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Research Paper

VOICE ANNOUNCER AND MEDICINE INJECTOR

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Abstract - The system is designed for an individual patient the parameters are read through the microcontroller and will be transmitting the information if any parameter goes abnormal through the GSM module to the concern mobile number. The controller is interfaced with the GSM modem to transmit a message to the mobile number along with the parameter details. Automatically medicine injector will be activated and injection will be given in case of emergency. A voice chip will announce if any of the parameter goes abnormal or the injunction is given through the speaker. The heart beat rate and temperature of the patient is continuously monitored will be displayed in the LCD.

1.INTRODUCTION

The project work is designed for "Health monitoring and controlling System with announcement" describes the design and development aspects. Since it is a prototype module and for study purpose the basic concept is proven here, it cannot be used for real applications. Because the sensors used here may not be so accurate. Heart rate must be sensed with high intensity type sensors, because the heart is playing a major role in the human body. The heart beat rate sensor and temperature sensor are connected to the patient and the information is transmitted to the authorized mobile through GSM modem. The concept presented here is aimed to monitor the blood flow through finger tips. For this purpose the finger must be placed between the IR LED and IR sensor. These two devices arranged in a clipping type of device can detect the intensity of blood that is flowing through finger tip. The sensor used here conducts little bit when it detects some IR energy transferred through the tissue of finger tip. The quantity of IR energy delivered from the tissue of finger tip varies according to the blood flow and the conductivity of the sensor depends on the density of blood flow. In this regard the sensor may not conduct fully, depending up on the level of conduction small levels are considered to trigger and generate digital pulse accordingly. The very small changes in reflectivity or in transmittance caused by the varying blood content of human tissue are almost invisible. Various noise sources may produce disturbance signals with amplitudes equal or even higher than the amplitude of the pulse signal. Valid pulse measurement therefore requires extensive preprocessing of the raw signal. The new signal processing approach presented here combines analog and digital signal processing in a way that both parts can be kept simple but in combination are very effective in suppressing disturbance signals. Voice Announcer and Medicine Injector The setup described here uses an amplifier; this amplifier designed with LM358 can detect slight changes in the preamplifier circuit. The sensor output is converted to proportionate voltage level and amplified by an operational amplifier i.e. LM358. The most important physiological parameter monitored in the intensive care unit is the heart rate or shape of the electrical wave from produced by the heart. This is done to observe or to detect changes in the heart rate that might be indicative of a serious condition. Thus, a cardiac monitor is

specifically useful for monitoring patients with cardiac problems and the special areas in the hospitals where they are generally used are known as cardiac care units or coronary care units. The cardio scope is basically similar to the conventional oscilloscope used for the display of waveforms in electronic laboratories. Normally, for monitoring the heart rate ECG machines are preferred, but in this project work an ordinary concept is presented which can gather the pulse rate and transmits a signal through GSM modem.

2.LITERATURE SURVEY

The development of an automatic voice announcer and medicine injector system is inspired by various existing technologies and research in the fields of healthcare automation, embedded systems, and smart medical devices.

Automated Medication Reminder Systems Electronic medication reminder systems that use alarms, buzzers, or voice alerts to remind patients to take their medicines. Used for elderly care and have proven effective in improving medication adherence. However, most basic systems only provide reminders and do not ensure actual medicine intake.

Voice-Based Assistive Technologies Voice-assisted systems have been developed to support visually impaired and elderly individuals. These systems use pre-recorded or synthesized voice messages to guide users. Research shows that voice alerts are more effective than visual notifications, especially for patients with limited literacy or vision problems.

Automated Drug Delivery Systems Devices such as insulin pumps and infusion used for automatic drug delivery. These systems provide precise and continuous medication administration. While they are often expensive and designed for specific medical conditions, limiting their general use.

IoT-Based Healthcare Monitoring Recent advancements in IoT have enabled remote patient monitoring systems. These systems allow doctors and caregivers to track patient health data and medication schedules in real time. Research indicates that IoT integration improves healthcare efficiency but introduces challenges such as data security and dependency on internet connectivity.

Smart Pill Dispensers Voice Announcer and Medicine Injector To organize and dispense tablets at scheduled times. Many systems include alarms and mobile notifications. However, they are limited to oral medications and do not support injectable drug delivery.

Embedded Systems in Healthcare Microcontroller-based systems (such as Arduino or Raspberry Pi) are widely used in healthcare automation projects. These systems provide flexibility, low cost, and ease of implementation. Literature highlights their effectiveness in developing prototype medical devices.

