**ARDUINO BASED SMART MEDICAL PILL BOX WITH VOICE AND DISPLAY REMAINDER FOR PATIENTS**

### PROJECT REPORT

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to

*The APJ Abdul Kalam Technological University*

*in partial fulfilment of the requirements for the award of the Degree*

*Of*

Bachelor of Technology

in

*ELECTRONICS AND COMMUNICATION ENGINEERING*



# Department of Electronics and Communication Engineering

# VIMAL JYOTHI ENGINEERING COLLEGE

# CHEMPERI

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**DECLARATION**

We undersigned hereby declare that the project report “ARDUINO BASED SMART MEDICAL PILL BOX WITH VOICE AND DISPLAY REMAINDER FOR PATIENTS”, submitted for partial fulfilment of the requirement for the award of degree of Bachelor of Technology of the Kerala Technical University, Kerala is a bonafide work done by us under the supervision of Dr. Jayesh George M. The submission represents our ideas in our own words and where the ideas or words of others have been included; we have adequately and accurately cited and referenced the original sources. We also declare and we have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in our submission. We understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously formed the basis for the award of any degree, diploma or similar title of any other university.

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# CERTIFICATE

This is to certify that the seminar report entitled **“ARDUINO BASED SMART MEDICAL PILL BOX WITH VOICE AND DISPLAY REMAINDER FOR PATIENTS”** submitted by **GEETHIKA T, SAISHNA SHAMEJ, SANATH K, SHILPA M NAIR** to the APJ Abdul Kalam Technological University in partial fulfillment of the requirement for the award of the Degree of Bachelor of Technology in ELECTRONICS AND COMMUNICATION ENGINEERING is a bonafide record of the seminar work carried out by her under our guidance and supervision. This report in any form has not been submitted to any other University or Institute for any purpose.

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**ABSTRACT**

In this Smart Medicine Pill Reminder Project, we are using an Arduino board, APR33R3 Voice playback module connected to Amplifier and this connected to Speaker, we have an LCD also to display that.the main intention before developing this project is to usually remind the medicines which have to be taken in the daily schedule and it is especially useful for old age people, patients, and busy people.

The objectives of this project are to develop a prototype of a smart medicine reminder for elderly people that helps them consume the medicines right on time.

In recent times, the rate of consumption of medicines has highly increased due to the wide spreading of different diseases and illnesses across the globe. While some diseases are temporary, many diseases have a toll on human health for a lifetime. In the pursuit of maintaining a healthy lifestyle, we often find ourselves to be sick.

This could be threatening if not properly treated. A visit to the doctor and consumption of the medical prescription becomes a necessity. Nevertheless, failing to consume the medicine regularly could cause a lot of problems. Keeping in mind this problem, the idea of creating a smart device that alerts the patient to take medicines right on time, so that they would recover soon and stay healthy without any issues in the body

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**CHAPTER 1**

**INTRODUCTION**

The autonomy of patients is a hot topic nowadays. Researchers are working to improve, not only this factor, but also the easy monitoring of the patient. Thus, the proposed system consists of a safety-related medical box that can alert the patient, via a phone application, about the time to take his medication and if the correct medicine dose was taken, the number of remaining pills in the box and auto-locks the box to keep the medicine out of reach of children.

This system is, for sure, not the first one that helps monitoring and assisting patients. Several previous published works have proposed such systems as the design of smart homes fully equipped by sensors, the monitoring of patients’ walk and fall, the telemedicine systems that monitors patients from home, and much more.

Added to that, as mobile phones are playing an important role in today’s life, the connection of such medical systems to mobile devices is increasing dramatically due to the ease monitoring and alarm generation.

As a human-related system is proposed, the safety and reliability issues are to be considered. These features must be provided mainly when transmitting data whether by making sure of the correct data delivery or the exact receiving part.

These terms were already defined by IEC (International Electro-technical Commission) in 1977, then in 2007 for medical devices. It is defined as being any device connected to a patient in order to monitor, analyze and/or treat them.

Even though medical boxes systems were presented in several previous works, none of them has integrated safety and reliability to the system; neither system duplication nor hardware failure measures were proposed by the developed systems.

Thus, this system deals with these inquiries: although it is a low-cost device, it is able to communicate through a phone application and to remind patients to take their correct medication dose on time. All these features are integrated while keeping a special attention on the system safety and failure safe state.

The fast-paced life of people has always taken a toll on the people. The irony is that the new medicines are found for the never-ending chain of diseases. These new diseases often require timely medication and course therapy for curing. But the busy life schedule of the people often let down the best procedure. Most common reason for the failure of a method of cure is the failure of the patient to administer the dosage in the right proportion and at right time.

The new awaited feature in these so-called intelligent pill boxes is the availability of the automated alert system for the chemist to send the re-fill of the tablets. With the GSM technology, we are able to connect to most people around the planet. So, a link between the patient and the chemist is employed using GSM. Also, it is not convenient for a fixed device to alert the patient nowadays. So, portability is a necessity in this device.

* 1. **Objective**

The main objective of smart medicine pill box is to remind the elderly people that helps them consume the medicines right on time. The pill box will also give us the information for the re filling of the box. The box will help us to detect the over dosage of the medicine or the wrong dosage that is been used.

**CHAPTER 2**

**LITERATURE REVIEW**

According to World Health Organization, over 80% of the people above the age of 60 years are prescribed medicines that are to be administered 2 - 4 times a day. With the increase in Cardio vascular diseases and Diabetes among the peer group regular medicine administration

has become a necessity. But among this another 40-60% is having the issues related to forgetting the taking of medicines at right time.

The current common techniques used in market for the reminder includes the normal alarm with a pill box. But this does not check for overdose and wrong dosage among the patients.

It only uses a clock, which on passage of a set time generates an alarm. Moreover, the timely alerting for the re-filling of the pill box to user is also absent resulting

often in breaks in the course of therapy.

The sensing of slots of the pill box can be done by both Load Sensing methodology and by Light based sensing. The advantages of the slot-based sensing are that individual moment sensing is possible for detecting over dosage problems and incorrect dosage issues. The survey for various modes of sensing the slots has been performed both analytically and practically and comparisons between the modes have been performed.

An advanced medicine box monitoring, analysis and control system is proposed in this paper. The latter design is based on a smart and safe medical box that assists patients in taking their pills treatment on time. Two main functionalities characterize this system: safety which assures the wellbeing of the patient and the good functioning of the system by duplicating the electrical components and the security that helps keeping the medication out of the reach of the children by automatically looking the medical box whenever the patient takes his pills. This system can also be monitored by the patient parents as it will be linked to a phone application. This application will be used to configure the medical box by calculating the weight of each pill, setting the schedule of medical intake, alarming the user of the number of remaining pills, generating alarms whenever the patient does not take the required number of pills or doesn’t take them at all, and so on… This system was implemented and tested by more than 50 patients who were taking several medication types (each one of them takes one medication only) and were using different mobile phone. The overall results were very acceptable with a faulty alarm generation below 3%.