VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

"Jnana Sangama, Belagavi-590018"

Design and Prototype of Smart Automated Pill Dispenser

A Project Report

Submitted in Partial Fulfillment of the Requirement for the

award of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

BY

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Under the Guidance of

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2017 – 2021

DECLARATION

We declare that the matter embodied in this report is a bonafide record of fully independent and original work carried out by us at the Department of Mechanical Engineering, Dr T Thimmaiah Insitute of Technology, Bangalore, under the guidance of **S. Suresh Kumar**, during the period 2017-2021.

The matter contained in this report has not been submitted elsewhere for the award of any degree.

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Certified that the project work entitled **"Design and Prototyping Of Smart Automated Pill Dispenser"** carried out byby Mr. R HEMANTH KUMAR (1GV17ME015), S. KISHORE RAJ (1GV17ME020), WASI ULLA KHAN JUNAID (1GV17ME036) and S. SUBASHKARAN (1GV18ME417), a bonafide students of Department of Mechanical Engineering, Dr T Thimmaiah Institute of Technology, in partial fulfillment for the award of **Bachelors Degree in MECHANICAL ENGINEERING**, of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY**, **BELAGAVI** during the year **2017-2021.** To the best of our knowledge, the work reported has not been submitted by me elsewhere for the award of the degree and is not the repetition of the work carried out by others.

Certified that the above declaration made by us is true to the best of our knowledge.

Signature
Professor and Head

Dr T Thimmaiah Insitute of Technology

Department of Mechanical Engineering

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CERTIFICATE

We hereby declare that the work to be submitted in the project is in line with the synopsis and topic, **"Design and Prototyping Of Smart Automated Pill Dispenser**". The project work to be submitted to the institution is the original work and has not been submitted by us anywhere and to the best of our knowledge has not been carried out by anybody else and reported.

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Date:

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DECLARATION

We hereby declare that the project work embedded in this report entitled, **"Design and Prototyping Of Smart Automated Pill Dispenser",** which is submitted for the award of the degree of **Bachelor's** in **Mechanical Engineering** under the Visvesvaraya Technological University, Belagavi, has been carried out under the guidance of **S. Suresh Kumar,** Associate Professor, Department of Mechanical Engineering, Dr T Thimmaiah Insitute of Technology, KGF-563120, Karnataka India, further declare that the Thesis is based on team work, which is previously unpublished. We also declare that the results of this work have not been submitted in part or in full for the award of any diploma or degree of this or any other institution.

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The ancient Vedic Seers of India declare:

"Gurubrahma Guruvishnuhu Gurudevo Maheswaraha,
Gurussakshaat Para Bramha Tasmai Shree Gurave Namaha"

Loosely translated, this means "Teacher is the creator, preserver, path guider and dissolver. A teacher is verily supreme absolute". Blessed as we are by such teachers,We like to offer my sincere "Pranams" to them.

Gratitude is the hardest feeling to express and one does not find ample words to convey that one feels. It gives us incredible contentment in acknowledging the priceless support extended to us by various persons in the successful completion of our project.

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Our special regards to the faculties because of whose teaching at different stages of education has made it possible for us to see this day. Because of their kindness we feel, was able to reach a stage where we could write this report.

Before concluding, though to only some of them it was possible to give particular mention here, We would like to thank everyone who has directly or indirectly helped us to achieve our aspiration.

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LIST OF ABBREVIATIONS

- SAPD – Smart Automated Pill Dispenser.
- NCD – Non Communicable Diseases.
- PLC – Programmable Logic Controller.
- PVC – Poly vinyl Chloride.
- IOT – Internet of Things.
- SMD – Smart Medicine Dispenser.
- ARD – Arduino Uno.
- IR – Infrared Rays.
- LCD – Liquid Crystal Display.
- LED – Light Emitted Diode.
- CNC – Computerized Numerical Control.

ABSTRACT

In this era of modern medicine where humans are largely dependent on the use of pills/tablets we know at least 1 or more who have to take their medication in the form of pills/tablets in order to live a healthy life.

In this project, we focus on a Smart automated machine which will help a person to take his/her pills on time according to a schedule and mainly focusing on making sure that your loved ones who are either old aged or having memory loss or have difficulty in remembering the medicine schedule take their pills on time from the touch of your phone around the world.

The project includes designing and fabrication of the body and the parts of the final product. Design will be done using software's like Solid Works or AutoCAD. The physical product will have PLC circuits and a Bi-directional rotating mechanism which will be enclosed inside the body of the product. This product will also be WI-FI enabled and has a dedicated smart app which can be downloaded on the phone. It also has a colored LCD panel screen which is mounted on the body and be accessed with the buttons provided on the body.

CHAPTER - I

INTRODUCTION

In this era of **modern medicine** where humans are largely dependent on the use of pills/tablets we know at least 1 or more who have to take their medication in the for a long term period in order to live a healthy life.

In this project, we focus on a **Smart Automated Machine** which will help a person to take his/her pills on time according to a schedule and mainly focusing on making sure that your loved ones who are either old aged or having memory loss or have difficulty in remembering the medicines schedule take their pills on proper time from the touch of your phone around the world.

The project includes designing and fabrication of the body and the parts of the final product. Design will be done using software's like **Solid works** or **AutoCAD**. The physical product will have **PLC** circuits and a **bi-directional** rotating mechanism which will be enclosed inside the body of the product. This product will also be **WI-FI** enabled and has a dedicated smart app which can be downloaded on the phone. It also has a colored **LCD** panel screen which is mounted on the body and be accessed with the buttons provided on the body.

1.1 HISTORY

I. Wanger pill dispenser patent model (1964)

David P. Wagner received his patent (number 3,143,207) for "medication dispensing means" on August 4, 1964. Wagner was prompted to invent the device when he and his wife had trouble remembering if she had taken her daily pill. The patent covered a variety of uses for a device that "aids the taking of a medication by an individual on an irregular schedule.

Fig. 1.1 Wanger Pill Dispenser

II. GMS Med-e-lert 28 Day Automatic Pill Dispenser

The med e-alert is an easy to use locked automatic pill dispenser from e-pill medication reminders. When it is time to take your medications, the device will alarm, prompting the patient to turn the device over, dispensing medications in a cup or their hand. The original made in Sweden remains popular after 18 years on market.

