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# IoT Enabled Smart Medicine Dispenser for Aged and Differently Abled Person

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**ABSTRACT:** This project proposes a novel idea to provide information automatically to patients to take their right dosages at appropriate time. Now a days, most of the patients may forget to take their medicines as per the prescription due to mental stress. Hence, it may cause prolong period to recover from the diseases. Sometimes, the aged patients are gulping tablets and their dosage level incorrectly causing a severe problem. Therefore, it is necessary to the patient to take proper medicines at precise quantity and time. To overcome these problems, a novel Smart Medication Dispenser (SMD) system is proposed. This system uses ATmega328p and ESP8266 Integrated circuit Microcontroller, LCD display and Real Time Clock (RTC) module, GSM module and an alarm system, Buzzer, Servo motor, Switch press button, Web page, Mobile app used to intimate the patients to take proper dosage according to the prescription at right time. This portable and economical SMD system would help aged patients, especially to the illiterate patients. When the LED is used to indicate the medicine or pill is expired or not. When the buzzer is used to provide an alert sound via mobile phone and their hardware component to take the pills at proper time schedule. If the person or patient not take the pills at a time, the buzzer provides a long sound to take the pills. Intake and not taking a pills information are send to the caretaker or related person via mobile app using TCP/IP Protocol in Cloud. The caretaker calls the person via mobile phone to take a medicine at a proper time. If the amounts of pills in the pill box is shorted or limited, automatically send a message to medical shop to deliver a require pills at a time.

**KEYWORDS:** Arduino, Servo motor, WiFi Module, GSM, IOT cloud.

## I. INTRODUCTION

Medication adherence is a growing concern throughout the healthcare industry with doctors, healthcare systems, and other stakeholders (insurance companies) since the elderly or senior patients' medication has a big issue of drugs misuse. It is very likely for them to forget to take their pills on time. Especially, those who take multiple medications at the same time.

Also, they might take wrong dosage accidentally which may lead to unfortunate consequences such as death. This is a clear proof that it is a widespread problem and clearly related to adverse patient outcomes and higher healthcare costs. The main purpose of SMD system is to help the patients, primarily seniors, take their medications on time in an easy way without the possibility of missing pills.

We started with these basic needs user and came up with a solution using ATmega328p and ESP8266 integrated circuit is used to manage the pill's dispersal and a proximity sensor to read and allow access of only a valid key to have the pill's dispensed. With this there are endless possibilities to where, how and when this pill dispenser could come to help an aid many different kinds of people in their lives. With the addition of a buzzer this pill dispenser can also remind you when to take your pills, and also notify others when your pills have not been taken. Below is just the beginning of some of the basic functions an accessed controlled pill dispenser could achieve.

## II. LITERATURE SURVEY

According to Mira et al (2015), the most common patient medication errors include: incorrect dosage, poor medication mix-up, and taking out of date and inappropriately stored drugs. Roughead et al. 2016 analyzed existing data and literature on medication errors in Australia, and found that 2-3% of hospital admissions were related to medication errors and non-adherence. McCarthy et al (2013) studied the use of patient-centered prescription label instructions as a means of improving adherence, and found that patient instructions/education play a major role in medication adherence. The potential costs of delivering incorrect doses or medications from the dispenser are extremely high. It would not be outlandish for this error to result in a hospital visit or death. Therefore, we take responsibility in “in making decisions consistent with the safety, health, and welfare of the public” as per IEEE Code of Ethics, #1. With the correct automation and double checking, these mistakes could be avoided with our system. As spoken about above, if used correctly this product takes 30 potential opportunities for error each month and shrinks it into one step. Also, our multilayer design of power supply is a standard practice intended to minimize any chance of fire hazards. A pill dispenser was created using a combination of infrared sensors and Arduino microcontroller with alarm system to help the patients take their pills at the correct time. The alarm system was implemented using a popup notification on smartphone. Pill-Mate-Medicine reminder is a device that uses both audio and visual signals to notify users to take medicines at a pre-set time.

A large plethora of medication assistance devices or system can be found in the market, majority of them are manual medication assistants which includes “pill trays” that hosts multiple containers to store medication. Each container is dedicated to hold medication for a single time, many such containers are grouped together forming a tray that serves medication for a period of 28 days. There is no provision of intimating the time of taking the medicine.

H. Yeh et. Al explained about APAMAT, A Prescription Algebra for Medication Authoring Tool. This tool includes The tools include prescription entry systems, authoring, scheduling, and pill dispenser. Authoring tool helps pharmacists to collect and integrate prescriptions given by clinicians, to verify drug-drug interactions amongst them, and to generate the corresponding scheduling instructions for dispensers.

