

CHAPTER-3

SYSTEM DESIGN

3.1 INTRODUCTION

Every system emerges from the proper system design. Good plan leads to good design which in turn gives an efficient system. The proposed system includes a development phase to happen at the hardware level and at the software level. The hardware development includes selecting the proper hardware and linking them together to form a flow. Software level development includes coding and integrating it into the hardware. Only if both the modules combine and work together, it acts as a single entity. For this development phase to become possible, the system design must be framed properly. Before starting the development process we should have the clear understanding on the project, overall process, flow, and nature of the system using some pictorial representations. In this chapter, system design is reflected with the illustration of various diagrams like system architecture, use case, activity, and state chart diagrams.

3.2 SYSTEM ARCHITECTURE

The Figure 3.1 represents the system architecture of the vegetable cutter. The entities involved in this process are the Mobile Application, and the Vegetable cutter. The working of the automatic vegetable cutter is divided into 3 modules. When the user his/her wants to chop the vegetables, there working of the smart cutter begins. Initially, the user connects or pairs the Bluetooth module (HC-05) with the user's mobile application. The mobile application constantly connects with the Bluetooth module, once the user paired with the Bluetooth (HC-05) then the process started. The Bluetooth connection exists between the 2 entities throughout the journey. The mobile application user-interface module consists of 3 sections they are, available Bluetooth devices

with connection status, types of blade button with images and the “start” button to activate the pneumatic cylinder. This design consists of stepper motor mounted with the twin type of blades. This Stepper motor activates when the user choose the type of blade from the mobile application once the Arduino receives then, according to the condition then the stepper motor turns to 180° degree if there is any change in the blade.

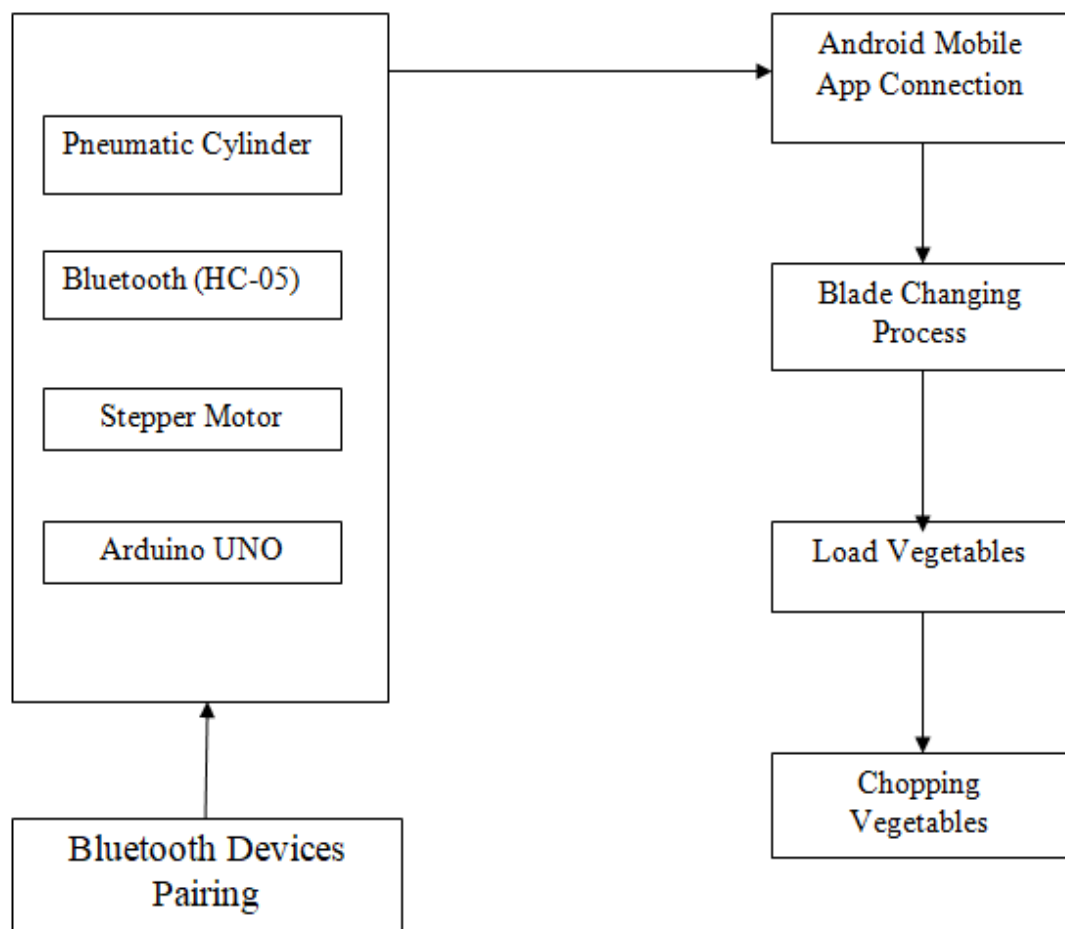


Figure 3.1 System Architecture

3.3 SYSTEM DESIGN

The Figure 3.2 represents the system architecture of the vegetable cutter. The entities involved in this process are the Mobile Application, and the Vegetable cutter. The working of the automatic vegetable cutter is divided into 3 modules. When the user his/her wants to chop the vegetables, there working