Fig. 2.2 GMS med e-alert automatic pill dispenser

1.2 REASON FOR SELECTION

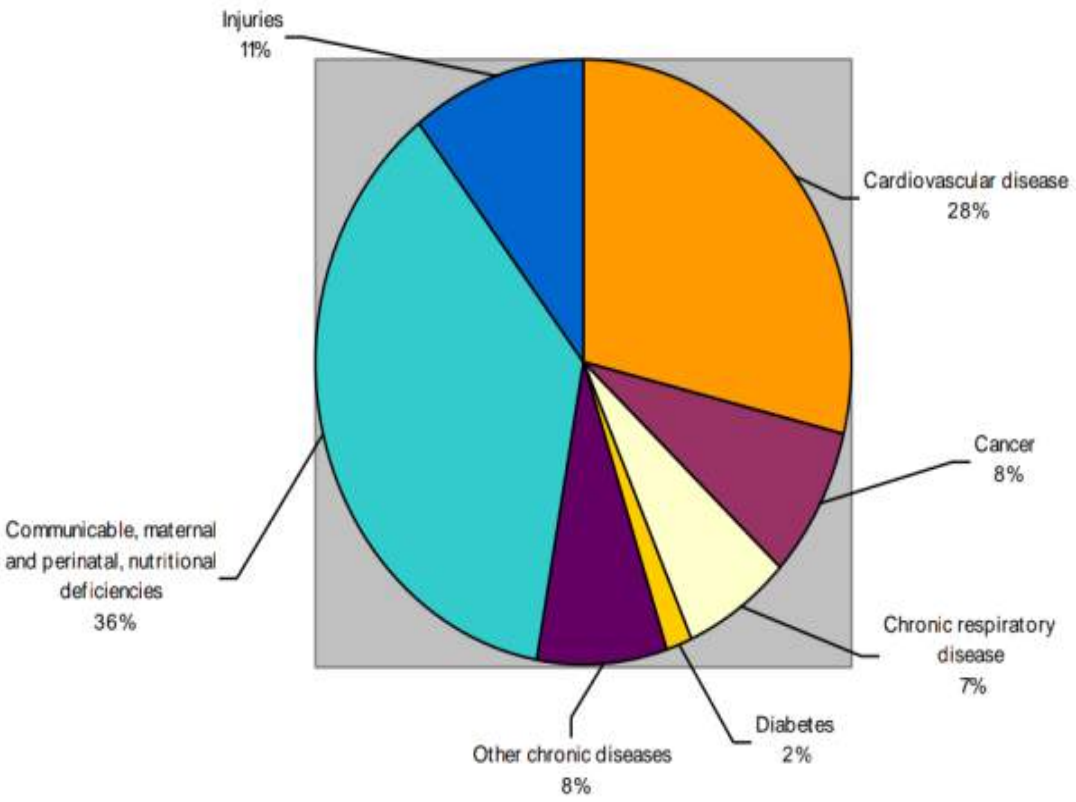

Fig. 1.3 Pie-chart of chronic diseases

- By not taking your medicines as prescribed by a doctor or a pharmacist could lead to your diseases getting worse, hospitalized or even death.
- Every doctor handling a chronic patient suggests to keep a medicine calendar with a pill bottle and note each time one takes a dose.
- In the past 10 years, India has become the third country in the world with the most number of cancer patients.
- It is rather sad that today, most of us either know someone or know of someone who suffers from one or more chronic diseases like diabetes or hypertension or cancer or other stress-induced reproductive health complications
- Hence, we have come up with an idea of an automated pill dispenser which specifically helps the chronic patients to take their medication and monitor it at a required time.

1.3 REQUIREMENTS FOR THE PROJECT

The project is in the initial stage so the requirement for this project still yet to be discovered. Hence the tentative requirements are listed below.

- Servo Motors.
- PLC circuits.
- Proximity sensors.
- Thermo sensors.
- Buzzers.
- LCD/LED display unit.
- 888 7-line segment display.
- Raspberry pie programming chip.
- Arduino Programming chip.
- Smart built App using JAVA/KOTLIN.
- Tablet Cartridges.
- PVC Fiber Plastic

CHAPTER- 2

2.1 LITERATURE REVIEW

In this section we are going to see the Literature study on our concept that was previously done by some engineers, scientists and other personalities. Our literature study includes mainly 4 articles they were:

1. Smart Pill Box Health Care System.
2. Improving healthcare using Smart Pill Box for Medicine Reminder and Monitoring System.
3. A Comprehensive Approach for a Smart Medication Dispenser.
4. Design and Development of Smart Medicine Box.

1. **A Comprehensive Approach for a Smart Medication Dispenser(July 2019)**

   By *Abdallah Kassem , Wissam Antoun , Mustapha Hamad and Chady El-Moucary.*

   This paper presents a comprehensive approach for a Smart Medicine Dispenser (SMD) prototype. The main purpose of the proposed system is to help patients, mainly seniors and elderly people, take their medications on time in an easy manner without the possibility of skipping pills and thus reducing the risk of accidental over/under dose treatment.

   An Android application is developed that is responsible for controlling the whole system as it constitutes a data base awaited to be synchronized and on synchronization the data is sent by the application that determines which motor should be rotated.

2. **Improving healthcare using Smart Pill Box for Medicine Reminder and Monitoring System** by *Diaa Salama, Abdul Minaam.*

   This paper consists on the conception, design and creation of a pillbox prototype intended to solve the deficiency in the medical area as it has the ability of sorting out the pills by itself.

   The medication pill box is focused on patients who frequently take medications or vitamin supplements, or attendants who deal with the more seasoned or patients.

It has 9 compartment boxes as the previous paper consists three and it has alert remainder set through android application. The pillbox will remind clients or patients to take pills utilizing sound and light.

3. **Smart Pill Box Health Care System (July 2018)** by *Nidhi Solanki, DR. P. H. Zope.*

   This Smart Pill Box was designed using GSM technology by which the system sends SMS alerts to the consumers or patients to their mobile phones like a remainder message.

   They used a pill box system containing three separate small pillboxes. Each box has a led display placed on the box. For the pill system, the user can store up to three different types of pills, which can be stored in those three small separate boxes.

   There main objective was to provide fast curing of patients by taking medicines on time in an appropriate dosage and in an efficient manner.

4. **Design and Development of Smart Medicine Box(2018)**

   By *Ekbal Rosli and Yusnira Husaini.*

   This smart medicine box was designed and develop to help the introvert patients taking their medicines without the help of others. They developed a robot which replaces the nurses in the hospital which avoided emotional disturbance in between the nurses and the introvert patients.

   They used IOT technology to control the medicine box which used sensors and robotic programming to store the data base and response would take place based on the data given by the patient or the nurse whose attends the patients.

2.2 PROBLEM DEFINITION

As the people are getting busier these days with their own lives, they don't have time either to take care of them or their loved ones and tend to forget the medicines to be taken at proper schedule and dosage.

This is a common problem seen in elderly aged people where they forget to take their medicines on time and they can be some uncertainties in their dosage of medication.

These may led to lots of complications as time goes further and especially if he/she is a chronic patient, it may led to unexpected incidents like death or disability.

Not only talking about general human life, the same problem arises in hospitals where a nurse has to attend number of patients at a time and chances are high that the nurse can go wrong with the pills to be given to the patients and she might even miss the period of interval that the pill has to be given to the patients.

Therefore to avoid such incidents we are introducing a smart automated pill dispenser that would dispense pills to the patients on time and in correct dosage by alerting them through their android devices and a loud alarm going on in the device itself.

So there would be an alertness and intimation given to the patient to take their medication correctly even if the nurse fails to attend the patient or even if he/she forgets about the pills.

In short our problem definition would be to tackle the problem of medical or drug adherence

2.3 OBJECTIVES OF THE WORK

The Objectives of the work can be broadly viewed as follows:

- To select appropriate materials used to design the SAPD.
- To select appropriate mechanism and program for actuating the device.
- To design and Fabricate Automated Pill Dispenser.
- To develop a working prototype
- To improve and simplify medical adherence.

CHAPTER-3

DETAILED METHODOLOGY

The detailed methodology can be explained using a detailed flowchart as shown below in the figure (2.4).

According to the flow chart the process can be further elaborated as each block segmental procedure

1. Purpose

The purpose of the work is to help the patients to take their day to day pills on time and in correct dosage in regular intervals.

2. Survey of the Purpose

The need for survey is to come to a clear idea how the people are suffering from their negligence and ignorance of just not taking pills on time and on regular intervals.

On study it is statically proven that non-communicable diseases (NCD) especially cardiovascular diseases and diabetes mellitus were found to be the leading cause of mortality worldwide. Morbidity, mortality, and disability attributable to major NCDs account for almost 60% of all deaths and 47% of the global burden of disease.

The majority of deaths occur among low and middle income countries like India and China. **NCDs account for 53% of all deaths in India**. One of the major strengths of study was the use of validated scale to measure medicine adherence. However, we could not get the exact pill count missed as the tool used to measure adherence has questions related to forgetfulness or carelessness and attitude of the patients toward drug intake. Higher response rate (93.8%) and exploring barriers to nonadherence for multiple NCDs also add to the strength of the study.

