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Dementia People Tracking System

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Abstract. The number of elderly people worldwide is rigidly increasing due to decrease in birth rates and innovations implemented in medical field. Due to the increase in elderly people population diseases like dementia are also being increased year by year. Having done many kinds of research it is found that there is no permanent treatment for diseases like dementia, even if those patients come in public they look similar to normal people, however, people with dementia have abnormal behaviors like loss of patience, aggression, lack of thinking which in turn causes burden to family members and caretakers. In order to address this issues, this paper demonstrates a follow-up and rescue program for the elderly. The system includes a GPS receiver, a GSM module and a long-distance RF transmitter and receiver, real-time location. Families and care takers can obtain real-time information and history of patient location through GPS to avoid loss of elderly patients. With the help of this system, the number of losing patients will be decreased and the pressure on the caretakers and family people will be cut down to some extent.

Keywords. Patient Tracking, Health Monitoring, GPS, GSM Module, Buzzer.

1. Introduction

Safety is one of the important concerns in present days. Incidents like misbehaving with old people are also raising day by day. It has been found that nearly 30 million people are suffering from dementia, autism, Alzheimer's [1]. The people suffering from dementia if they have been lost from their residence, this device helps in locating, health monitoring, alerting the surroundings with the help of a buzzer, and tracking the patients who got lost from their homes [2].

2. Existing System

Even in the past years, there are many tracking and monitoring systems for vehicle tracking and children monitoring [3]. A person named Kennedy in 2007 implemented alert notification through text messaging which is extracted from Amber alert system and that system helped in finding kids who got kidnapped [4]. and they were also indicated by a map through some icons and visual characteristics along with the locality of the vehicle in 2005 [5]. King and Yancy these two persons innovated that if

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any vehicle had an emergency, it will be reached to the destination safely and quickly and there was also a location scheme

3. Proposed System

To solve this problem, we propose a technique based on the Arduino Uno board and RF receiver and transmitter modules. If the RF receiver and RF transmitter both have strong signals, it signifies the dementia patient is in range. The buzzer will sound if the patient is out of range, and the GSM location will send a message to the pre-registered mobile number with GSM location. So that dementia patient can be easily located. We also use a heartbeat sensor and a temperature sensor to monitor patients [6].

The heartbeat sensor monitors heartbeats, whereas the Dallas temperature sensor monitors temperature. And if the patient has a problem, it will send an SMS through GSM and a buzzer will sound to alert the patient. The data will be displayed in the LD. Here using Arduino Uno, RF receiver and RF transmitter modules, Buzzer, heartbeat sensor, Dallas temperature sensor, GSM, GPS, LCD. RF transmitter and receiver modules are used [7]. If the RF transmitter and RF receiver are both in range, it means the dementia patient is in range. If the patient is out of range, the buzzer will alarm, and the GSM location will be sent to the per-registered mobile number. As a result, you'll be able to easily locate the dementia patient. We're also monitoring patients using a heartbeat sensor and a temperature sensor. Heartbeat sensor and Dallas temperature sensor are for monitoring heartbeat and temperature, respectively. And if the patient has a problem, it will send an SMS through GSM as well as a buzzer to alert them. In the LCD, data will appear.

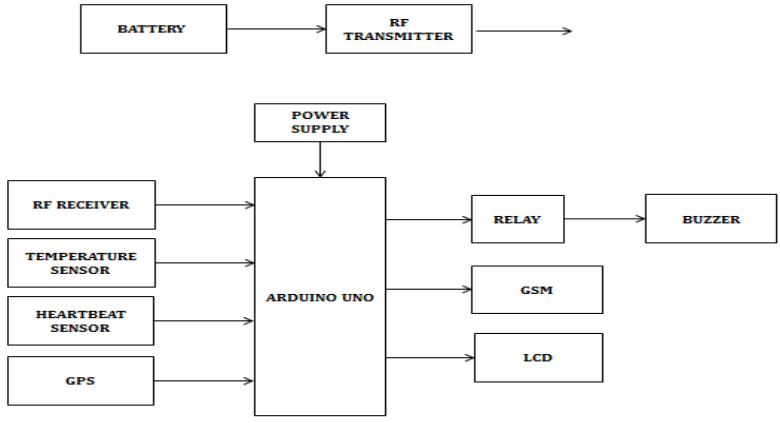

Figure 1. Block Diagram of Proposed System

4. Hardware Description

Arduino UNO:

It is a microcontroller ATmega328P which was developed by Arduino.cc and it is an open-source. It consists of analog input/output pins and digital pins. It has 14 digital pins and 6 analog pins. Arduino IDE software is used in Arduino UNO board using the USB cable or 9-volt battery

Power Supply:

A power supply that is regulated converts the alternating current (AC) to a constant direct current or voltage (DC). In this regulated power supply even though input changes output remains constant.

