Automatic Medicine Vending Machine

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Abstract—Accessibility to basic healthcare is an important cornerstone of development towards building a healthy future. This project presents a machine designed to provide such healthcare at areas where having a medical store may not be feasible or possible. It allows the user to select a medicine, pay the required amount after which it verifies the amount received and dispenses the medicine. It provides an all-encompassing solution to an individual looking for immediate symptomatic relief for trivial health problems. By relieving small symptoms at work, it can completely eliminate both presentism and absenteeism in the workplace. It can also decrease the current costs of open medicine cabinets. By having an over the counter vending machine in the workplace, worksites without clinics or pharmacies can benefit from increased work efficiency and avoid underperformance of ill employees. Moreover, it prevents hours wasted waiting in queues at clinics for trivial problems like colds and headaches. This situation gets especially magnified when a location is suffering from a localized epidemic or pandemic.

Keywords—Medicine Vending Machine, PIC Microcontroller, LCD, motors, UART, WiFi, Temperature sensor, patient secure details.

I. INTRODUCTION

Degrees of social status are closely linked to health inequalities. Those with poor health tend to fall into poverty and the poor tend to have poor health. According to the World Health Organization, within countries those of lower socioeconomic strata have the worst health outcomes. Health also appears to have a strong social component linking it to education and access to information. In terms of health, poverty includes low income, low education, social exclusion and environmental decay. The poor within most countries are trapped in a cycle in which poverty breeds ill health and ill health leads to poverty. Our project although may not be an out of the box idea in its entirety, it still could prove useful. Especially in developing countries like India where there are innumerable numbers of people who are unable to avail medicines. In this project the system will contain four medicines which are available as first aid and without prescription. They are Band-Aids for minor abrasions and cuts, Paracetamol for reducing fever, Vicks Action 500 for common cold and ORS packets for dehydration and other problems involving loss of fluids in the body. Nowadays in this fast moving world, appliances which are completely automatic are preferred. This is the biggest advantage of this paper. other advantage would be the use of smart card instead of coins. The system is fully controlled by a 16 bit PIC microcontroller. Automated dispensing machines decentralized medication distribution systems that provide computer controlled storage, dispensing and tracking of medications have been recommended as one potential mechanism to improve efficiency and patient safety and they are now widely used in many hospitals. There is no doubt that these machines can enhance the efficiency of medication distribution, but their capacity to reduce medication errors is

controversial and depends on many factors, including how users design and implement the system. Still, we are confident in supporting our position that automated dispensing machines improve patient safety. Automated dispensing machines provide secure medication storage on patient care units, along with electronic tracking of the use of narcotics and other controlled medicines. Automatic dispensing machines enhance rest dose availability and facilitate the timely administration of medications by increasing their accessibility on patientcare units.

II. LITERATURE SURVEY

Suhail Beg et al. proposed an FSM based automatic dispense machine[1] which has an expiry date feature using VHDL, in this paper the author described Finite State Machine based automatic dispense machine using Xilinx ISE 14.2. This machine accepts money as an input to dispense the products and returns back the money without dispensing the product to the customer if the product is out of date. Thus, it can be useful to ensure the good quality of the product along with quantity and cost.

Singh [2] proposed a touch screen based automated medical Vending machine and in this paper the author described medicine vending machine based on IR Standard touch technology as the input to select different medical facilities like First Aid facility, ambulance facility, and direct calling facility via GSM, dynamic GPS, smart card facility and restocking medicine alert. The software used is visual basic was programmed such that when the patient selects certain facility, it will be served to that patient. Thus it can be helpful in case of illness, small or big accidents and so can be placed anywhere.

Steven Woodbine, The Complete Vending Machine. Published on 18 May 2011.

There are a large variety of medication administration assistance devices for non-- professional users. Most of them are manual, providing multiple compartments called pill trays. The pill tray has a number of compartments that can be filled with medication. Each compartment can hold different sizes and combination of medicines. The user is required to take the medicine from each tray each day for a maximum of 28 days. It does not provide any alarm to indicate the time of taking the medicine .

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III. OBJECTIVE

Diagnosis is always a concern for the people living in rural area.At the same time medicine availability also has a major impact excluding the factor about complete cure. The aim of this prototype is that temporary relief is to be given out that can give people a better chance for resisting the health from withdrawing before they are able to reach doctor. Major advantage is that people would be able to access the drugs via patient kiosks in public places such as drug stores, malls, bus, railway stations, on

highways, areas where medical stores are limited.Initially the user has to swipe his/her smart card to activate the machine. Once he has an access to the device, he can submit his disease's symptoms through the touch screen. Then once his medicine is decided by the s/w, he will be given some coin like tokens from an outlet. Once he receives the tokens, a message will be displayed on the screen that the user has to put these tokens in particular medicine box area. As the user puts the tokens in the specified boxes, he will receive one tablet from that box. Thus he will get a onetime dose on the basis of his disease symptom.

