

Auxiliary Service System Based on ZigBee

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ABSTRACT:

Performing high-quality nursing for patients in hospital is an essential medical issue nowadays. To this purpose, a framework for smart infusion auxiliary service system with ZigBee wireless network. The framework has three components a master service platform; multiple independents control platforms; and a wheeled robot. Patient will keep a RFID card and be assigned a seat accordingly. Each seat is equipped with an independent control platform, a patient can able to send various service requests to the master service platform using this. The automated vehicle is used to deliver goods requested by the patients, Which is controlled by using Bluetooth.

KEYWORDS: ZIGBEE(CC2500),RFID(EM-18),infrared sensor, wheeled vehicle, Bluetooth(HC-06), PC

1. INTRODUCTION:

1.1 PROBLEM STATEMENT

Nurses are always busy, so that patients needs might not be well taken care of. The performance test of overall system. Due to the crowd circumstance, patients may not get timely treatment. In order to provide patients with medical services, the nurses will be arranged in the infusion room. In most cases, the process of patient's service is very long. So, the staff's couldn't do works effectively. Oral service requests will increase the burden of the service staffs, which is not convenient. What's worse, the communication between patients and staffs is prone to error. For the above problems, many hospitals are in need of the intelligent service system to improve the efficiency and customer services of infusion services.

1.2 OBJECTIVES

Without Oral communication patients can communicate with the staffs using RFID card. Going to add the automated wheeled vehicle, it is used to deliver goods requested by the patients. By using ZigBee we are going to connect wheeled vehicle and RFID card.

1.3 ZIGBEE WIRELESS NETWORK TECHNOLOGY

ZigBee is used for communication control. Zigbee is working on IEEE 802.15.4 protocol which is standard for wireless personal area networks (WPANs). Zigbee communication standard defines physical and Media Access Control (MAC) layers which is used to handle many devices at low-data rates. ZigBee WPANs operate at 868 MHz, 902MHz-928MHz, and 2.4 GHz frequencies. For two-way transmission of data between sensors and controllers, the data rate of 250 kbps is used.

1.4 RADIO FREQUENCY IDENTIFICATION TECHNOLOGY

RFID tag ia a tracking system used by radio frequency which can do searching, identification, tracking, and communicating with items and also with people. RFID tags are made up of an integrated circuit (IC), that can store a range of information from serial numbers. Tags are identified by their radio frequency.

1.5 WHEELED SERVICE VEHICLE

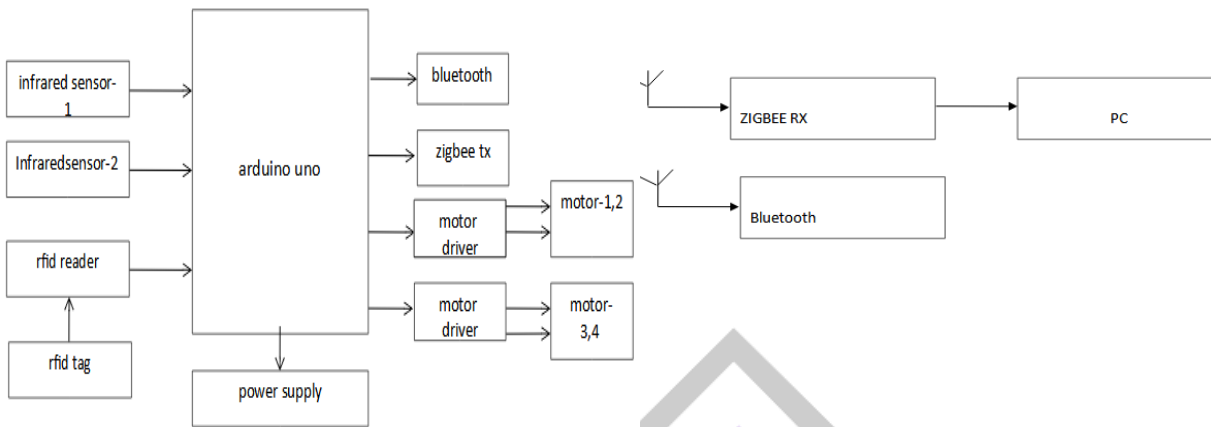
The wheeled robot is composed of infrared sensors, switch, microcontroller(Arduino), ZigBee communication module, motor drivers

and independent power(12V 1.3A). The main usage of the wheeled robot is to send tablets, water, food, etc...The two sides of the vehicle body are fixed with two infrared sensors each. The infrared sensors are used to identify path. The wheeled vehicle is controlled by using Bluetooth.

