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Design and Implementation of medicine vending automatic teller machine

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Abstract
This project is a way to overcome the long-standing problem of the non-availability of doctor or medicine in a large part of our country. The "Medicine Vending Automatic Teller Machine" (MV-ATM) is an easy way to overcome this problem. As the name suggests, it would act as an ATM and could be placed anywhere with just a prerequisite of an area having good network connectivity.
The MV-ATM works on GSM module. Whenever the patient needs medicine, he is connected virtually to a Doctor telling the symptoms and thus on the basis of the symptom, the practitioner could give the command and the medicine would be dispensed on direct instructions of medical practitioner. In this MV-ATM we have used a dc motor to control the rack, an IR sensor to detect the number of medicine being dispense and coil connected to the Motor to keep the stock of medicine. We have also used a DF player to give a voice to the MV-ATM so that the visually impaired person could also benefit from it. In this entire project is a holy grail for present scenario which could suffice our need of a Universal Medical Coverage.

Keywords: global system for mobiles (GSM), infrared, arduino, short message service (SMS)

Introduction
In the present scenario, people often get infected and distressed due to menace of diseases and infections leading to congestions in hospitals and clinics. The problem gets manifolds for the people residing in remote rural and plateau areas where the reach of government medical facilities is minimal or absent completely. Hence, this project utilizes modern communication protocols and sensor fundamentals to increase the reach of medical facilities to all corners of the country by connecting a remote patient to a medical practitioner sitting miles away who is able to not only prescribe the medicine but also dispense it meanwhile.
The Component being used are specified below

- LM2596 Module
- Arduino Atmega328
- 16x2 LCD
- GSM Sim900A
- IR Sensor
- Bo Motor
- DF Player

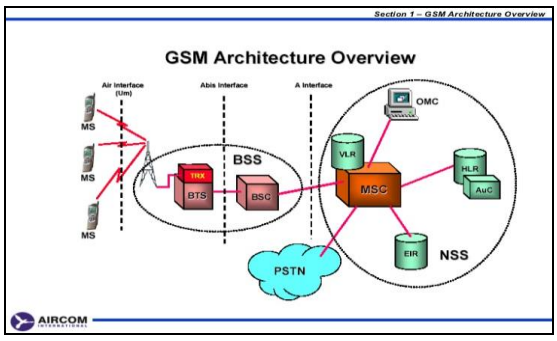

Fig 1

Design and Operation
The MV- ATM could be run on as low power as 12V only it does not require much space. It contains of BO DC motor which is connected to the coil which in turn is used to store medicine. It has a GSM module which is required to receive the message send by the Doctor the message thus received is given in command to the motor or the stack and the medicine is given. IR Sensor are also installed to detect the no. of medicine is being dispensed. Also there is a LCD installed to get information of medicine and the remaining stock DF player is used to also pronounce the medicine being given. All the programming is done on ATMEGA 326 on Arduino software.

Specification of components

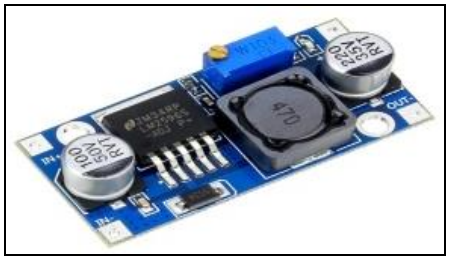

Fig 2: LM2596 Module

- With voltage meter display, voltage meter error of ±0.1V; the range among 0~40V. (note: to ensure the voltage meter accuracy, please make sure that the input voltage is 4.2V or more)
- Voltage meter can be closed by long pressing button(minimum power loss)
- The range of input voltage is 4.2~40V and output voltage

is1.25V~37V, which are continuously adjustable.(The input voltage must 1V higher than output voltage)
- Maximum output current can be as high as 3A, but normal and stable working current is2A.
- Use 150KHZ internal oscillation frequency, which belong to the second generation of switch voltage regulator with low consumption and high efficiency.