3. Effect of the Survey

The effect of the survey was divided by two segments namely:

- Chronic patients
- Impaired Ability

The main aim of this project is that it will be a great use to the chronic patients whose lives are led by having their day to day pill and according to the survey study, Of the estimated 10.3 million deaths that occurred in India in 2004, 1.1 million (11%) were due to injuries and 5.2 million (50%) were due to chronic diseases.

Mortality rates for people with age-specific chronic diseases are estimated to be higher in India than in high-income countries. In 2004, the overall age standardized mortality rates for chronic diseases were 769 per 100 000 men (56% higher than in high-income countries in 2004) and 602 per 100 000 women (100% higher than in high-income countries in 2004).

4. Scope of Work

Our scope of work is mainly to stream with the problem definition which includes our study, research and development to be implemented in a systematic manner to complete our stated objectives as per the standards mentioned to us.

5. Concept Selection

The concept selection process was first initiated by the group members deciding the title of the project, objectives and how to tackle with the current situation. Then the idea of SAPD hit our team members mind very hard and we went on to approach our lecturer for further clarification, discussion and approval. When he approved our concept, it was on the members of the team to implement this concept with the guidance of our guide (lecturer) and we went on to decide the specifications and design of the SAPD.

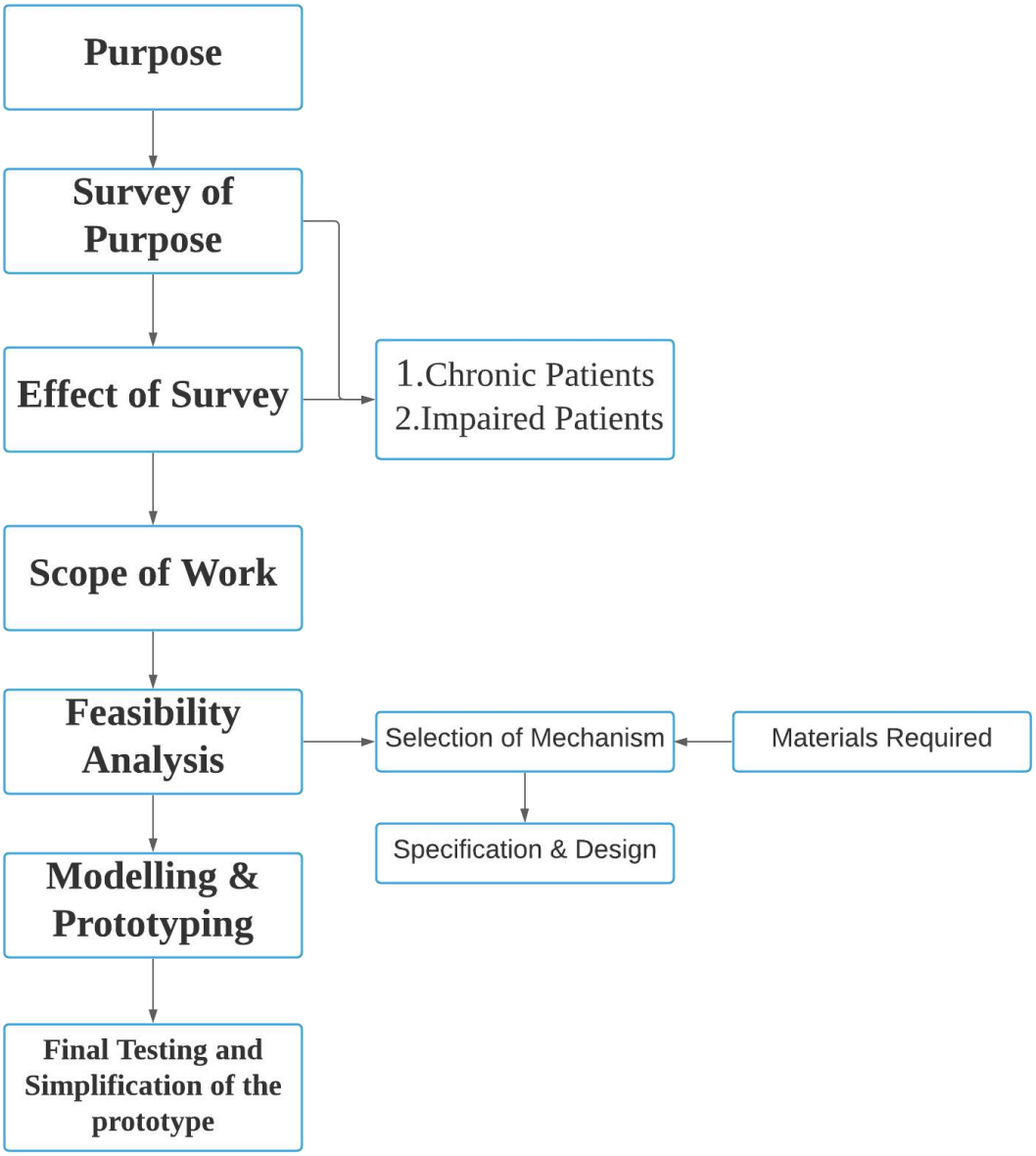

Fig. 3.1 Flowchart of Detailed methodology

6. Feasibility Analysis

We are trying to make this project as feasible as possible with no compromise in quality. As of now since the project is still in the development stage we are constantly learning and analyzing the feasibility of the final outcome. The design for the outer body/housing of the product has been designed using SOLIDWORKS. The dimensions for the housing has not yet been finalized as it will be totally dependent on the size of the internal mechanism which is still under development. The final assembly of the product is shown in the figures in the further slides.

6a. Selection of mechanism

The materials required is listed above in the chapter (2) and all are selected feasibly under some criteria's like availability, quality of the material, cost of the material and its specific task performing action.

Now coming to the mechanism part the device requires numerous motions to complete the assigned task i.e. to dispense the pills on time.

So on studying and interpreting some references we have found that two primary motions can be used to dispense the tablets and they are

i. Rotary Motion Mechanism.
ii. Circular – Straight line motion mechanism.

For the rotary motion mechanism we would use a NEMA-17 Stepper motor and for the second type of motion we are studying on drag link or a Crank and slotted lever motion mechanism.

Other option can also be the tool changing mechanism of a CNC machine which will be added to consideration for study and finalized mechanism will be the best of the feasible conditions mentioned above.

6b. Materials Required

This section is already discussed in chapter number 1.3 for any further details on the materials please refer to it on page number 6.

7. Specifications and Design

At this initial stage of our SAPD we have come up with a concept design for our better understanding of the concept selected.