LCD (Liquid Crystal Display):

LCD modules are very commonly used because of its cheap price. It is also programmer-friendly. 16×2 LCD is mostly used in recent days. It will have 32 characters and each one of the character will be of 5×8 Pixel Dots.

GPS (Global Positioning System):

It is a satellite navigation system and is 20,000km far from the earth. This provides location and time information. It requires a minimum of 24 satellites and now 33 satellites work in GPS and work for 24 hours a day.

GSM:

GSM full form is global system for mobile communication. SIM800 is a quadband GSM SIM800 current consumption is as low as 1.2mA. SIM800 is very helpful for data transfer instructions as it integrates TCP/IP protocol and extends TCP/IP AT commands.

RF module – Transmitter & Receiver:

They are small in dimension but have a wide voltage range that is 3V to 12V. These modules are 433 MHz They consist of two microcontrollers for data transfer.

Temperature Sensor:

This is a digital sensor like DS18B20. It is a single wire protocol.it is used to measure temperature with an accuracy of +-5%.

Relay:

Relay is similar to switch. Relay is same as a switch that connects or disconnects two of the circuits. Relay is used with the electrical signal instead of manual operation.

Heartbeat Sensor:

It is a device that helps to measure the speed of the heartbeat. Heart rate can be measured or monitored using two ways 1. Manually check the pulse at the wrist or neck. 2. Use a heartbeat sensor.

Buzzer:

It is a magnetic device that produces a magnetic field when a signal and that too it must be oscillating, moves across the coil which helps in wavering the disk at a frequency that is similar to the drive signal.

5. Software Description

Arduino IDE:

The Arduino Integrated development environment is software that can be used for any Arduino boards this Arduino IDE helps in writing the code easily and dump it to the board. It is open-source software. The programming language used in it is java. Arduino is a microcontroller ATMEGA 328P for the UNO.

6. Advantages

- Don't take much time as in the traditional method.
- Can easily monitor the dementia patient.

7. Future Scope

In our proposed system, we demonstrated an innovative proposal of a low-cost GPS tracking system that relies on mobile using GPS module, which at this present and the future point will be helpful for Alzheimer diseased patients [8]. The solution for this is that the architecture consists of five components web platform, web server, web service for tracking location, mobile application, and database. In the future, we can add a feature that allows caretakers to share their experiences too so that others will be knowing and learning from them.

8. Results and Discussion

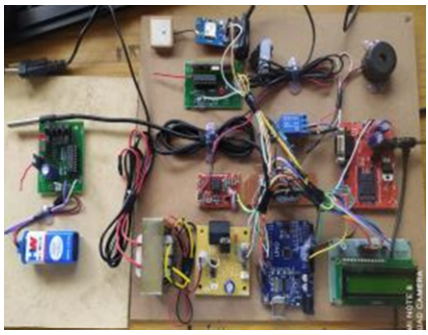

Figure 2. Outputs of Transmission and Reception

Figure 2 show the entire kit of transmitter and receiver. Figure 2 tells the pulse rate of the person using a heartbeat sensor. Figure 2 shows the temperature value using the Dallas temperature sensor and it also shows that the patient is in range. Figure 2 tells about the location of the patient with the help of GPS. Figure 2 shows the patient is out of range. These readings and values will be sent to the caretakers or family members through messages to the prescribed phone number using GSM and alert them about the patient's condition and place. There is also another feature of the buzzer system which alerts the surroundings that the patient around them is suffering from some kind of dementia or some chronic diseases. Through this system, we can trace out the patients and reduce the burden of family members.

9. Conclusion

The system we proposed is a tracking device using RF receiver and RF transmitter modules for those people who are fighting every day from diseases like dementia and it can also be used for Alzheimer's disease. This system is affordable as it is of low cost and low complexity and the best part is it consumes low power. The people suffering from these diseases can purchase it as it is of low cost and it reduces the burden of family members, caretakers. We have done the trials of our prototype and it is successful in showing the patients' location, temperature, and pulse rate through the messages which will be sent to the family members mobile phone using

GSM. We can add the databases like NGO phone numbers and nearby police stations which will be not difficult for the caretakers to tell to the police and NGO people to find and get hold of the patient at their location.

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