of the smart cutter begins. Initially, the user connects or pairs the Bluetooth module (HC-05) with the user's mobile application. The mobile application constantly connects with the Bluetooth module, once the user paired with the Bluetooth (HC-05) then the process started. The Bluetooth connection exists between the 2 entities throughout the journey. Figure 3.3 represents the slicer design. This is the platform where the vegetables are placed and chopped. This design consists of stepper motor mounted with the twin type of blades. This Stepper motor activates when the user choose the type of blade from the mobile application once the Arduino receives then, according to the condition then the stepper motor turns to 180° degree if there is any change in the blade.

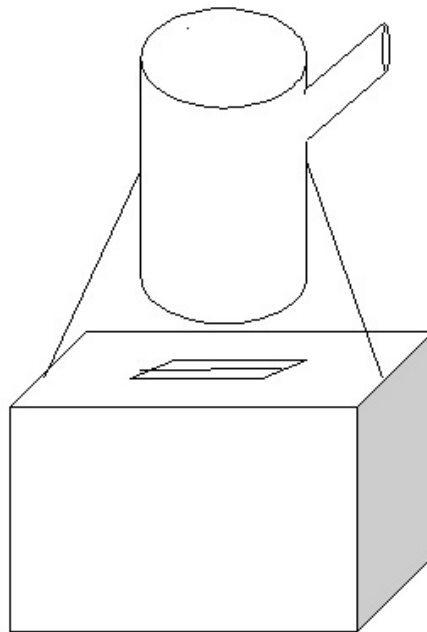


Figure 3.2 Abstract Design

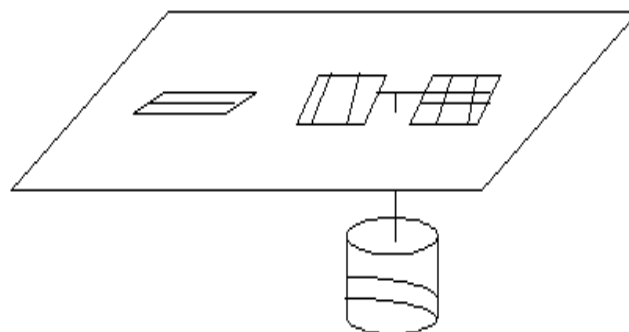


Figure 3.3 Slicer Design

3.4 UML DIAGRAMS

The following UML diagrams are designed to represent the project, they are,

- Usecase Diagram
- State Diagram

3.4.1 Use case Diagram

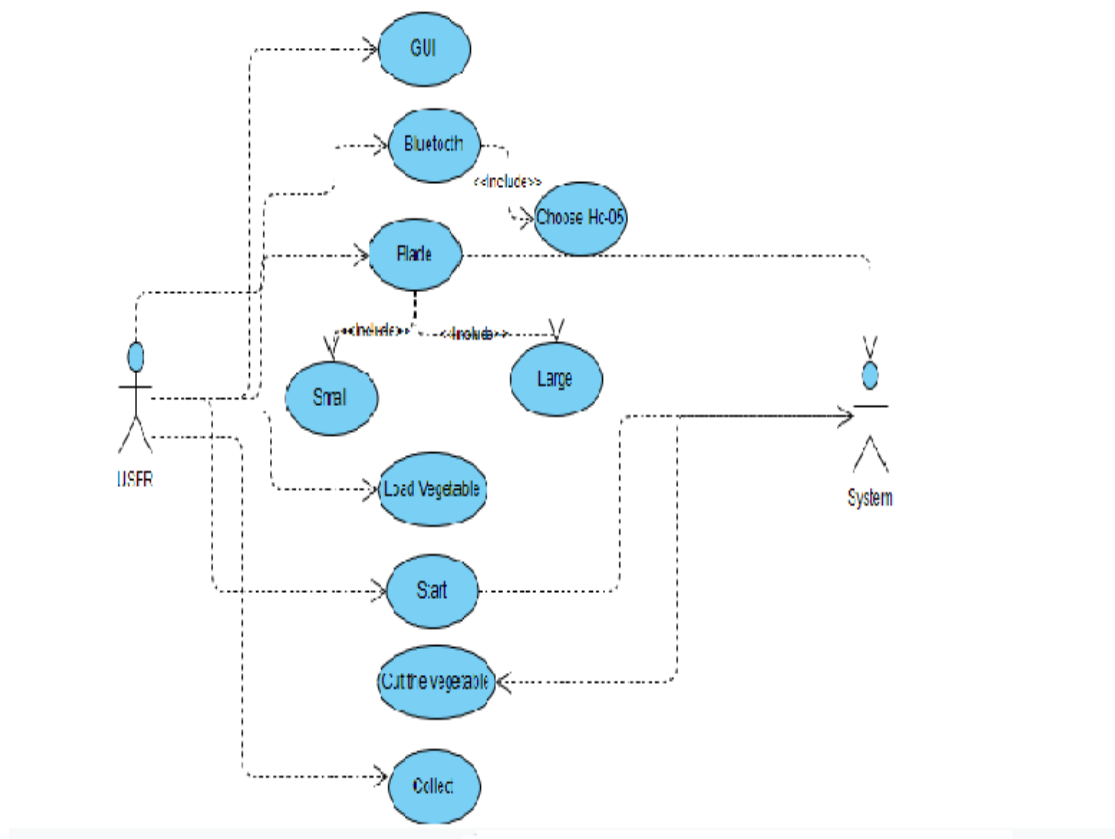


Figure 3.4 Usecase Diagram

The Figure 3.4 represents the use case diagram of Twin Blade Digital vegetable cutter. It contains actors (who perform the action) and the use cases (action or task). The actor here is categorized as Primary and Secondary actor. Primary actor involved here are User. Secondary actor's role is played by the System. With the help of this diagram the user, and the action performed by them can be easily identified.

From the Figure 3.4 we can diagrammatically represent the actions carried out by the actors at each level in the system execution. At the level 1, the user installs the mobile app provided, and pairs the mobile phone with the Bluetooth module(HC-05) in the system to control it. At the level 2, after pairing the system with the mobile app, the user will select the what type of blade(large or small) needed to chop the vegetable in their preferred shapes and load the vegetables into the system. At level 3, after loading the vegetables into the system, the user needs to click the start button the application to chop the vegetables.

