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Advanced User Interfaces For Vending machines using wireless technologies

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ABSTRACT

***In* the present days the vending machines are manually operated and they are not using any wireless technologies. All the machines need to be operated manually and the presence of human is a must. So, a human assistance system using sensors is provided to transfer the money and operate the vending machine is implemented. The proposed system is designed to control the vending machines using the sensors. The MEMS sensor can be used to control the motors that are operated in the vending machine. The sensor is placed on the hand of a operator (Sensor can also be implemented in mobile machines). If the operator moves his hand forward the motor will move for few seconds and also displays the amount and product transferred on the LCD. Same way if motor is on for few seconds based on the directions such as left or right or backward**

***Index Terms*— Advanced user interface, MEMS sensors, wireless technology**

1. INTRODUCTION

As the technology is increasing day by day even the humans are more attracted to the new technologies. Different types of vending machines are used for different objects but the basic problem with the vending machines is that there may be a chance of getting fake notes and even have a problem of stuck coins in the machine when it is overloaded. To overcome this problem we are using RFID card through which the payment can be done. As the technology is increasing in this project we are giving input through MEMS sensor which can be done wirelessly. By this we can even attract the customers.

Thus, it is proposed in this project to design and fabricate an advanced user interface vending machine for medicines, so as to reduce the time taken and the human effort taken to deliver the medicine to the customer in required time and also meet the higher demand for medicines at the peak time, such as at road side areas when a person met with accidents examination seasons near educational institutions and almost everlasting demand near offices when a person fall sick.

2. OBJECTIVES

The main objective of the system is to save time.

1. There is no necessity of a sales man for selling the medicine.

2. We can move this machine from one place to another place.

3. There is no chance of getting fake notes and don't have a problem of coins stuck in the system.

4. A person can get medicines anywhere and even at any time.

3. METHODOLOGY

Here in this system we are using both mechanical and electronic system to design it. In this project we have both transmitter and receiver, where we give input to the transmitter and at the receiver the object is collected. The message is transmitted through zigbee transmitter and received at the receiver through zigbee receiver. When we display the RFID card to the RFID reader it reads the card and then it allows the customer to select the medicine which can be displayed on the LCD screen. MEMS are placed on the persons hand to give input. For example if we tilt MEMS towards right bandage is selected and if we tilt it towards left syrup is selected, thus the object is collected at the receiver.

4. REQUIREMENTS OF ADVANCED USER INTERFACE VENDING MACHINE

i. Microcontrollers
ii. MEMS Sensor
iii. Zigbee Transmitter
iv. Power supply board
v. RF ID
vi. LCD
vii. LPC 2148 ARM
viii. DC Motor
ix. Zigbee Receiver

MICROCONTROLLER

In 1981, Intel introduced an 8-bit microcontroller called the 8051. It was referred as system on a chip because it had 128 bytes of RAM, 4K byte of on-chip ROM, two timers, one serial port, and 4 ports (8-bit wide), all on a single chip. When it became widely popular, Intel allowed other manufacturers to make and market different flavours of 8051 with its code compatible with 8051[3]. Here we are using 8051 at the transmitter.

MEMS SENSOR

Micro-electromechanical systems (MEMS) is a technology

that combines computers with tiny mechanical devices such as sensors, valves, gears, mirrors, and actuators embedded in semiconductor chips.

Fig 1.1 MEMS Sensor

ZIGBEE TRANSMITTER

It is a type of technology which requires ultra low power consumption with an excellent battery life ranging from moths to years. As we know that there is no. of appliances in the present era which are remote control and often these devices need large number of batteries to be provisioned. In this technology maximum data rates allowed for different frequency bands but in some cases these bands are fixed.Transmits up to 1024 I/O Values through ZigBee Wireless Link. Range of freq inputs to 250 kHz.

Fig 1.2 ZIGBEE

POWER SUPPLY BOARD

The power is supplied to components which are used in the circuit and micro controller uses 5v and other modules require 12v.

RFID

RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader[5]. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects.

LCD

We get the definition of LCD from the name "Liquid Crystal" itself. It is actually a combination of two states of matter – the solid and the liquid. They have both the properties of solids and liquids and maintain their respective states with respect to another. It is typically of the order of microwatts for the display in comparison to the some order of mill watts for LEDs. Low power consumption requirement has made it compatible with MOS integrated logic circuit. Its other advantages are its low cost, and good contrast.

