding the visitors but they need to be trained, might look dull and must be provided wages. Human behaviors are unpredictable and they can go wrong in guiding a visitor with their punctuality and politeness. In this paper robot receptionist have built that will be able to do the following receptionist chores on its own. The robot will first separate the visitors into regular employee or a general visitor and greets them with a welcome message in a clear voice It shows the greetings image and then renders an onscreen keypad with letters and prompts the user to enter his signature on the embedded GUI display if he is an employee or just enter his name and the purpose of visit if the person is a general visitor. The robot also assigns a visitor ID number to each of them. The entered name along with the time will be saved in memory. It asks the user to touch their choice. Once the user chooses the right option on the screen, the system will acknowledge with voice and it shows a route map of that building for the user to reach his destination spot or the place where the respective official would be normally available. Before this process more importantly it sends the visitor request through a wireless network to other slave units fixed near the official persons that will display the visitor name and his purpose. The official can communicate

with the robot (call or hold) using the push buttons on his device and the robot will announce the visitor ID audibly and manage them in the reception.

1.1. Circuit diagram of employee transmitter.

Data is transmitted through the wireless communication way by using RF transmitter and receiver. of three candidates. Employee transmitter schematic contains following devices.

- 1) 433.92 MHz transmitter
- 2) HT-12E encoder IC
- 3) Pushbuttons switches

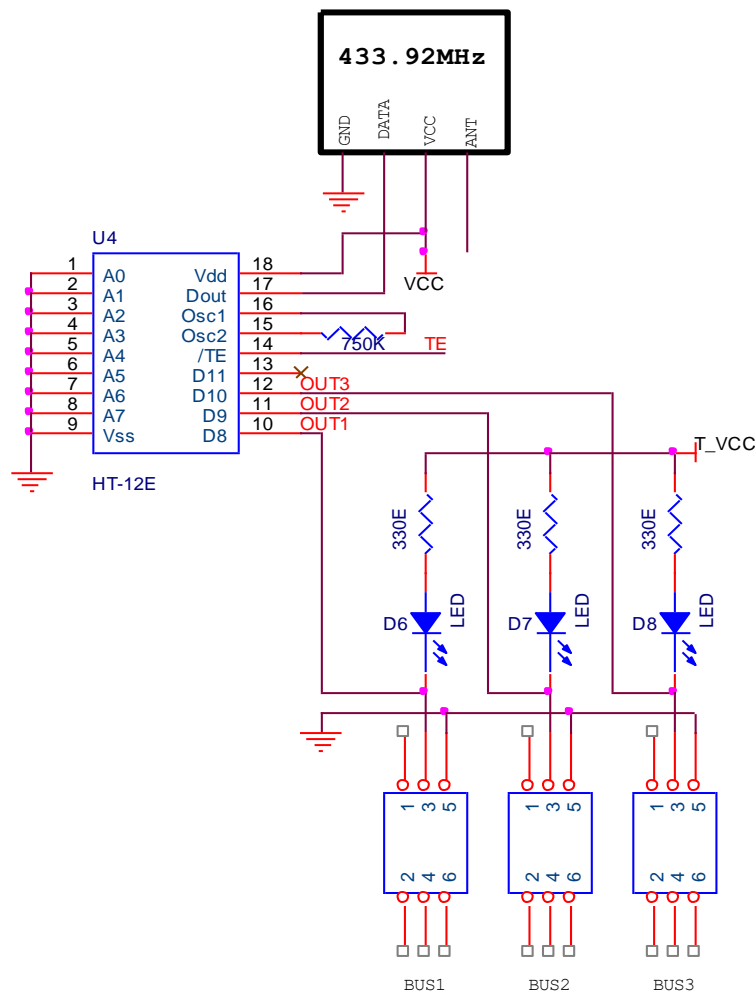


Fig.1.1. Description of Employees transmitter section circuit

Fig.1.1 When once any switch is pressed then that employee name and designation along with its arrival time is recorded in the visual basic data base. When employee leaving office then again he press same switch then his departure time is recorded in database. Each separate switch is given for each separate employee. When the push button switch is pressed then low signal is given on the respective pin of the encoder IC.

