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Intelligent Medicine box for disabled peoples

Pandimurugan[1], Dileep[2], vikneshan[3]

[1]*Assistant Professor, Hindustan University, Chennai-India.*
[2 3] *Student Hindustan University, Chennai-India*

Abstract - *The aging population, prevention of chronic diseases, and outbreaks of infectious diseases are some of the major challenges of our human society. Health monitoring (HM) is the practical application of safety monitors to a complicated system in order to ensure either prediction of a potential mishap before it occurs. Drugs playing a major role in the health care and maintaining the health. Most of the people do not use the prescription for identifying the correct medicine which may lead to improper health condition and some mishaps. At present there is no automatic system for intimating the user to take the drugs at right time. In this paper we are presenting the system that can deliver drugs (medicines) to the patient on time without any other support and also setting a alarm to intimate the patient to take the right medicine at right time.*

Keywords: Health monitoring, RFID, Wireless sensors and wearable sensors

1. INTRODUCTION

Due to the huge number of elderly population worldwide, many health and government organizations are focusing on their quality of life from medical, social, and physiological points of view. According to the World Health Organization (http://www.who.int/), there will be 1.2 billion people aged 60 or above by 2025 and 2 billion by 2050. So it is utmost important that we continue working with these groups of population, who are somehow dependent and vulnerable in different aspects. As the number of elderly people in our society increases so does the need for assistive technology in the home. Elderly people run into all sorts of barriers in performing their daily routines as they get older. Activities of daily living (ADLs), such as bathing, toileting and cooking, taking drugs are good indicators of the cognitive and physical capabilities of elderly [1]. So designing devices and equipments to increase their independency is important to them. Drug management system that is considered in this paper, make it possible to deliver drugs to the patient on time and without the presence of the nurse. Using this kind of system is safe and more effective than others. It may not be possible to prevent all cases of musculoskeletal disorders (MSDs) but there are things you can do, at work, to help prevent symptoms occurring or getting worse.

2.INTELLIGENT BOX (IM)

Now days there is no automatic system for distribute the drugs in that time.25% of the population do not adhere to their prescribed medication, which may lead to poor health outcomes and increased mortality. We have designed the system that can deliver drugs to the patient on time and without the presence of the nurse by setting time of each box of drugs. This box called as intelligent medicine box (IM).The intelligent medicine box (IM) contains drugs, RFID, RFID reader,

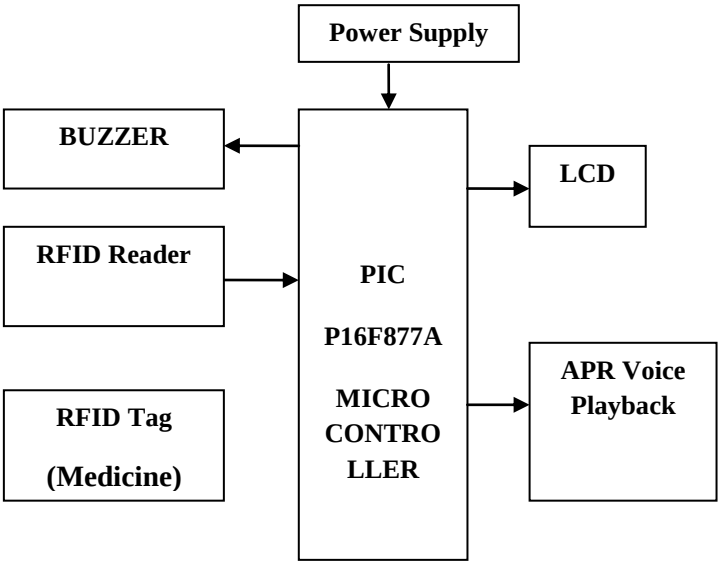

Figure 1: Intelligent medicine box layout

3. RADIO-FREQUENCY IDENTIFICATION (RFID)

Radio-frequency identification (RFID) is the wireless use of electromagnetic fields to transfer data, for the purposes of

automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. Some tags are powered by electromagnetic induction from magnetic fields produced near the reader. Some types collect energy from the interrogating radio waves and act as a passive transponder. Other types have a local power source such as a battery and may operate at hundreds of meters from the reader. Unlike a barcode, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object. Radio frequency identification (RFID) is one method for Automatic Identification and Data Capture (AIDC).

