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SMART VISITOR GUIDANCE ROBOT WITH EMBEDDED BASED IEEE WIRELESS PROTOCOL

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ABSTRACT

One of the important issues in educational foundations, banks, medicinal centers is new visitors need to discover the behavior with others help to accomplish their objective. Human behaviors are variable and they can turn out badly in managing a guest with their timeliness and regard. Our undertaking, robot assistant is a robotized mechanical social time framework that fills the role of a secretary and guides the guests by inside them to their specific objectives/specialists by goals/authorities course maps with the help of touch screen shading board and multilingual voice generation. It is similarly prepared for recording the employee signature and ongoing signature check to maintain a digital attendance book.

Keywords: Robotic, TFT Display, Ultrasonic Sensor, IEEE 802.15.4 and ARM CORTEX-M3

I. INTRODUCTION

Human–Robot interaction (or HRI) is likely to play a key role in the future development of industrial production, with humans and robots working together at complementary tasks, while sharing a common workspace [1]. The state of the art, however, is that industrial manipulators are still physically separated from human workers and installed in dedicated areas where humans are not allowed to enter. In addition, because of the inherent dangerousness that a moving robot [2] represents for a human being for the consequences of impacts between robots and humans.

The difficulties that people have unaware of the location of places for example hospitals or colleges. In order to overcome this problem we introduced receptionist robot. Also the simple details like number of visitors, the direction, are obtained automatically.

II. SYSTEM ARCHITECTURE

This procedure, the robot will exhibit a list of names (ex: principal, administrator, etc...) whom the visitor need to meet or a list of places (medicinal dispensary, workshop room etc...) where the visitor need to go. It requests that the client touch their decision. Once the client picks the correct alternative on the screen, the framework will recognize with voice [6] and it demonstrates a guide of that working for the client to achieve his goal spot or where the individual authority would be ordinarily accessible. Prior to this procedure all the more vitally it sends the guest ask for through a

remote system to other slave units settled close to the official people that will show the guest name and his motivation [7]. The authority can speak with the robot (call or hold) utilizing the push catches on his device and the robot will report the visitor ID audibly and oversee them in the gathering. Squeezing a catch on the robot will make the framework demonstrate the signature representative names alongside the relating time. The robot is also able to handle multiple languages and the user will be guided in his language of choice [8].

ROBOTIC RECEPTION UNIT – MASTER

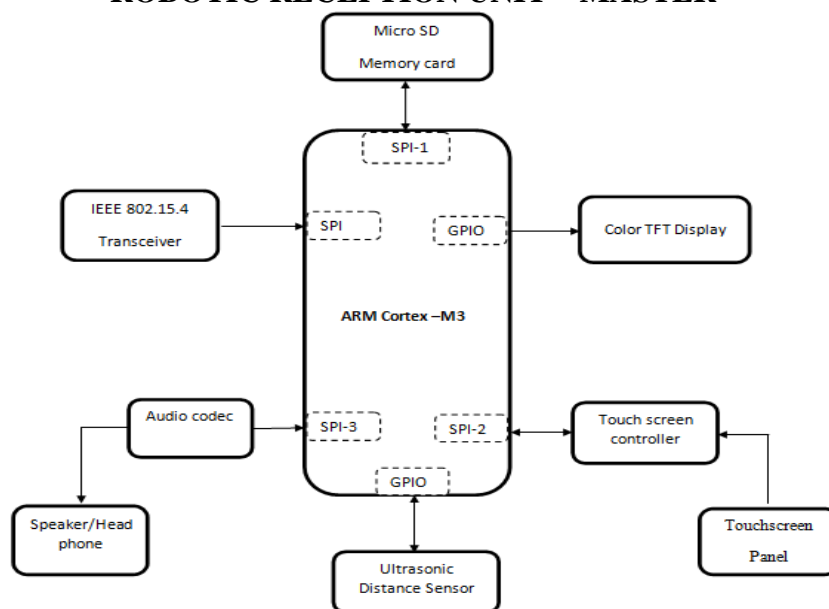


Figure 1: Robotic Reception Unit - Master

VISITOR ALERT UNIT - SLAVE

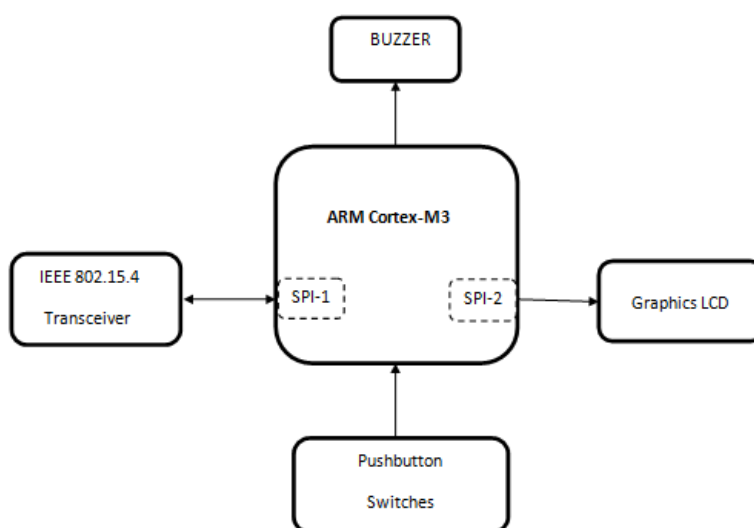


Figure 2: Visitor Alert Unit - Slave

Figure 1 and 2 represents the robotics visitor unit and visitor alert unit. A 65K color Touch screen TFT Display acts as the main GUI interface in the robot unit. All the robot generated voice data are stored as MP3 format files in a 2GB MicroSD Memory Card. The images are also stored in it. The voice files are decoded and played with the help of an MP3 Audio Codec chip. The robot scans the space before it using ultrasonic SONAR sensor. The robot communicates with the slave unit using IEEE 802.15.4 wireless network protocol. The slave unit has a Graphics LCD as its main display. Both the robot unit and the slave unit are built around a 32-bit ARM Cortex-M3 microcontroller from NXP Semiconductors.