1.2 Robot receptionist unit master

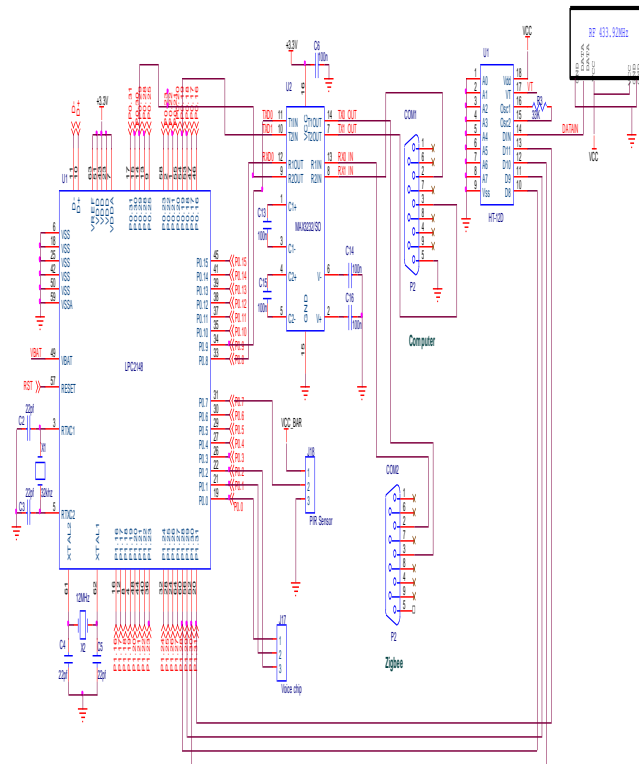


Fig.1.2. Description of Robot receptionist unit master circuit circuit

In this master section data transferred by the employee section is received by RF receiver and it is decoded by IC HT12D. Data out from pin no. 10, 11, 12, and 13 of HT12D is given out to Port P1.28, P1.29, P1.30, and P1.31 respectively. As per that data signal are given to processor and information is going to collected in the database. Human motion is detected by the PIR sensor that signal is transferred to the processor and then message is given by voice chip through the speaker. PIR sensor is connected to the P0.7 pin of LPC2148 microprocessor. AM4EC005x voice chip is connected to port pin P0.0, P0.1, and P0.2.

For serial communication two UART are used. First UART1 is used to get connection between processor and Personal Computer. Second UART2 is used to get connection between processor and Zigbee. For first UART1 P0.9 and P0.8 pins i.e.RXD1 and TXD1 are used. For second UART2 P0.29 and P0.19 pins are used. UART2 is connected to zigbee module so there is no need of wired connection between master module and slave module. Data is transferred through wireless medium.

2. Description of visitors alter unit slave circuit

In the slave section following devices are used

- 1) ARM7 based LPC2148 microprocessor.
- 2) MAX232
- 3) Buzzer
- 4) DB9 connector