LPC 2148 ARM

An ARM processor is one of a family of CPUs based on the RISC (reduced instruction set computer) architecture developed by Advanced RISC Machines. ARM makes 32-bit and 64-bit RISC multi core processors. RISC processors are designed to perform a smaller number of types of computer instructions so that they can operate at a higher speed, performing more millions of instructions per second (MIPS). By stripping out unneeded instructions and optimizing pathways, RISC processors provide outstanding performance at a fraction of the power demand of CISC (complex instruction set computing) devices.

Fig 1.3 LPC2148 ARM7

DC MOTOR

Every DC motor has six basic parts -- axle, rotor (a.k.a., armature), stator, Commutator, field magnet(s), and brushes. In most common DC motors (and all that Beamers will see), the external magnetic field is produced by high-strength permanent magnets[1]. The stator is the stationary part of the motor -- this includes the motor casing, as well as two or more permanent magnet pole pieces [1]. The rotor (together with the axle and attached commentator) rotates with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the Commutator[1].

Fig 1.4 DC Motor

5 WORKING PRINCIPLE

Here we have transmitter to transmit data whereas receiver receive data and gives the selected object.

TRANSMITTER

The proposed system is designed to control the vending machines using the sensors. The MEMS sensor can be used to control the motors that are operated in the vending machine. The sensor is placed on the hand of a operator (Sensor can also be implemented in mobile machines). If the operator moves his hand forward the motor will move for few seconds and also displays the amount and product transferred on the LCD. Same way if motor is on for few seconds based on the directions such as left or right or backward.

TRANSMITTER

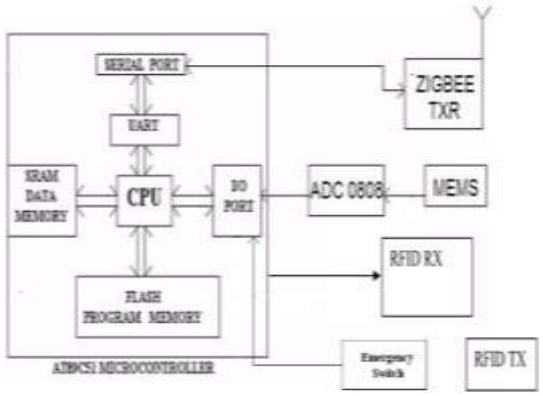

Fig1.5 Block Diagram of the Transmitter

RECEIVER

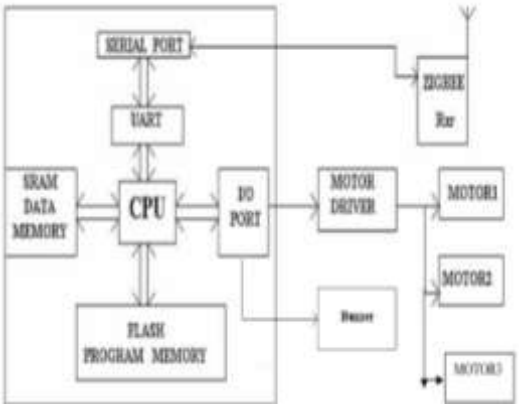

Fig1.5 Block Diagram of the Receiver

The receiver unit placed in the other section receives the commands wirelessly and sends to the microcontroller. According to the instruction the amount/product is displayed on the LCD and motor is on for few seconds. To implement the commands and data transfer from Control unit and receiving section we use Zigbee transmitter and receiver. Experimental results will be carried over motors connected using Zigbee receiver.

6 RESULTS

We can observe that transmitter and receiver having components such as

i. Microcontrollers
ii. MEMS Sensor
iii. Zigbee Transmitter
iv. Power supply board
v. RF ID
vi. LCD
vii. LPC 2148 ARM
viii. DC Motor
ix. Zigbee Receiver

Input signal is applied through MEMS to RFID. In micro controller we will select the object through MEMS such as clockwise anti clockwise and backward. The signal is processed through zigbee to the receiver section. In the receiver section the signal is received through zigbee receiver from there to RFID tag depending on the application the motor is rotated.

At the Transmitter

Fig 1.6 Transmitter

At the Receiver

Fig 1.7 Receiver

7 CONCLUSIONS

A vending machine in communication with a remote station, delivers a labelled container to a user from storage holding containers of different sizes and shapes and containing different products such as medicaments. This type of automatic vending machines could be used to reduce time and human effort with improved accuracy. The control system is further operable to move the labelled container to a delivery zone accessible to the user.

8 REFERENCES

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