1.6 BLOCK DIAGRAM

TRANSMITTER BLOCK:

RECEIVER BLOCK:



1.6.1 EXPLANATION

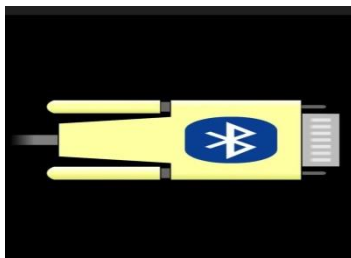
Arduino UNO is used to connect the components. Four Infrared sensors are used in both sides of the vehicle. It will sense the colour and move according to it. Two motor drivers are connected to the arduino board and four 100rpm motors are connected with the motor drivers, two motors for one motor driver. RFID reader is also connected with arduino. 12V power supply is connected with arduino before that the power supply is passed to voltage regulators. ZigBee Transmitter is connected with arduino. Receiver is connected with PC by using the USB cable. Bluetooth transceiver is connected with arduino and can be controlled by serial Bluetooth app in android. Connect PC and ZigBee Using USB cable. Pair android Bluetooth with the Hc-06 Bluetooth module. Then swipe the RFID card using the RFID reader. The operation is simultaneously displayed on PC. Then the patient can request their needs via that bluetooth app, the vehicle will started to move by using the infrared sensor, These sensors will sense the line follower(Black Tape), it also can be controlled by patients via android Bluetooth app. The goods will be delivered to the patients then the delivery status message displayed on PC. The wheeled vehicle is composed of RFID reader and tag, Infrared sensors, MCU, ZigBee communication module, motordrivers and independent power. The main usage of the wheeled robot includes sending stuff delivering. RFID can identify specific targets, read and write relevant data by radio signals. It is swiped and the identification message will be displayed on PC. The two sides of the vehicle body are equipped with four infrared sensors. The infrared sensors are used for navigation. RFID can identify specific targets, read and write relevant data by radio signals. ZigBee is responsible for communicating with PC and the intelligent wheeled robot. Bluetooth is paired with android and used to control the wheeled vehicle. Motor drivers are responsible for the movement of the wheels. ZigBee receiver side is connected with PC. It will show the messages regarding the wheeled vehicle.

2. REQUIREMENTS

2.1 SOFTWARE REQUIRED:

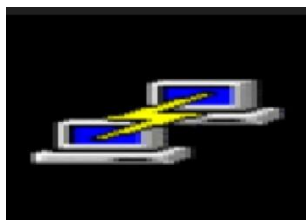
Arduino- The Arduino programming language is a very simple hardware programming language, It is similar to the C language.

SERIAL



BLUETOOTH LOGO

PuTTY- PuTTY is a free implementation of Secure Shell for PCs running in Windows.



PuTTY

2.2 HARDWARE REQUIRED:

- 1) **System-** Windows 10
- 2) **Zigbee-** The ZigBee wireless technology is used for communication. It is basically an openly available global standard to address the unique needs of low-power, low-cost wireless M2M(machine-to-machine) networks and also Internet-of-Things(IoT).



CC2500

- 3) **RFID reader& tag-** RFID is a wireless communication technology like radio transmitters, Bluetooth, etc. RFID contains **tags** and **readers**.



EM-18

- 4) **Arduino UNO-** Arduino is a microcontroller board. It has digital and analog pins.
- 5) **IC (7812,7805)-** These two are voltage regulators. IC7812 is used in the circuit to give 12V for the components. IC7805 is used to give 5V for the components.
- 6) **100 RPM motors-** It is a DC gear motor and used for robotic application.
- 7) **Infrared sensors-**An infrared sensor is an electronic device. It can measure the temperature of an object and detects the motion.



HC-06

- 8) **Motor drivers (L293d)-** L293D IC is a Motor Driver IC, it allows the DC motor to drive on any direction. L293D consists of 16-pins which are used to control DC motors direction.



L293d

3. DESIGN AND IMPLEMENTATION

Using ZigBee technology small LAN is setted. It is used for the communication between PC and the wheeled vehicle. The wheeled vehicle is implemented by using Arduino mega, Motor drivers, gear motors, Voltage regulators and battery 12V 1.3A battery is used to give supply to the Arduino and motor drivers. Bluetooth module is implemented to receive the data from the patients and send requests to the PC. The wheeled vehicle is based on the line follower technique. For that a black tape is used. Line follower is achieved by using infrared sensors. The Control of the wheeled vehicle is achieved by the Bluetooth.

4. PROPOSED SYSTEM

We proposed a model which consistently surpasses a constant model and provides reliable prediction. Instead of human work for service, a Arduino Uno is fixed with the wheeled vehicle, a RFID card will be assigned to each patient which will be controlled by the Bluetooth module and PC displays the information. After receiving the request, wheeled vehicle is switched on and it is controlled by Bluetooth and tablets, food, water etc., will be delivered. RFID tag is used for identify the patient. Bluetooth is used to control the vehicle and it is controlled by the patients.

4.1 EXISTING SYSTEM

The main structure of the system is complex. The algorithm bang-bang is costly. Photoelectric sensors are used in this system. The price is the main concern in medical service. The efficiency is low. Connection is complex and operation is also unstable.

5.0 CONCLUSION

In this paper a method of designing a smart auxiliary service system based on ZigBee wireless network is proposed. With use of ZigBee module, the system achieves information sharing between two or more platforms. The medical staff or nurse can view the patient's needs in real time. On the other hand, the patients who swipe the RFID into the infusion room can be automatically assigned a seat and the service permissions of the independent control platform. This intelligent infusion service system can be applied in the infusion room to reduce the labor cost. In the future we will place cameras to track the location of the wheeled robot. With the cameras, the robot can provide high quality services to patients in short time.

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