Level 1: Connecting the Bluetooth module (HC-05) with Mobile app.

Level2: Choosing the type of Blade that is needed to cut the vegetables.

Level 3: Click “START” button in the App to cut the vegetables.

3.4.2 STATE DIAGRAM

The Figure 3.5 represents the State diagram for Twin Blade Digital vegetable cutter. This diagram shows sequence of state of actions carried out at each and every state. This state diagram describes that the sequence of execution of the system, first the user should pair Bluetooth module(HC-05) with their mobile phone using the mobile application provided, after pairing the devices the user need to choose the type of blade they required in the mobile application, then load the vegetables in the slicer platform, and click the start button in the mobile App which activates the DCV and the Pneumatic Cylinder to slice the vegetables. Finally, we get the chopped vegetable.

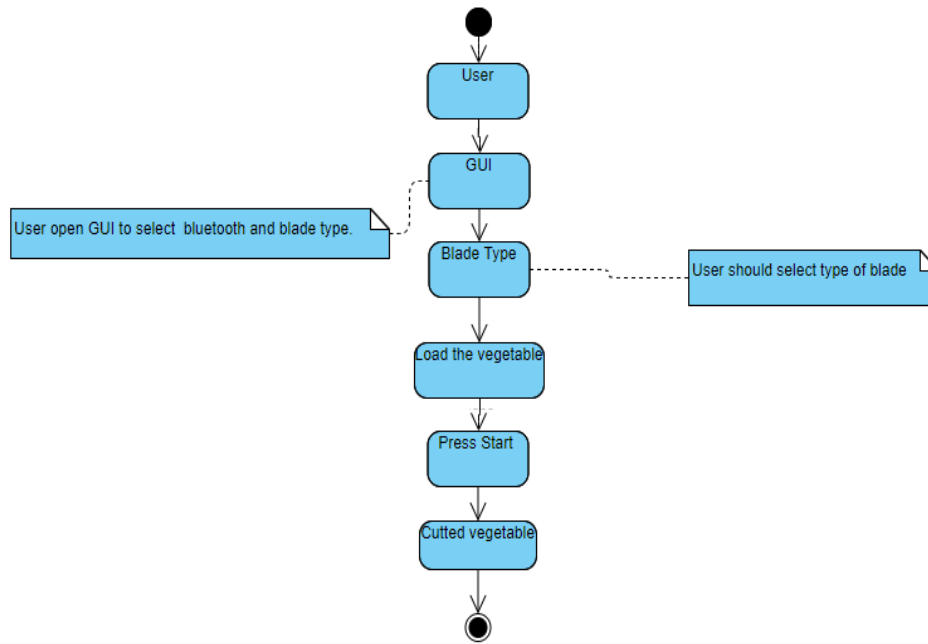


Figure 3.5 State Diagram

3.5 SUMMARY

This chapter helps in making the system design efficient and also in understanding the nature of the system. The designs introduced in this chapter are system architecture, usecase diagram, and state chart diagram. Also it briefs about the system in various perspectives like, as an actor's role, as sequence of states, and the relationships of the entities. The system architecture describes the overall process of the system in its various phases of its execution .Through these diagrams the developer and the users can easily understand and will get an idea on the process flow of the system more efficiently. With this system design, the proposed system Design of Twin Blade Digital Vegetable Cutter is built.