A INNOVATIVE METHOD OF AUTOMATIC MEDICATION REMINDER FOR OLD AGE PEOPLE

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Abstract: Automatic pills reminder is an instrument developed for elderly patients who need to take medicines in a frequent interval of time without human intervention. This helps the patients to take tablets regularly on their own. The existing technology uses microcontroller, 555 timer. In the proposed system, raspberry pi microcomputer is used. Initially tablets are filled in the container box and the timings are set in accordance with the doctor prescription. When the time arrives the corresponding tablets can be collected from the tray. This project can be implemented in old age homes.

Index Terms - **DC motor, PLC, relays, Sensors, 555 timer, Raspberry pi.**

I. INTRODUCTION

Every year, thousands of senior citizens are placed in nursing homes because they are not taking the tablets at the right time. A pills reminder and organizer can help to prevent these life-threatening mistakes and reminding patients to take the right tablets at the right time. PLC perform various functions such as delaying an action, causing an operation to run a pre-determined period of time and recording the total accumulated time of continuous or intermittent events. The instrument consists of pill containers filled with tablets and dispenser tray for collecting tablet. Initially tablets are filled in the container box and the timings are set in the PLC in accordance with the doctor prescription. Alerting the patients to take tablets on time is essential in the absence of caretakers. The drawback of this system is when the pills are filled in the container some medicines reacts with the atmosphere. This can cause chemical reaction inside the tablets which can alter the dosage of medicine.

II. CHALLENGES

Once when the senior citizen gets up and begin their day, they may get distracted by the hustle and bustle of daily life. It is easy for them to take wrong meds or even skip doses. To overcome this, the Automatic Pills Dispenser is proposed with PLC as the core processor. The timing and alarm operations are done with microcomputer. As it is automated there will not be any confusion among the patients to take their medicine. A notification will be sent through email or message to the caretaker by communication using GSM where messages are sent in the form of push notifications.

III. SYSTEM OVERVIEW

The proposed methodology uses PLC as a core processor replacing microcontroller 8051. The programming used in PLC is ladder logic diagram. The main advantage of using ladder diagram is about simplicity in program structure and more reliable for electronic component.It is a versatile language and adapting to parameter functions over additional systems.
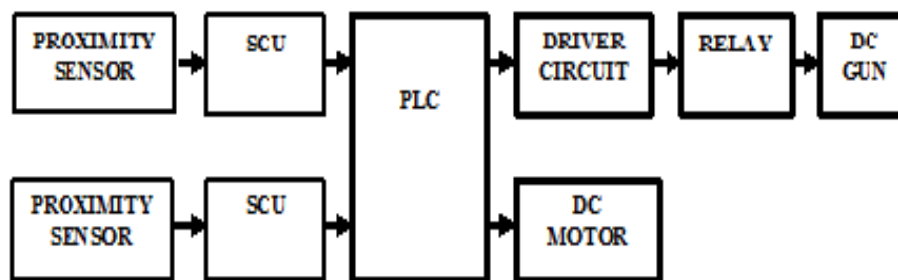

Figure 3.1 Automatic Pills Reminder using PLC

Figure 3.1 explains the block diagram of the Automatic Pills Reminder. The input given to the proximity sensor is the position of the container box. The sensor senses the metal piece when it comes near the sensor face. This signal is controlled using sensor control unit. The signal from the SCU is sent to the PLC and the output of the PLC is given to DC gun and driver circuit. The driver circuit drives the motor and the motor starts to rotate until the container box reaches the dc gun position. Once the DC gun detects the container box it ejects the pill from container.

PLC- programmable logic controller:PLC is a specialized computer for control operations. The specific functions of PLC include ON/OFF control, timing, counting, sequencing, arithmetic, and data handling. In our project, the power supply of PLC is an essential component to run PLC. The timer control operation is done by PLC where the timer is set during programming. Operating voltage is from 12V DC. It provides an isolated DC supply to DC input circuits, switches and other indicators. The overall supervision of the PLC operation is done by CPU. A bus system carries information from CPU.
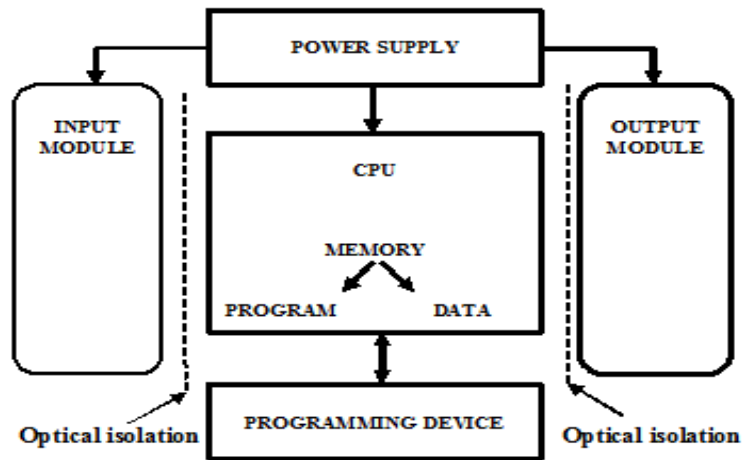

Figure 3.2 PLC architecture

When the power supply is on, DC motor rotates. The input to sensor is the metal piece and signal is sent to PLC and so the Normally Open contact of relay become Normally Closed. Therefore the actuator pushes the tablet into the funnel. The actuator is set with 0.5 sec time delay. When actuator comes to its original position DC motor starts its rotation in 1 min delay. The step down transformer of 30 V DC is rectified to 24 V DC power supply and given to the PLC. Auto transformer of 12 V DC is given to relay circuit.

IV. RESULT ANALYSIS

This chapter discusses about the analysis instrument. The following are the experimental results. The experimental setup consists of PLC controller, DC motor, DC gun, inductive proximity sensors.

Table 4.1: output analysis

RELAY ACTION	DC MOTOR CONDITION	ACTUATOR
ON	STOPS	TABLET IS PUSHED
OFF	ROTATES	OFF
ON	STOPS	OFF

Trail 1
When the motor is on rotation, relay action takes place. When relay is switched on motor stops and actuator pushes the tablet.
Trail 2
Again the motor started rotating, both the relay and the actuator was in OFF position.
Trail 3
In trial 3, relay is on, motor stopped its rotation. Actuator failed to push the tablet.

V. CONCLUSION

The Automatic Pills Reminder works with the help of PLC. Here, the timer control action is employed using PLC for accuracy and versatility. The main drawback in this project is that it is not cost efficient. Therefore PLC can be replaced by Raspberry pi controller.The governance of the patient is acknowledged with the message to their mobile phone when the patient has taken the tablets from the tray. This is done by the IoT using Raspberry pi controller.

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