IV. PROPOSED SYSTEM

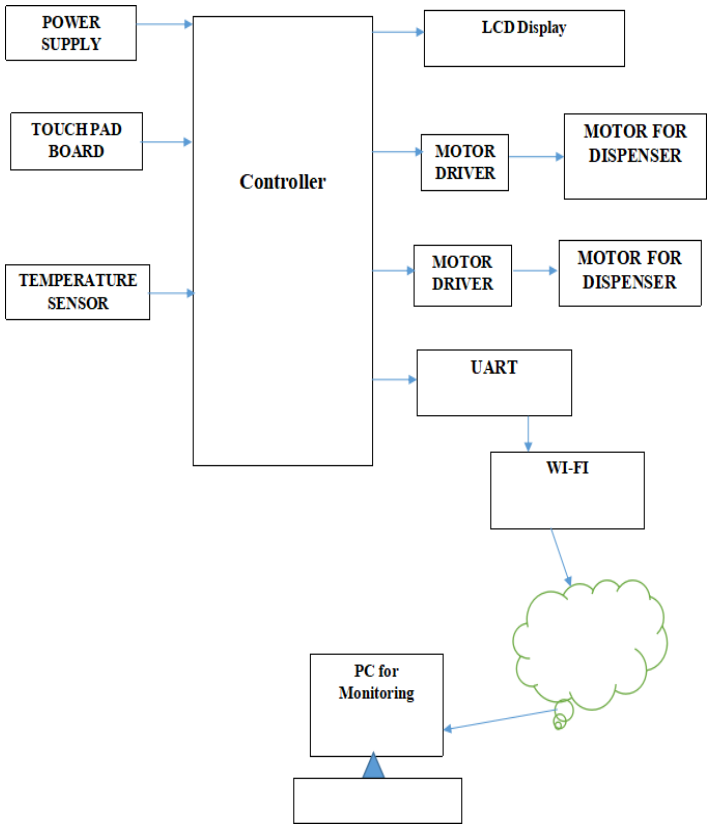
A. Hardware

- PIC (16f877A) Micro controller
- LCD Display
- Screen Touch key pad
- Temperature sensor (LM 35)
- Relay Driver
- DC Motor
- Wi-Fi module (ESP8266)
- RFID Reader
- RFID Tags

B. Software

- Embedded c programming
- MP Lab IDE
- CCS Compile
- PIK Kit 2
- Express PCB

V. BASIC BLOCK DIAGRAM OF AUTOMATIC MEDICINE VENDING MACHINE



A. Radio Frequency Identification (RFID)

It is a communication technology which allows for defining some unique characteristics of an object or a living being, usually its identification information, by relating it to a numeric serial number within a tag, and ensures that this number is conveyed by using radio waves. RFID provides a communication infrastructure at the radio frequencies between a special tag and reader device that can detect the tag, and allows for establishing communication between devices within the system without any physical contact, or even without seeing each other. In this system, the RFID tag stores individual information of the patient and an RFID reader communicates with the tag in radio frequencies to identify the patient. After the information of patients has been recorded, and the relevant doctor who is assigned to the patients can read the personal details of the patient reach the server and withdraw relevant health information from database and submit them to the doctor.

B. Microcontroller (PIC16F877A)

IC PIC 16F877A is an 8-bit microcontroller 8K x 14-bit flash program memory,368 bytes of RAM_Extra peripherals like ADC, USART, timers, compare capture and pulse-width modulation modules, and analog comparators. It is based on the reduced instruction set computer (RISC) architecture. The microcontroller processes the sensor output to compute the temperature in degree Celsius. The internal ADC of the

microcontroller is used to convert the analog output of the sensor into its digital equivalent value. The channels of analog inputs and gives 10-bit digital output. The above described sensor values has been interfaced with the microcontroller at the ADC ports of the microcontroller and these values are displayed on the LCD(16X2) by interfacing the microcontroller with the LCD.

C. **Sensors**

1.**Temperature sensor (LM35)**

The body temperature of the patient has to be measured to send it to the Doctor. In this purpose LM35 has been used. It has 3 terminals which gives an output voltage proportional to the body temperature. 5VDC supply has been given to pin number 1 of LM35. The output from pin 2 will give the voltage proportional to temperature. A 10K ohm variable resistor is used at the output from LM35.This variable resistor acts like a calibration. The calibration of the output voltage is done by measuring the body temperature by using normal thermometer and its equivalent voltage. The same voltage has to be generated at the output of LM35.The variable resistor acts like a voltage divider when its resistance is varied.

2.Heartbeat rate sensor

The heartbeat of the patient is detected using an IR LED and LDR combination. The red high intensity light emitted by LED initially falls on LDR.This is the condition where the heartbeat is calibrated to zero using a resistor. When a patient places their finger in between LED and LDR. The light is restricted by the finger. The intensity of light penetration decreases if the blood is pumped into the finger. If the blood is not pumped, then the light intensity is high. This high and low light intensity helps to measure heartbeat. Actually light falling on LDR cuts due to blood movement. The duration of each heartbeat pulse, inverse of this time gives the time duration of each heartbeat count per minute. This signal is amplified in two stages using two LM358 ICs. It will amplify the input signal having high feedback resistance to produce high gain. The second amplifier is a comparator which is used to compare the available voltage with the reference voltage.

3.LCD module

A 16 x 2 LCD is used for displaying the temperature, heartbeat and respiration count. The control lines EN, R/W, and RS of the LCD module are connected to pins RB3, Ground and RB2 of Port B of Port B of the microcontroller respectively. The commands and data to be displayed are sent to the LCD module in the nibble mode from Port B of the microcontroller. The higher four bits of the LCD (D4 through D7) are connected to the higher nibble of Port B (RB4 through RB7).

4. DC motor

It is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors

have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings.

5. Wireless networking

It is known as Wi-Fi or 802.11 networking as it covers the IEEE 802.11 technologies. The major advantage of Wi-Fi is that it is compatible with almost every operating system, game device, and advanced printer. Wireless technology has widely spread lately and you can get connected almost anywhere; at home, at work, in libraries, schools, airports, hotels and even in some restaurants.

VI. CONCLUSION

From this concept we are conclude that, the automatic medicine vending machine is technically feasible to the peo- ples. It is based in PIC micro-controller provide GSM service. It gives availability of medicines all the time, also in rural ar- eas. it is very helpful. It gives ease of access also. It is sales person-less service which is based on smart card.

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