Design Phase – I: Tentative Design

FRONT VIEW

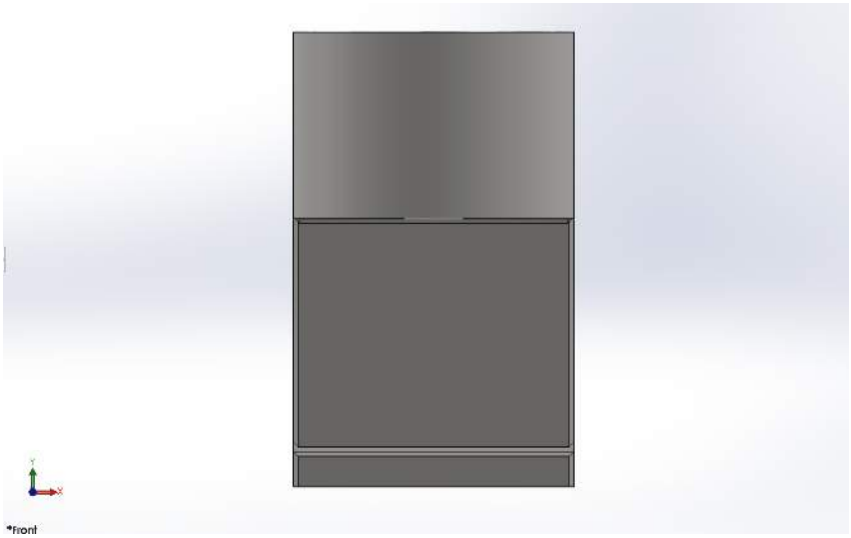

Fig. 3.2 Front View of SAPD

TOP VIEW

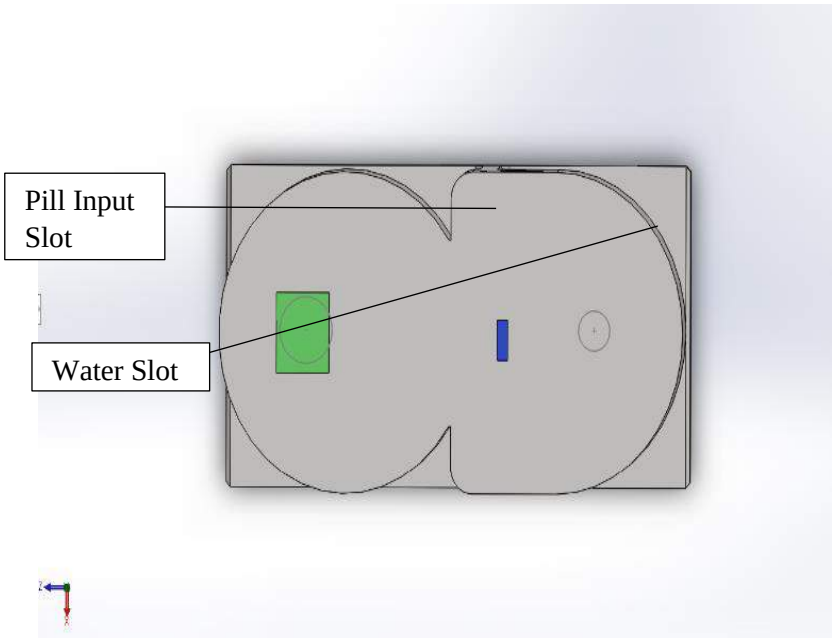

Fig. 3.3 Top view of SAPD

SIDE VIEW

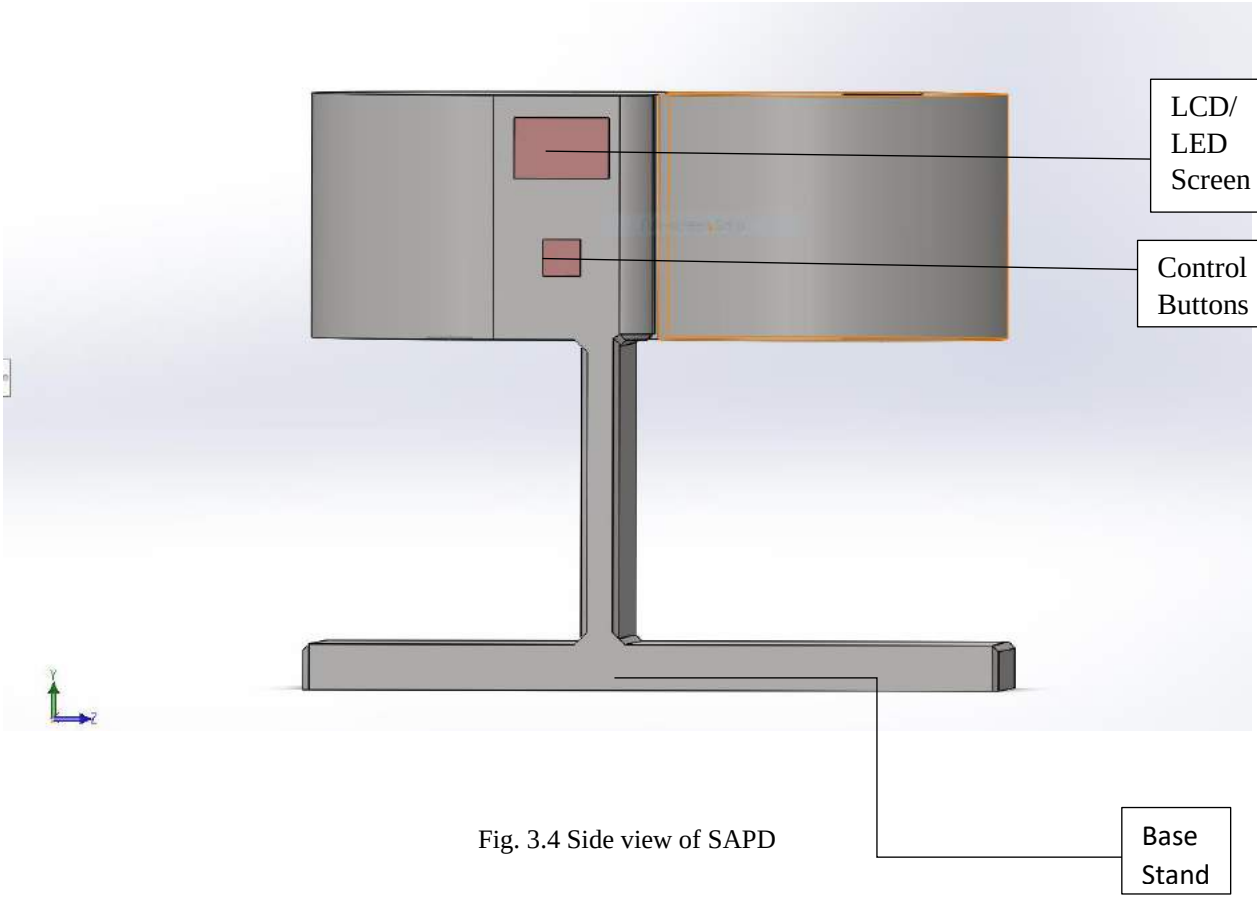

Fig. 3.4 Side view of SAPD

This design of SAPD was done using Solid Works 2016, design of SAPD consists of a dedicated shape and size that is irrespective of standards as it is a Phase-I design, the final component will be as per standard dimensions.

The SAPD has distinct slots for tablet and water storage (capacity unknown) in the top view and in the side view the SAPD has a LCD/LED screen for visual presentation of data incorporated with specified control buttons needed as per the patients point of view. The base stand supports the device to hold its position fixed at a desired place.

Other things like Feasibility analysis, modelling, testing of model and other things are to be done in Design phase –II which is still under study.

8. Modelling and Prototype

When it comes to the modelling and prototype the team developed 2 prototypes named as:

i. Prototype-1

ii. Prototype-2

Section a.) Prototype-1

The prototype consisted a basic design made from wooden cardboard which consists of simple working mechanism with the aid of IR proximity sensor and Arduino Uno.

The materials required to develop this prototype are listed as below:

- Wooden cardboard
- 15mm Tablet Cartridge/ Loader
- MG-90s Servo Motor
- Arduino Uno R3
- IR proximity sensor
- Connecting wires

The prototype-1 is connected using the circuit diagram shown below.