Figure 2: RFID tags

RFID tags are used in many industries. An RFID tag attached to an automobile during production can be used to track its progress through the assembly line. Pharmaceuticals can be tracked through warehouses. Livestock and pets may have tags injected, allowing positive identification of the animal.

4. RFID APPLICATIONS IN MEDICAL FIELD

There are a lot of interesting ways to use RFID products in the medical field. However now that the tags, themselves, can be made small; pharmaceuticals, lab samples, wristbands and other medical equipment can be tracked and traced, and data entry can be automated. Thus, RFID products in the medical field are aiding in the elimination of medical mistakes.

There are two types of RFID product tags widely used in medical applications. The first are HF (High Frequency) tags, which have short read ranges (up to 3 inches). These tags can be used to tag tissue samples, blood and other critical fluids. They work well in proximity to liquids and human tissue. UHF RFID products have longer read ranges, but unless they are properly engineered, can be detuned by proximity to tissue, fluids and metals. These RFID products are used to track and locate critical medical devices, manage inventories of medical items, and, sometimes for tracking and identifying patients. The vast majorities of these RFID products are compatible with worldwide standards and are easily deployed, because of their compatibility with widely available and competitively priced RFID readers.

One of the fastest growing applications for RFID product tags is to track of the pharmaceuticals and ensure their authenticity. Application of RFID products to solve the problem of counterfeit drugs will dramatically increase the effectiveness of anti-counterfeiting efforts. This will improve U.S. drug safety.

In the medical equipment field, RFID product tags can be used to track and locate medical devices [3]. The use of RFID products on equipment and RTLS (Real time locating systems), enables hospital staff to rapidly locate critical medical devices [2]. This enhances patient safety, and can reduce the amount of equipment investment needed. Additionally these tags can be used to inventory equipment and consumables used in an operation, including scalpels, sponges, clamps and other surgical equipment. At the end of an operation everything can be automatically accounted for. Finally, applying RFID products to assets aids medical institutions in automating inventory management, reducing overhead and minimizing duplicate supplies of critical inventory.

5. RFID READER

An RFID reader's function is to interrogate RFID tags. The means of interrogation is wireless and because the distance is relatively short; line of sight between the reader and tags is not necessary. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier

to boost the signal enough to awaken the tag. The receiver has a demodulator to extract the returned data and also contains an amplifier to strengthen the signal for processing. A microprocessor forms the control unit, which employs an operating system and memory to filter and store the data. The data is now ready to be sent to the network. An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data.

Figure: 3: RFID Reader

An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked. "RFID" stands for Radio Frequency Identification [4]. The tag's antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information).

A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive rfid tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory.

5.1 Microchip PIC16F877A

The PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port. Program Memory - A memory that contains the program(which we had written), after we've burned it. As a reminder, Program Counter executes commands stored in the program memory, one after the other.

- Data Memory – This is RAM memory type, which contains a special registers like SFR (Special Faction Register) and GPR (General Purpose Register). The variables that we store in the Data Memory during the program are deleted after we turn of the micro.

  These two memories have separated data buses, which makes the access to each one of them very easy.

- Data EEPROM (Electrically Erasable Programmable Read-Only Memory) - A memory that allows storing the variables as a result of burning the written program.

Each one of them has a different role. Program Memory and Data Memory two memories that are needed to build a program, and Data EEPROM is used to save data after the microcontroller is turn off. Program Memory and Data EEPROM they are non-volatile memories, which store the information even after the power is turn off. These memories called Flash Or EEPROM. In contrast, Data Memory does not save the information because it needs power in order to maintain the information stored in the chip.

The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.

In this system, with the use of PIC microcontroller, we have designed the system that can deliver drugs to the patient on time without the presence of the Nurse.

This system will alert the elder person to take medicine on time with the help of buzzer [5]. When the time reaches the system automatically blow the buzzer. Each

medicine sticks with RFID tag. Once the patient takes the wrong medicine the reader detects it and inform through the speaker. The status of the system displayed on LCD.

6. CONCLUSION

In this paper we have designed the system of intelligent medicine box for health monitoring and its uses. Special attention has been devoted to a systematic approach in the health monitoring by using Wireless sensors and RFID. We learned some difficulties and drawbacks from previous systems, so we will do a brief research in wearable sensors and how we can provide a quality based health monitoring for disabled peoples. This system has the ability of using by common people, especially disabled (blind) and aged people, and don't need any special training. Finally we decided to concentrate on wearable sensors types and its structure for improving the patient monitoring in the medical field.

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