SPECIFICATIONS

1. Arm Cortex-M3 - 72 MHz
2. Touch Screen TFT Display – 65 K Color
3. Ultrasonic Sonar Sensor - Range 15cm - 6m
4. Mp3 Audio Codec
5. IEEE 802.15.4 Wireless Network Protocol
6. Graphics LCD
7. Battery – 6V

II. RESULTS AND DISCUSSION

Boards and Modules Required:

- 1) LPC 1313_MBV14 ---2
- 2) MRF24J40MA(MIWI)---2
- 3) HC_SR04 (SONAR)---1
- 4) GLCD ---1
- 5) BUZZER---1
- 6) TFT---1
- 7) MP3AUDIO DECODER---1
- 8) SPI_DBV11 OR SPI_DBV12 (BASE BOARD)---1
- 9) VE_SDC (MEMORY CARD HOLDER)---1
- 10) MEMORY CARD---1
- 11) RF_DBV11 (MIWI EXTENSION BOARD)---1



Figure 3: Hardware Implementation

Project Demonstration Procedure

- 1) Switch on TFT mote and principal mote. With five second of delay both the units will get paired it will be like both the LED'S in both board will glow and the GLCD will also glow. In TFT mote it will display "CONFIG AND DEMO".
- 2) Click CONFIG and create employer ID by giving three names. The first name should be ABCD the second should be EFGH third is IJKL. After that click DEMO mode.
- 3) It will show the 3D picture of the campus. If you keep an object in front of the SONAR (within 1m) the unit will recognize that a new person has come near it. Immediately a model receptionist image will appear and greets you with the college name.
- 4) Pressing SW1 will cause the audio track to be skipped. This is done to avoid wasting time while waiting for the audio track to get completed. Students can also be informed about this facility in case if they need this.
- 5) Then there will be two options "EMPLOYEE and VISITOR".
- 6) If you click the EMPLOYEE mode you have to give the employee ID which you have created before. The procedure for putting attendance is you have to press A and slide your finger all the way to D.
- 7) In display it will only show ABC after the attendance is generated it will show the full name as ABCD and the time of enter. And for rest of the employee you have to press E and slide all the way to F, G, h. Then only the attendance will create. Same goes for IJKL.
- 8) If you are a visitor it will show list of places in college. Pressing a block name it will show the way for that block from the reception place. Principal office is an exception to this.
- 9) For seeing the way to principal's office you have to press principal. It will ask your name you have to type your name and click ok.
- 10) The name what you have typed will appear in the principal unit with a buzzer sound. Now

there are three options.

- First principal can tell he/she to come to his office by pressing SW1 it has to be pressed with in 10 second by pressing the button the receptionist will tell to come to his office and the way to principle office will appear in the display.
- Second option principal can ask the people to wait by pressing the hold button which is SW2 it has to be pressed with in 10 sec .the receptionist will tell that the principle has asked you to wait and it will generate a token number and show the way for waiting room will appear in the display.
- The last one is after the name is displayed and the principal is not there and he does not press any button with in 10 sec. The voice will tell that principal is not available and it will generate a token number and tell the token number to the visitor and show the way to the waiting room.

The list of names will display according to the token number and the principle can ask them to come to his room by switch SW1. So the name which is in top will be called in the reception mote the name will be called one by one you can't skip a name. Table 1 and 2 represents the project connection details. Figure 3 represents hardware implementation.

Table 1: Project Connection Details: mote0

Peripheral	Port	Detail
MP3 Audio Codec	SPI0	via SPI_DBv11 orSPI_DBv12 board
TFT LCD	TFT_LCD	Via j4 in lpc1313.
MRF24J40MA	UART0 board	Via RF_DBV11
SONAR	UART1	HC-SR04 module using

Table 2: Project Connection Details: mote1

Peripheral	Port	Detail
Nokia GLCD	GLCD	
MRF24J40MA	SPI0	
Buzzer	AD2	P1_1, GND

III. CONCLUSION

This smart robot will have the capacity to do the following receptionist tasks individually. The robot scans the space before it utilizing sensors and on the off chance that it finds a man moving it welcomes them with an appreciated message in a reasonable MP3 quality voice. Next the robot will isolate the visitors into standard representative or a general visitor. It demonstrates the welcome picture and afterward renders an onscreen keypad with letters and prompts the client to enter his signature on the implanted touch screen board show on the off chance that he is a worker or simply enter his name and the reason for visit if the individual is a general guest. The robot likewise doles out a visitor ID number to each of them. The entered name alongside the time will be saved in memory.

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