3.EXISTING SYSTEM

Automatic Voice Announcer and Medicine Injector

The existing system of an automatic voice announcer and medicine injector is designed to assist patients in taking medications on time while reducing human error. It integrates audio alerts with an automated drug delivery mechanism Automatic Voice Announcer The voice announcer module is used to notify patients about medication schedules.

It typically includes:

- A microcontroller-based system programmed with medication timings
- A speaker or buzzer for audio output This feature is especially helpful for elderly or visually impaired patients who may forget their dosage schedule.

Medicine Injector System The medicine injector is responsible for delivering the correct dosage at the scheduled time.

It consists of:

- A syringe or pump-based injection mechanism
- Controlled by actuators or motors
- Pre-programmed dosage and timing settings
- Safety mechanisms to avoid overdose In some systems, insulin pumps are a common real-world example of automated injectors.

Working Principle

Voice Announcer and Medicine Injector

- The system is programmed with patient-specific medication schedules.
- At the scheduled time, the voice announcer alerts the patient.
- Simultaneously or after confirmation, the injector administers the required dose automatically.

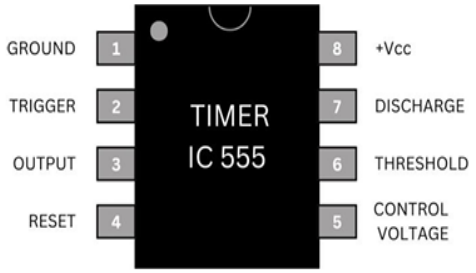
4. IMPLEMENTATION

Hardware Details

The details or data sheets of the important components like IC's other devices used in the project work are gathered from websites. The following are the chips and other important components, whose data sheets are collected and provided

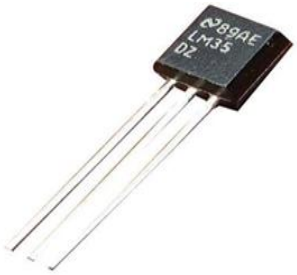
The AT89C52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of Flash programmable and erasable read-only memory (PEROM). Compatible with the 8051 industry standard, it features 256 bytes of internal RAM, 32 I/O lines, three 16-bit timers, eight interrupt sources, and a full-duplex UART.

2. 555 Timer chip



The 555 timer chip is commonly used in medical and communication devices due to its ability to manage precise timing and generate audio frequencies. In medicine injectors, it ensures accurate dosage timing, while in voice announcers, it serves as a trigger or tone generator.

3. LM 35 Temperature Sensor



The LM35 is a precision integrated-circuit temperature sensor whose output voltage is linearly proportional to the Celsius temperature. Unlike thermistors, which require complex calculations, the LM35 is pre-calibrated and provides a simple, direct voltage output.

4. Heart Beat Rate Sensor

A heart rate sensor is an electronic device used to detect and measure the speed of the heartbeat, typically expressed in beats per minute (BPM). These sensors are widely used in fitness tracking, medical monitoring, and electronic projects to provide real-time data on cardiovascular performance. .Voltage regulator In both voice announcers and medicine injectors, a voltage regulator serves as a "power gatekeeper," ensuring that delicate electronic components receive a steady stream of energy despite fluctuations in the battery or power source.

6. GSM modem

A GSM module (Global System for Mobile communication) is a specialized electronic device that acts as a bridge between a host system—like a computer or a microcontroller—and the cellular network. By inserting a SIM card, it allows these systems to perform tasks typically reserved for mobile phones, such as sending text messages, making voice calls, and transmitting data via GPRS

7. BC 547 Transistor

In a Voice Announcer, the BC547 acts as a preamplifier to boost weak audio signals for clearer sound. In a Medicine Injector, it works as an electronic switch to control the motor or solenoid that moves the syringe. Its high sensitivity allows it to trigger these components using very small signals from a microcontroller. It is ideal for these tasks due to its reliable switching and small-signal amplification capabilities.

8. Relays

The Voice Announcer and Medicine Injector is an automated system that monitors vitals like heart rate and temperature using a microcontroller. If abnormalities occur, it triggers a relay to drive a mechanical injector for precise dosing while a voice module provides audible status alerts. This integration ensures rapid medical response and clear communication for caregivers in emergency or home-care settings.

9. DC Motor DC motor drives a plunger or pump to deliver precise medicine dosages through mechanical force. A synchronized voice module then provides real-time audio status or instructions based on the motor's action. Together, they ensure the injection is both physically accurate and easy for the user to monitor.