2.1 Circuit diagram of employee visitors alter unit slave circuit

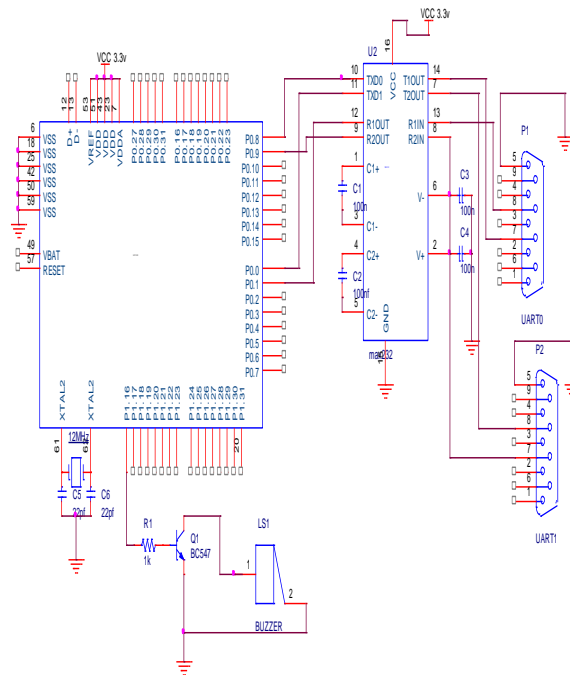


Fig.2.1. Description of visitors alter unit slave circuit

In this Slave section module is kept in the authorized person room. When two commands are obtained from the master section that is displayed in HyperTerminal output screen when slave section is connected to PC For first command Alphabetical letter ‘A’ is obtained on the output screen and the respective sound message given from speaker. When second command Alphabetical letter ‘B’ is obtained on the output screen and respective sound message given from speaker. The authorized person gets intimated about the visitor by getting given Alphabetical letter ‘A’ and ‘B’ respectively. Then as per his condition he given input from keyboard which are transferred serially to processor and outputs are generated. If authorized person is Busy then he gives input to keyboard Alphabetical letter ‘C’. Then same message is displayed from speaker as wait for some time authorized person is busy for the visitor. If authorized person is not available then input given to keyboard Alphabetical letter ‘D’ and buzzer will be turned on So visitor gets understand that required person is not available. Buzzer is connected to pin P0.1 of processor and push button is gets connected to P0.0 of processor. For serial communication two UART are used. First UART1 is used to get connection between processor and Personal Computer. Second UART2 is used to get connection between processor and Zigbee. For first UART1 P0.9 and P0.8 pins i.e.RXD1 and TXD1 are used. For second UART2 P0.29 and P0.19 pins are used. UART2 is connected to zigbee module so there is no need of wired connection between master module and slave module. Data is transferred through wireless medium.

3. RESULTS And DISCUSSION

3.1. Output of the system

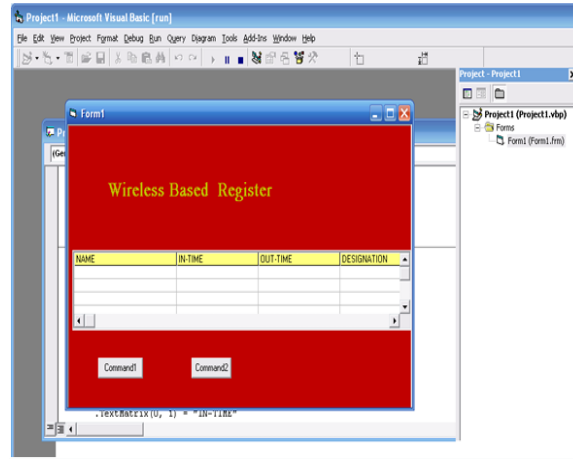


Fig.3.1 Output window of the visual basic database

Fig. 3.1 Robot receptionist system gives the output in the form of stored database information. Visual basic language is used to store the employee database information which consists of Name, In Time, Out Time and designation of employee. When the push buttons on the transmitter sections are pressed and instantly leave it then us get particular name is entered into the wireless based register. Each separate switch is applicable for each separate employee. That switches are working as identification cards for separate employee.

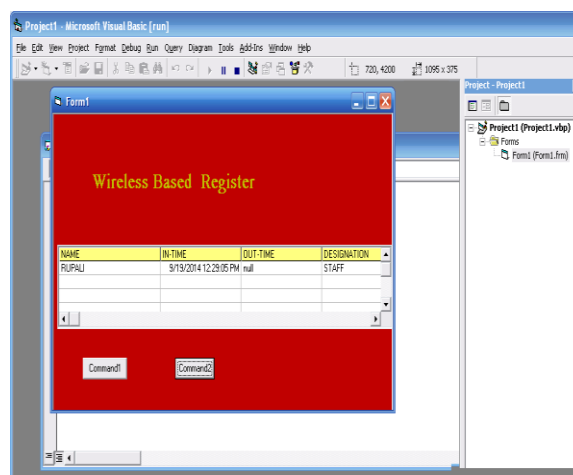


Fig.3.2 Finger print identification of the first employee within time.