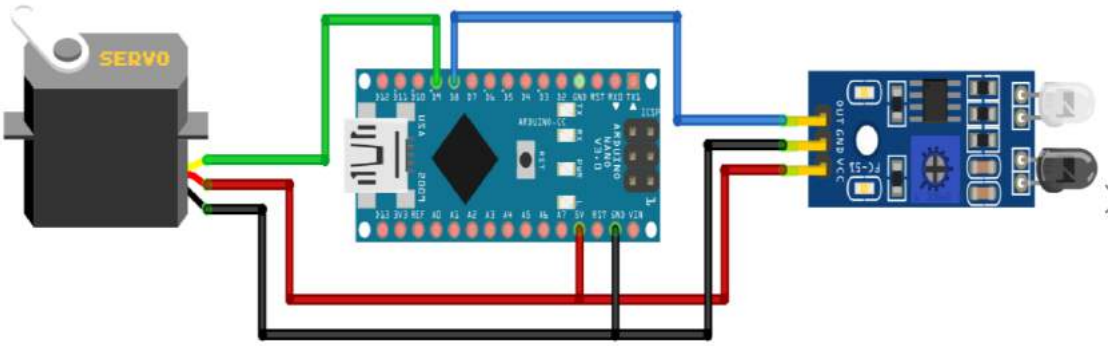

Fig 3.5 circuit diagram of prototype-1

When the connections are given accordingly, a program is fed into the Arduino Uno board which drives the servo 90 degree anticlockwise when any object is detected by the IR sensor and 90 degree clockwise to its home position at a time delay of 1 sec after an object is detected by the IR sensor.

A small mechanism is designed for the dispensing section i.e. a cam attached to the output shaft which will dispense one pill at a time when an object is detected by the IR sensor. The mechanism to be attached to the output shaft is as shown in the figure

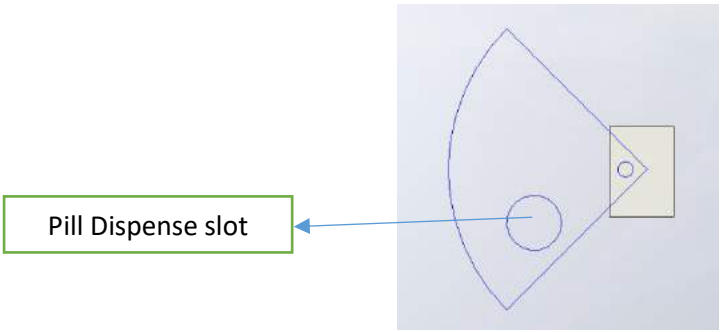

Fig 3.6 Dropping mechanism

Working of the prototype

- The tablet will be loaded from this cartridge and this is the small geometrical mechanism for the dispensing of the tablet.
- As the cartridge will limit the size and the tablet will not fall in any other portrait positions.
- Then the dispensing mechanism will rotate 90 degree's anticlockwise when an object is detected by the sensor where it will dispense one tablet and this tablet cartridge will be closed while the dispensing is taking place.

Following figure represents the Prototype-1 and its parts are mentioned below:

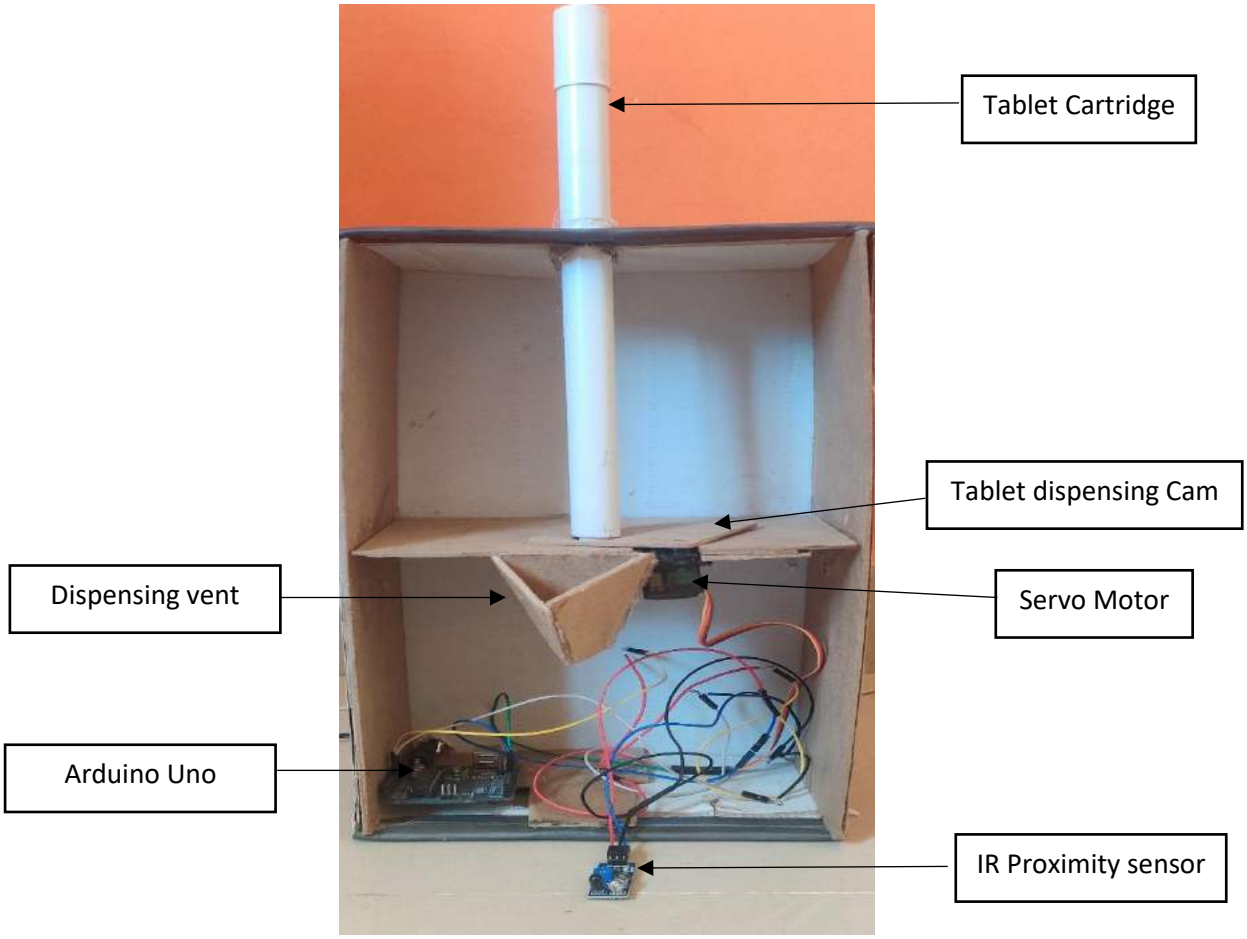

Fig 3.7 Prototype-1

Drawbacks of Prototype-1

- A major problem was analyzed in this prototype that was it could accumulate only one type of tablet.
- The tablet of that kind should match the exact shape and size of the Tablet cartridge or the tablet loader.
- Hence not feasible as a perfect solution but created a new order for segregation of tablets and how the harmony of the mechanism can be maintained.
- Therefore, a new prototype was emerged from this concept.

Section b.) Prototype -2

The concept of this arises from grouping the tablets according to its shape and size, with the aid of wooden cardboard another prototyping was possible and the materials required for this section will include as follows:

i. Bread Board.
ii. Jumper wires.
iii. A4988 Driver.
iv. ARDIUNO-UNO Microcontroller.
v. 12V 2.5A AC-DC Power Supply.
vi. Small PVC pipes as tablet Cartridges.
vii. NEMA-17 Stepper Motor.

Note: A special note on **A4988** driver, which is used to step the stepper motor.

The **A4988** is a complete **Micro stepping Motor Driver** with built-in translator for easy operation. The driver has a maximum output capacity of 35 V and ± 2 A. It can operate bipolar stepper motors in full-, half-, quarter-, eighth-, and sixteenth-step modes.