Debiao, discussed about the design of parallel pharmaceutical automatic dispensing (PPAD) machines that are widely used in central fill pharmaceutical units to improve the prescription dispensing speed and accuracy. The objectives of the design by Debiao are to minimize the makes pan and collation delay. Many devices emerged into the market and can schedule the dispensing of medicines based on clinician’s prescription and can be monitored through Internet.

## III. EXISTING SYSTEM

In our existing system, the number of pills are stored manually with the help of human interaction. when the person take pills in dispenser without providing the proper dosage of the pills or medicine. The incorrect dosage of the pills cause may unwanted problems in our body. When the system send a alert message or sound to particular person via pill dispenser system to take a medicine at proper time period. The intake and not taking message are displayed in the LCD display.

### *(i). Demerits of existing system*

The main drawback of this application does not predict the expiry date of the medicine. The pills dispenser does not automatically send the notification or message to medical shop to deliver the limited medicine at proper time period.

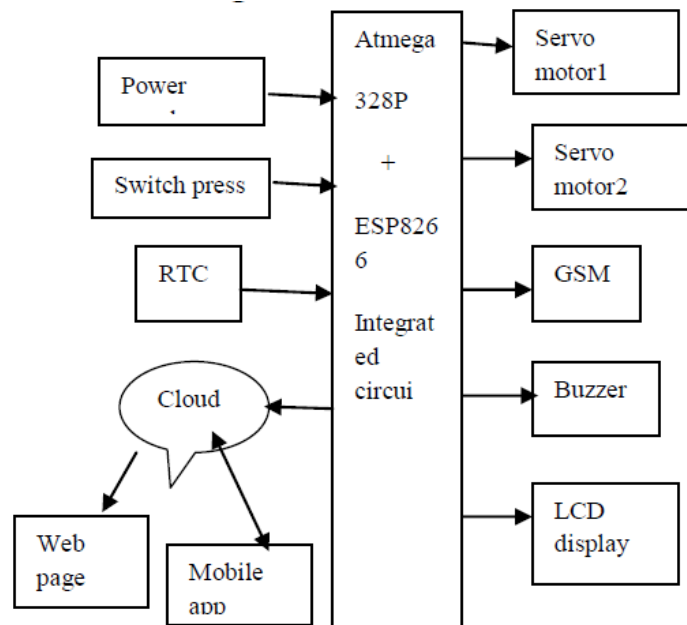
## IV. PROPOSED SYSTEM

The architecture of proposed system as shown in the figure. It consists of ATmega328p+ESP8266 Integrated circuit as a main source and it receive input signal from the switch press, the required amount or number of the medicine deliver to the person. The components are Power supply, RTC, Switch press, servo motors, buzzer, GSM, LCD display, mobile app are used.

When the notification of intake and not take message does not send to the caretaker and does not intimate to take a supply, RTC, Switch press, servo motors, buzzer, GSM, LCD display, mobile app are used.

When the buzzer is used to send an alert message or sound through mobile and alarm sound, at a time to take a medicine remember to that person. Servo motor is used to rotate require pills. LCD display is

used to display the intake and not take details. Internet of things is used in this project. It is used to send a message to registered contact number and medical shop. If the pills are limited automatically send a message to medical shop and deliver the pills at required time. Expiry pills also sensed using the sensor. Intake and not take pills details also send to the care taker, that person call via mobile to take a medicine at proper time.



**Fig. No.1: Block diagram of Proposed System**

#### (i).ESP8266 Micro Controller

ESP-12E Wi-Fi module is developed by Ai-thinker Team. core processor ESP8266 in smaller sizes of the module encapsulates Tensilica L106 integrates industry-leading ultra low power 32-bit MCU micro, with the 16-bit short mode, Clock speed support 80 MHz, 160 MHz, supports the RTOS, integrated Wi-Fi MAC/BB/RF/PA/LNA, on-board antenna. The module supports standard IEEE802.11 b/g/n agreement, complete TCP/IP protocol stack. Users can use the add modules to an existing device networking, or building a separate network controller. ESP8266 is high integration wireless SOCs, designed for space and power constrained mobile platform designers.

#### Features

- 802.11 b/g/n
- Integrated low power 32-bit MCU
- Integrated 10-bit ADC
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- Supports antenna diversity

#### (ii).ATmega 328P

ATmega48A/PA/88A/PA/168A/PA/ 328/P is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega48A/PA/88A/PA/168A/PA/ 328/P achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

#### Features

- \* High Performance, Low Power Atmel®AVR® 8-Bit Microcontroller Family
- \* Advanced RISC Architecture
- #131 Powerful Instructions **DS1307 64 x 8 Serial Real-Time Clock Features**



- 56-byte, battery-backed, nonvolatile (NV) RAM for data storage
- Two-wire serial interface
- Programmable squarewave output signal
- Automatic power-fail detect and switch circuitry
- Consumes less than 500nA in battery backup mode with oscillator running Optional industrial temperature range: -40°C to +85°C

**(iii).DS1307 64 x 8 Serial Real-Time Clock**

The DS1307 operates as a slave device on the serial bus. Access is obtained by implementing a START condition and providing a device identification code followed by a register address. Subsequent registers can be accessed sequentially until a STOP condition is executed. When VCC falls below 1.25 x VBAT the device terminates an access in progress and resets the device address counter. Inputs to the device will not be recognized at this time to prevent erroneous data from being written to the device from an out of tolerance system. When VCC falls below VBAT the device switches into a low-current battery backup mode.