Arduino Atmega 328

The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

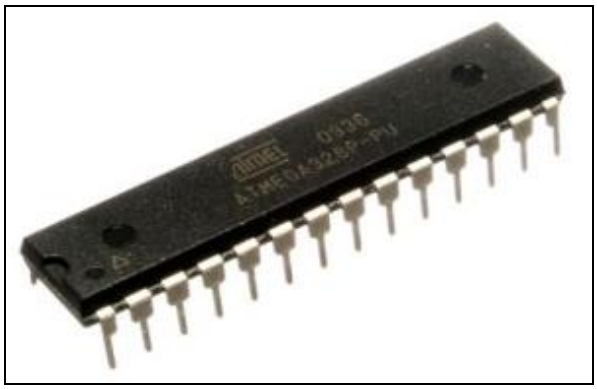

Fig 3: Atmega328

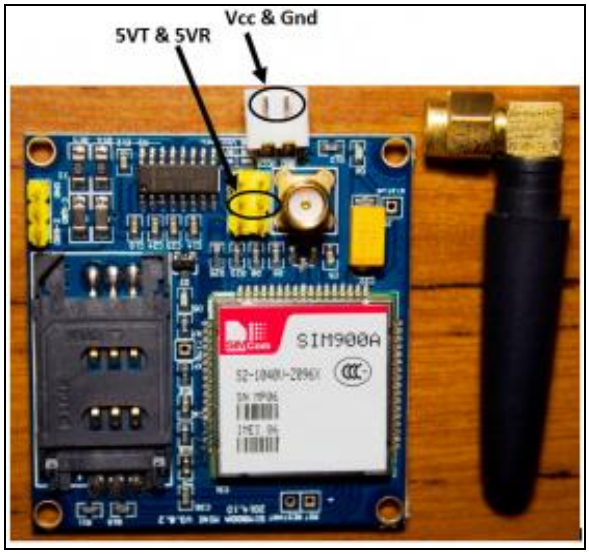

Fig 4: GSM Sim900A

GSM Sim900A

This is an ultra-compact and reliable wireless module. The SIM900A is a complete Dual-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900A delivers GSM/GPRS 900/1800MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mmx24mmx3mm, SIM900A can fit in almost all the space requirements in user applications, especially for slim and compact demand of design.

Important Features
- Dual-Band 900/ 1800 MHz
- GPRS multi-slot class 10/8GPRS mobile station class B
- Compliant to GSM phase 2/2+Class 4 (2 W @850/ 900 MHz)
- Class 1 (1 W @ 1800/1900MHz)
- Control via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands)
- Low power consumption: 1.5mA (sleep mode)'
- Operation temperature: -40°C to +85 °C
- Status indicator (D5): It will flash continuously whenever the call arrives otherwise it is left ON.
- Network LED (D6): This led will blink every second which indicates that the GSM module is not connected to the mobile network. Once the connection is established successfully, the LED will blink continuously every 3 seconds.

DF Player

The DF Player Mini is a small and low-price MP3 module with a simplified output directly to the speaker. The module can be used as a stand-alone module with attached battery, speaker and push buttons or used in combination with an Arduino UNO or any other with RX/TX capabilities.

Specification
- Sampling rates (kHz): 8/11.025/12/16/22.05/24/32/44.1/48
- 24 -bit DAC output, support for dynamic range 90dB, SNR support 85dB
- Fully supports FAT16, FAT32 file system, maximum support 32G of the TF card, support 32G of U disk, 64M bytes NORFLASH
- A variety of control modes, I/O control mode, serial mode, AD button control mode
- Advertising sound waiting function, the music can be suspended. when advertising is over in the music continue to play
- Audio data sorted by folder, supports up to 100 folders, every folder can hold up to 255 songs
- 30 level adjustable volume, 6 -level EQ adjustable

Conclusion

This project is very beneficial and very cheap revolving around already developed communication protocols and system mechanics, providing much needed innovations to sustain an application which can change the picture of medical connectivity in India.

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