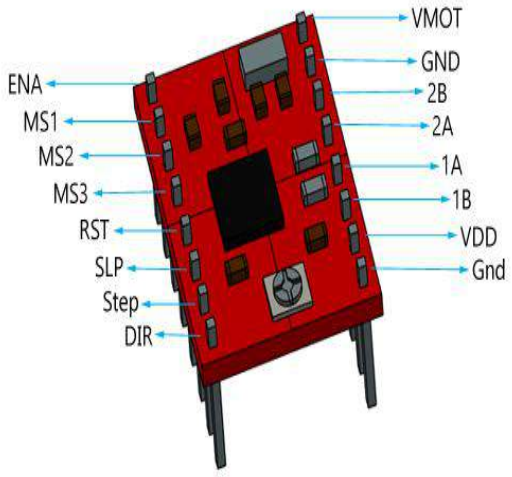

Fig 3.8 A4988 Driver

As shown in the above diagram, this driver consists of 16pins and each pin as a specific function when connected to a microcontroller. Let's see each pin function:

i. Pin-1 (ENA) – ENA stands for ENABLED, which enables the driver.
ii. Pin- 5 (RST) – RST stands for RESET, which resets the driver.

iii. Pin- 6 (SLP) – SLP stands for SLEEP, which puts the driver to sleep mode or it gives the delay when needed.

iv. Pin- 7 (Step) – This pin enables the motor connected to the driver to actuate in steps.

v. Pin- 8 (DIR) – DIR stands for direction, which determines the motor to move in required direction.

vi. Pin- 9(VMOT) and Pin -10 (GND) – These pins are used to power the motor and provides grounding also.

vii. Pin- 15(VDD) and Pin- 16(GND) – These pins are connected to 5V and GND of the Micro-Controller.

viii. Pins MS1 MS2 MS3 –These pins are the micro-step selection pins which determines the motor to move in steps, this is followed by a truth table which actuates the motor in quarter, half, eighth and sixteenth step as follows :

MS1	MS2	MS3	Resolution
LOW	LOW	LOW	Full Step
HIGH	LOW	LOW	Halft Step
LOW	HIGH	LOW	Quarter Step
HIGH	HIGH	LOW	Eighth step
HIGH	HIGH	HIGH	Sixteenth Step

Fig 3.9 Truth Table of A4988 Driver

ix. Pins 1A, 1B, 2A, 2B –These pins are connected to the 4coils of the motor respectively.

This prototype is connected using the following circuit connections

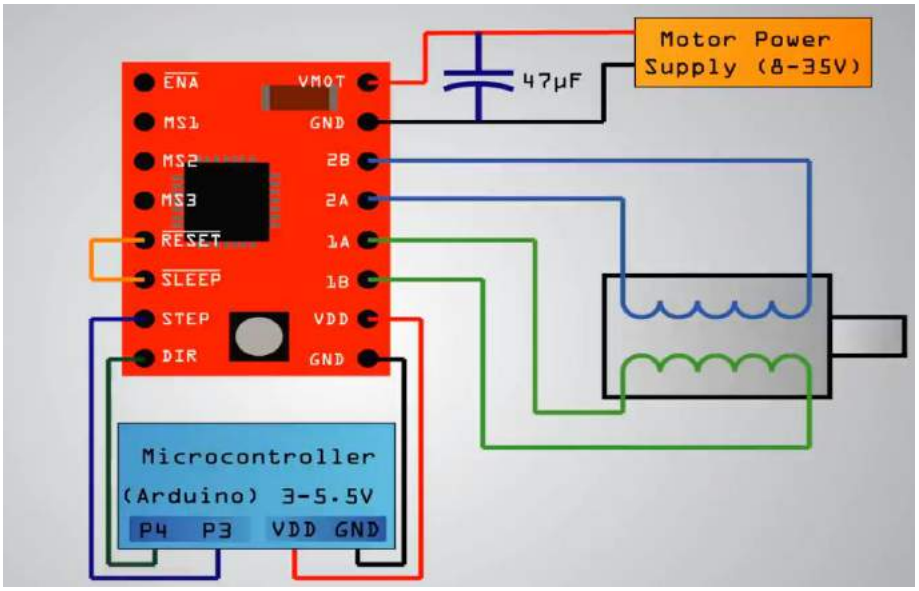

Fig 3.10 Circuit diagram (i) Prototype-2

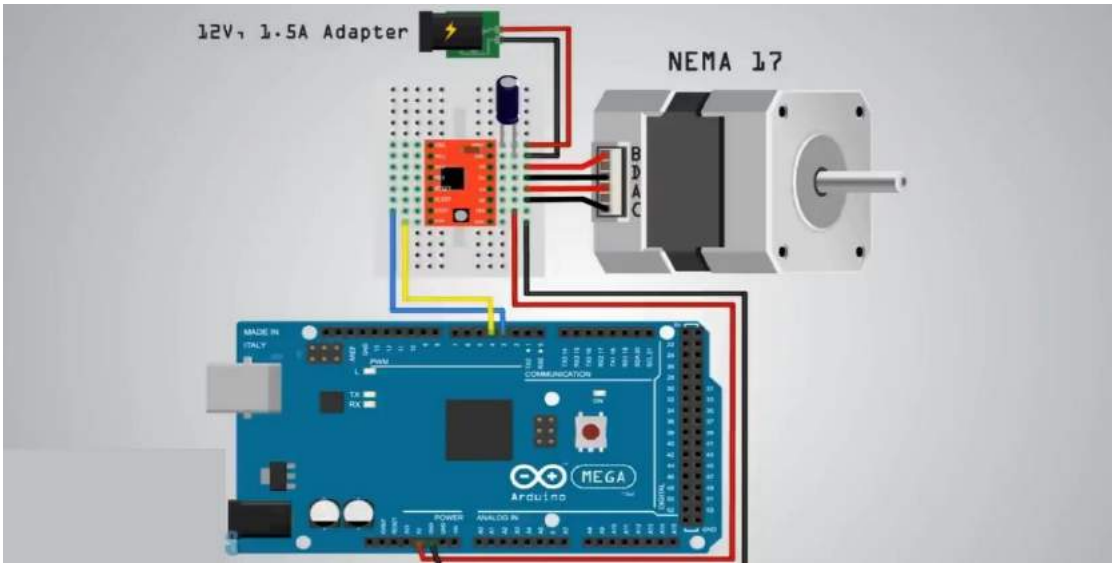

Fig 3.11 Circuit diagram (ii) Prototype-2

Procedure to connect the circuit:

i. Place the A4988 driver in the center divider in between the terminal slots and insert it firmly (The driver is stepped at its 16th step mode).
ii. Identify the same coils of the motor and connect it accordingly to pins 1A, 1B, 2A, 2B.
iii. Short the pins Reset and sleep with a connecting wire.
iv. The Pin- Step is connected to the 3rd digital output pin in the ARDINO-UNO and Pin- Dir is connected to the 4th digital output in the same microcontroller.
v. Pin VMOT & GND is connected in parallel with a 47micro Farad capacitor and from the same terminal the positive end of the capacitor is given to positive of the power supply and the same follows with the negative one.

vi. Pin VDD is connected to +5v of the ARDINO-UNO and VDD is connected to the VDD of the same microcontroller.

The Functional Block diagram of this Prototype-2 is shown below

Fig 3.12 Functional Block Diagram

Working phase of the Prototype-2

1. A base circle of 130mm is cut, which is divided into four quadrants respectively and the tablet cartridges are placed on to the four quadrants where each cartridge has different properties

   For example: Cartridge 1- can be used for smaller tablets

   Cartridge 2- can be used for medium sized tablets

   Cartridge 3- can be used for irregular shapes of tablets like oval for instance.