**(iv).BUZZER**

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or key stroke.

Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices.

**(v).LCD Display**

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life, either at PCO's or calculators. The appearance and the pin outs have already been visualized above now let us get a bit technical.

**(vi).MIT App Inventor**

App Inventor lets you develop applications for Android phones using a web browser and either a connected phone or an on-screen phone emulator. The MIT App Inventor servers store your work and help you keep track of your projects.

The App Inventor development environment is supported for Mac OS X, GNU/Linux, and Windows operating systems, and several popular Android phone models. Applications created with App Inventor can be installed on any Android phone.

**(vii).Arduino**

Arduino first and foremost is an open- source computer hardware and software company. The Arduino Community refers to the project and user community that designs and utilizes microcontroller-based development boards. These development boards are known as Arduino Modules, which are open-source prototyping platforms. The simplified microcontroller board comes in a variety of development board packages.

## V. EXPERIMENTAL RESULTS

When the Smart Medicine Dispenser is used to give the pills to a person correct dosage at a correct time. It is used to take a pills periodically without fail. The Mobile app and App inventor are used to set a time, date, types of the pills or medicine in the proper order. The alert message sent through the mobile and pills dispenser.



Fig. No.2: Date and time to take pills

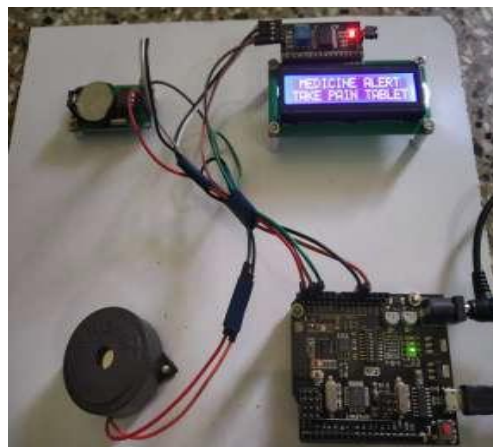


Fig. No.3: Display pills name and alert message



Fig. No.4: Expiry date of pills



## V. CONCLUSION

This Project is all about the existing applications for Pills dispenser and comes out with an innovative idea to take a correct dosage pills at correct time without fails to a patient and person. This will help to solve them technology with compact equipment and ideas. Using screaming alarm and also alerting the message to take a pills proper time period. To overcome under or high dosage pills and expiry pills to take a person.

## REFERENCES

- [1]. D.Howcroft and N.Mitev, "An empirical study of Internet usage and difficulties among medical practice management in the UK," *Internet Res.*, vol. 10, no. 2, pp. 170–181, 2000. 11
- [2]. Hsiu-Ling Tsai , Chun Hsiang Tseng , Long-Cian Wang , Fuh-Shyang Juang "Bidirectional Smart Pill Box Monitored Through Internet And Receiving Reminding Message From Remote Relatives", 2017 IEEE International Conference on Consumer Electronics - Taiwan (ICCETW).
- [3]. H.Yeh, P.Hsiu, C.Shih, P. Tsai and J. W. S. Liu, "APAMAT: A Prescription Algebra for Medication Authoring Tool", 2006 IEEE International Conference on Systems, Man and Cybernetics, Taipei, 2006, pp.4284-4291. doi: 10.1109/ICSMC.2006.384807.
- [4]. Ieee.org, "IEEE Code of Ethics",2016.[Online].Available: <http://www.ieee.org/about/corporate/governance/p7-8.html>. [Accessed:02Oct2017].
- [5]. Ligo, George. "Interfacing LCD with Atmega32 Microcontroller Using Atmel Studio." *Electro Some*, 20 May 2013, [electrosome.com/interfacing-lcd-atmega32-microcontroller-atmel-studio](http://electrosome.com/interfacing-lcd-atmega32-microcontroller-atmel-studio).
- [6]. Mathur P. (2019) Key Technological advancements in Healthcare. In: *Machine Learning Applications Using Python*. Apress, Berkeley, CA.
- [7]. McCarthy, D. M., Davis, T. C., King, J. P., Mullen, R. J., Bailey, S. C., Serper, Wolf, M. S. (2013). Take- Wait-Stop: a patient-centered strategy for writing PRN medication instructions. *Journal of health communication*, 18(sup1), 40



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