At first master and slave modules are powered and connected to respective personal computer. For Master Module unit two UART has connected. UART1 is used to get serial communication between Master unit and PC. UART2 is used to get connection between Master unit and first zigbee module. For slave module unit also there are two UART connection is available. UART1 is used to get serial communication between Slave unit and PC. UART2 is used to get connection between Slave unit and second zigbee. When system is on and we run

the visual basic output code we get following window. It generate Form1 named as wireless Based Register as shown in figure. When first employee press the first switch, then his name, In Time and Designation is recorded into the database.

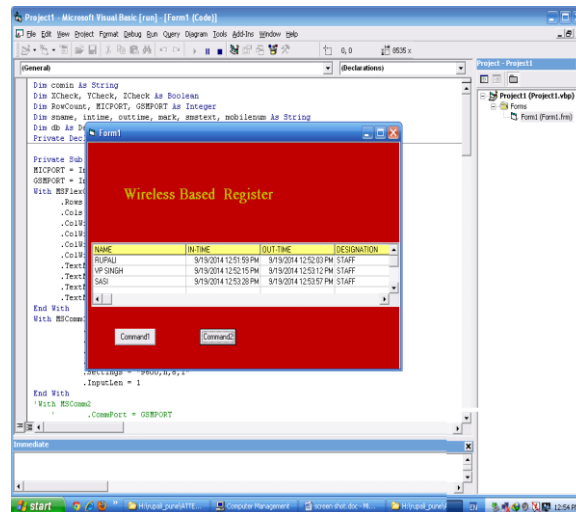


Fig.3.3 Finger print identification of the first three employees.

When the first employee press the switch second time, then his Out Time is recorded in to visual basic database. On the employee transmitter section three switched are programmed. When all three employees are press the respective switches then there eatery are recorded into wireless based register. Wireless based register contains two commands. Command 1 and Command 2. These two commands are used for visitors. Command 1 is used to indicate that to whom visitor want to meet. Command 2 is used to indicate that which department visitor want to go. When command1 button is pressed data is transferred serially through the wireless medium using zigbee to the slave modem. Salve modem is connected to PC. Using HyperTerminal output window shows Alphabetical letter 'A' for first command and Alphabetical letter 'B' for the second command.

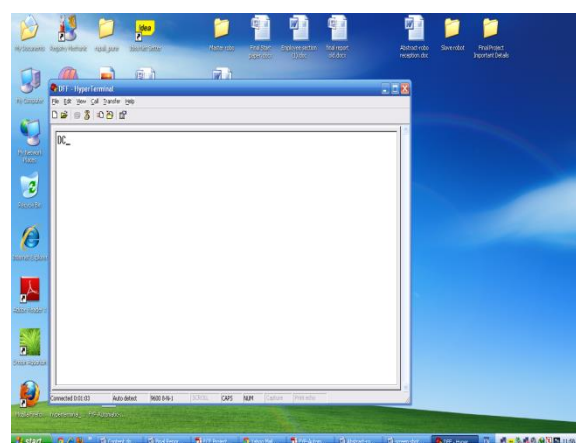


Fig 3.4 Hyper terminal screen shot from the master circuit.



For slave unit when getting inputs from master unit in the form of Alphabetical letters 'A' and 'B' then Slave unit gives waiting signal to visitor by giving input from keyboard 'C' in the HyperTerminal window. If the concerned person is not available then again then it gives its indication to visitor in the form of buzzer output signal by giving input from keyboard 'D' in the HyperTerminal window.

4. CONCLUSIONS

From the research conducted with the following conclusions are arrived

1. Robot receptionist system is designed will be able to do all the receptionist chores on its own. The robot will first separate the visitors into regular employee or a general visitor and greets them with a welcome message in a clear voice.
2. It shows the greetings image and then renders an onscreen keypad with letters and prompts the user to enter his signature on the embedded GUI display if he is an employee or just enter his name and the purpose of visit if the person is a general visitor.
3. The entered name along with the time will be saved in memory. the employee and visitors, and also help them to fulfill their need. Our paper is called robot receptionist which is an automated reception system that takes the role of a receptionist and hence be more effective & punctual.

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