   Cartridge 4- can be used only for capsules
2. Now the stepper motor is used dedicatedly to bare this load condition and can rotate in steps or angles using an A4988 driver.
3. Therefore, on programming according to the angle view of the motor, on specific input the dedicated cartridge will be in the dispensing section and the output will carry on from there.
4. The dispensing mechanism will consist of a Geneva view mechanism which will act like pick and drop mechanism which is shown in the figure below.

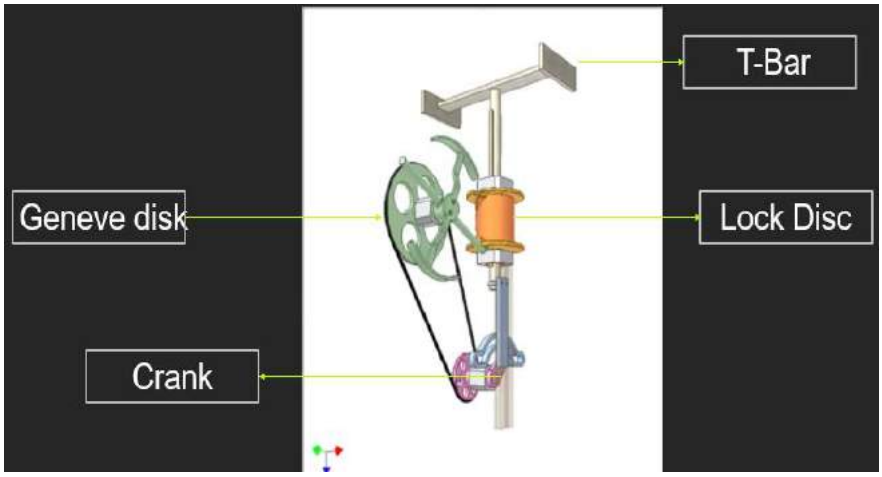

Fig 3.13 Pick and Drop Mechanism

5. Now according to the input the cartridge is carried from the base circle and dropped for the dispensing to occur.
6. The prototype is still under study and further working should be discovered and planned accordingly with lots of study to undergo.
7. Below figure will show the prototype figure with listed parts

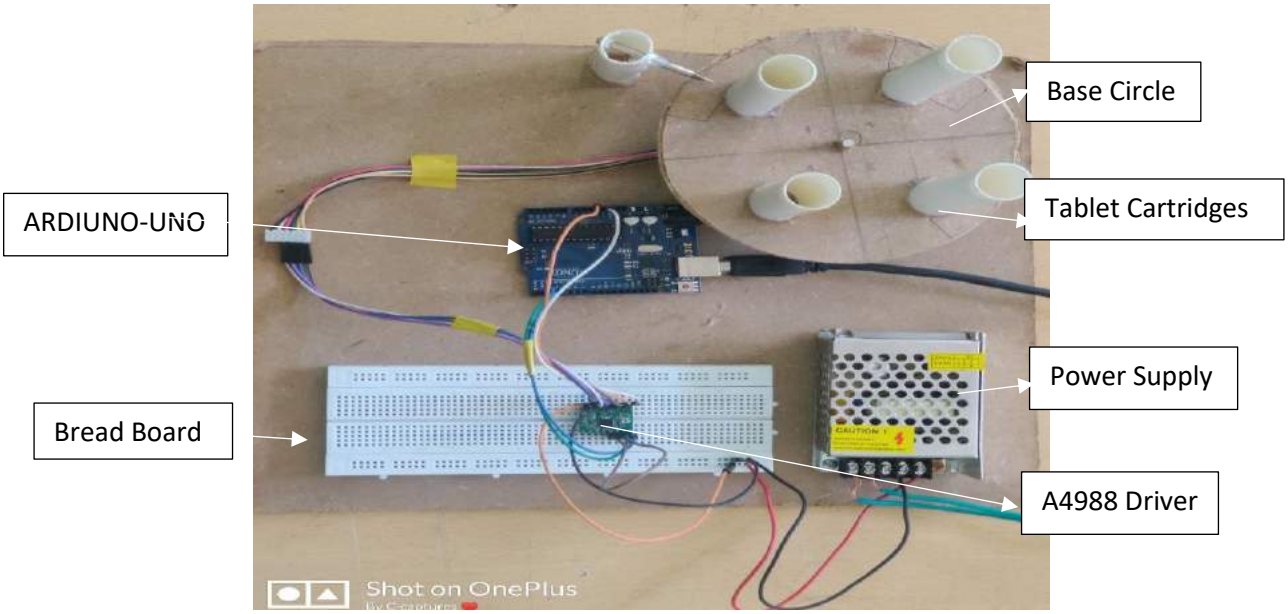

Fig 3.14 Prototype-2

CHAPTER-4

ANDROID/IOS MOBILE APPLICATION

- The requirement of a software application in a smartphone to have a very user friendly interface between a user and a machine is very important.
- Hence, we have used IOT application in our project.
- To have a successful IOT application one needs to make sure that there is seeming less connection between the machine and the user.
- Therefore, looking into all the above aspects we have designed a **SMART MOBILE APP** which can be either downloaded from the **Google Play Store** or the **Apple App Store.**

4.1 APP DEVELOPMENT AND PROGRAMMING

- The Smart app is totally programmed using an app development software called **ANDROID STUDIO.**
- The programming language used to develop the app is **JAVA**.
- The app is designed keeping in mind that the final interface should be in a user friendly environment.
- The following images show the renders of the software during testing.

1. LOGIN

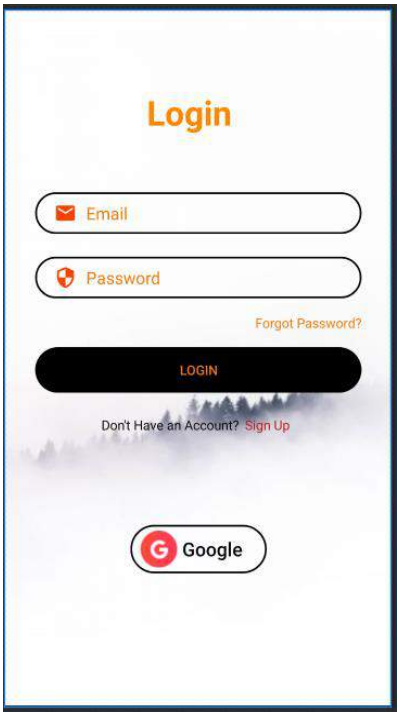

Fig 4.1 Login page

- The login is page is provided so that the user can login to his/her registered account which has all the required information saved by the user.
- Logging in is very simple. The user has to enter their registered email id and password and click on Login to enter the home page of the app.
- There's also an option given which is named as "Forgot password", in case a user forgets their password it can be recovered by clicking on this option.
- A user can also login seamlessly by just clicking on the Google button which will log them in by connecting the account to their Google account.
- In case, the user is new to the app and does not have a Google account they can register themselves by clicking on the "SIGN UP" button.