Software Requirements

The software part of the automatic voice announcer and medicine injector system is responsible for controlling hardware components, scheduling tasks, and enabling communication.

1. Embedded Programming Environment

- Arduino IDE (or similar platform)
- Used to write, compile, and upload code to the microcontroller
- Supports C/C++ based programming

2. Programming Language

- Embedded C / C++
- Used to control sensors, motors, GSM module, and voice system
- Enables real-time operation and hardware interfacing

3. Microcontroller Libraries

- Wire Library – for I2C communication (RTC module)

- RTClib – to interface with RTC module
- SoftwareSerial – for communication with GSM module
- Servo Library – to control servo motor
- DFPlayer Mini Library – for voice playback module

4. GSM Communication Software
   - Uses AT Commands to communicate with GSM module
   - Functions include:
     - o Sending SMS alerts
     - o Receiving messages
     - o Network status checking
5. Voice Module Software
   - Pre-recorded audio files stored in module or SD card
   - Triggered via microcontroller commands
   - Plays specific messages at scheduled times
6. Scheduling Algorithm
   - Software logic to:
     - o Compare real-time clock with stored medication schedule
     - o Trigger alerts and injection at correct time
   - Ensures accurate and timely operation
7. User Interface Software
   - Controls LCD/OLED display output
   - Displays:
     - o Current time
     - o Next dose
     - o System status

5.RESULTS AND DISCUSSION

The Voice Announcer and Medicine Injector system demonstrates significant improvements in patient care by ensuring timely medication intake through automated voice alerts and delivery mechanisms. This reduces human errors such as missed doses, incorrect timing, or double dosing, which are common in manual medication management. The system is particularly beneficial for elderly and disabled patients, as voice announcements assist those with visual impairments or memory-related issues. Additionally, the automation of drug delivery minimizes the need for manual intervention, thereby enhancing accuracy and reliability. Continuous monitoring and reminder features contribute to better treatment adherence and overall healthcare outcomes. Furthermore, the system provides strong support to caregivers, including nurses and family members, by reducing their workload and ensuring consistent patient supervision.

However, the system also has certain limitations. The use of advanced components such as injectors, sensors, and GSM modules increases the overall cost, making it less affordable for some users. There is also a risk of system failure, as hardware or software malfunctions could result in incorrect dosage or missed medication, which may be critical in healthcare scenarios. Regular maintenance, including cleaning, calibration, and technical servicing, is required to ensure proper functioning. The system is highly dependent on a continuous power supply, and any power interruption can disrupt its operation. Additionally, the complexity of setup and usage may pose challenges for elderly users without assistance. Lastly, the system has limited flexibility, as it may not be suitable for all types of medications or emergency situations.

6.CONCLUSION

Voice Announcer and Medicine Injector This project work is completed successfully and the results are found satisfactory. Since it is a prototype module, it has been thoroughly revised taking in to consideration the developments in technology and introduction of new and improved methods of medical instruments for proper diagnosis. The hardware used in this project work were bulky, when this prototype module converted into engineering

model, all bulky components can be accommodated into a single chip and a sleek, portable, good looking module can be made. As the technology advances, particularly in the field of world-wide telecommunication networks, people are expecting improved quality service for various other applications in addition to the personal communications through mobile phones. In this regard GSM modules are developed which can be used for many applications. The use of GSM technology in medical instrumentation has resulted in the integration of automation and built in intelligence in medical instruments to a great extent. The advantages of using GSM processor is that there won't be any range restriction, because the telecommunications network is enhanced to all corners of the globe. In order to understand linkages between the life sciences and engineering techniques, it is necessary for engineers to have a fair understanding about the anatomy and physiology of the human body.

REFERENCES

1. Linear Integrated Circuits – By: D. Roy Choudhury, Shail Jain

2. Digital & analog communication systems – By K. Sam Shanmugam

3. Basic Radio & television By: S. P. Sharma

4. The 8051 Micro-controller Architecture, programming & Applications By: Kenneth J. Ayala

5. Programming and Customizing the 8051 Micro-controller By: Myke Predko

6. The concepts and Features of Micro-controllers By: Raj Kamal

7. Digital Electronics. By JOSEPH J.CARR

8. Electronic Circuit guide book – Sensors – By JOSEPH J.CARR

9. Mobile & Personal Communication Systems and Services By: RAJPANDYA

10. Michael j. point "EMBEDDED C" Pearson education limited 2002.