2. HOME PAGE

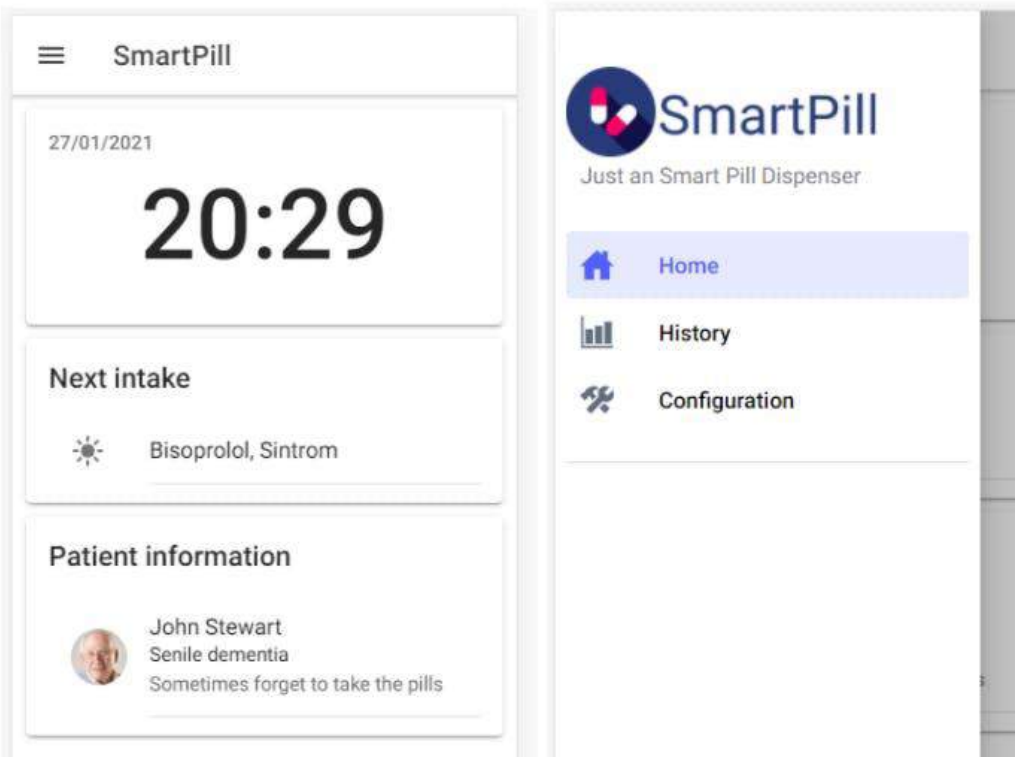

Fig 4.2 Home page

- The above image shows the render for the home page of the smart app.
- First option that a user can access is the home option. Once this option is accessed the user can have access to a lot of information like “Time”, “Next Intake”, “Patient Information” etc.
- The time option is given access so as the user can have the information of the current time.
- The “Next Intake” option is given access as so as the user can have information about when they have to take their next medication.
- The “Patient Information” gives access to enter the details of the patient for whom the medication should be provided.

3. EDIT CONFIGURATION

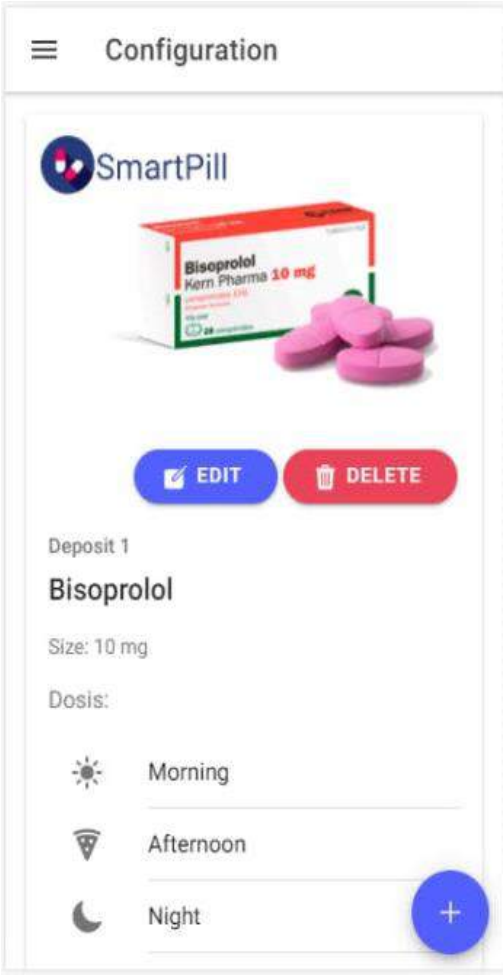

Fig 4.3 Edit Configuration

- This option when enabled gives the user to schedule their pill intake according to the required prescription.
- The app has several tablets name, pictures, doses which are already in built in the app.
- The layout of this page is designed and segregated so as the user can can schedule the intake of pills accordingly.
- Also, in the bottom right corner we have provided a plus button which when clicked the user can give inputs for more tablets if required.

4. UPDATE DEPOSIT

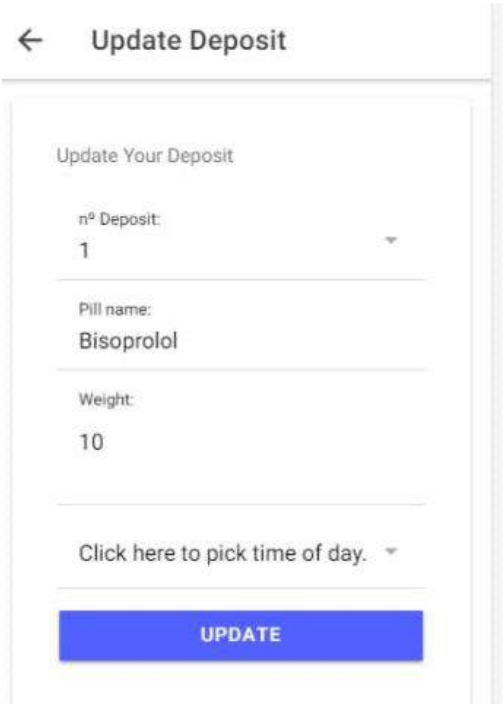

Fig 4.4 Update deposit

- This feature has been added so that the user can change or edit the current intake of pills.
- This feature also makes it easier for the user to not only edit but also to add or remove a particular medication according to the doctor's prescription.

5. History

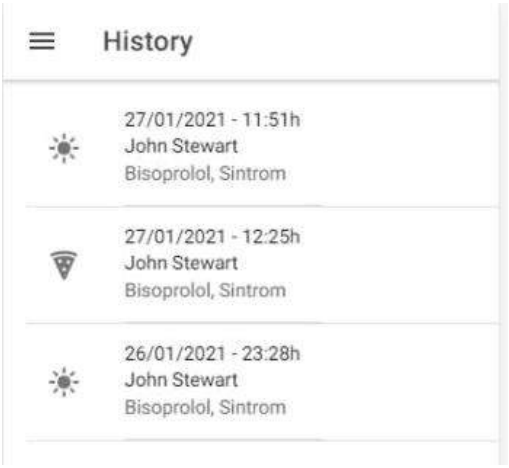

Fig 4.5 History

- The history option when clicked shows the history of the pills taken by the patient.
- This feature helps the caretaker to track the health record of the patient and also helps doctors to monitor the pill intake by a patient.

CHAPTER-5

RESULTS

- The design of the Smart Automated Pill Dispenser has been successfully designed using Solidworks.
- The render of the Android/IOS mobile application is completed.
- The tablet dropping mechanism has been successfully prototyped in Prototype – 1.
- The drawbacks of Prototype – 1 were successfully tackled creating a new prototype.
- The bi - directional mechanism for tablet slot rotation is prototyped in Prototype – 2 which is a fusion of some features taken from Prototype – 1.

CHAPTER-6

CONCLUSION

- As of now the SAPD concept design is explored and some of its specifications are listed.
- The applications of SAPD is described in the problem definition.
- The Purpose of the idea and the survey of the idea is determined in the report.
- The scope of work and conceptual selection is also explained clearly.
- The basic driving mechanisms have been finalized and have been tested.
- The Smart Phone App is rendered and is under testing for 100% function without any bugs so that it can be published on the Play Store as well as the App Store for customer usage.

CHAPTER-7

SCOPE OF OUR FUTURE WORK

- The mechanism of input of pills as well as the dropping mechanism is yet to be finalized.
- The Smart Phone App is yet to be published.
- Finally after the approval of the allotted dignitaries, the product is to be manufactured with proper standards guided to us.

CHAPTER-8

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