

CHAPTER-2

LITERATURE SURVEY

2.1 INTRODUCTION

The Internet of Things (IoT), sometimes referred to as the Internet of Objects, will change everything including ourselves. Soon every device that one owns and nearly every object that one can imagine will be connected to the Internet. Whether it's through a phone, wearable tech or everyday household objects, the Internet of Things (IoT) will connect us in ways we cannot even imagine yet. IoT has its impact in every field of life which everyone experiences it in one or the other way. By integrating IoT with Mechatronics where mechanical modelling calls for modelling and simulating physical complex phenomena in the scope of a multi-scale and multi-physical approach. This implies to implement and to manage modelling and optimization methods and tools, which are integrated in a systemic approach. Several products were working on similar ideas in order to develop products which are more efficient and making process automotive. This literature survey illustrates how IoT in Mechatronics can be made use of to transform an ordinary vegetable cutter to "Twin Blade Digital vegetable cutter" which reduces the human power for changing blade and make the vegetable chopping process efficient and easier.

2.2 EXISTING PRODUCTS AVAILABLE IN THE MARKET

The following are the products that we discussed in this chapter are,

- Sirman Vegetable Cutter
- HDS Stainless Steel Vegetable Cutter
- PATTISH Vegetable Cutter
- VEGETABLE Cutter for Commercial Kitchen
- VBENLEM Commercial Vegetable Cutter
- SS Disk Vegetable Cutter

- Design And Development Of Automated Vegetable Cutting Machine
- Design and Development of a Tomato Slicing Machine
- Potato Spiral Slicer Cutter
- Design Of An Automated Vegetable Cutter

2.2.1 Sirman Vegetable Cutter

The functionality of this Sirman Vegetable Cutter machine[1] is slicing, grating, dicing vegetables into desired shapes. Material used for both outer layer and blade is Stainless Steel. Power supply provided to this machine is 230V. The weight of the machine is 21kg and the dimensions are 720x350x500mm. This machine comprises of multiple blades to chop the vegetables into user required shapes. Simple switch, start and stop buttons offer easy operation. For safety concerns, the machine will only work when cover is closed. The merits are Semi-Automatic. Demerit is input capacity is very less.

2.2.2 HDS Stainless Steel Vegetable Cutter

The HDS Stainless Steel Vegetable Cutting machine[2] is commercial kitchen. Material used in this is Stainless Steel. This machine includes multiple blades to chop the vegetables into user required shapes. The weight of the machine is 30kg and the dimensions are "25" x 15" x 28"mm. Input capacity of the machine is 60-120 Kg / hour. Disadvantage is difficult to change the blade amateur.

2.2.3 PATTISH Vegetable Cutter

The usage of this PATTISH Vegetable Cutting machine[3] is slicing, dicing, chips, French fries and grating. Material used for blade is Stainless Steel. The weight of the machine is 35kg and the dimensions are "20" x 12" x 22"mm. This machine includes single horse power. Input capacity of the machine is 150 Kg to 200 Kg. per Hour. Disadvantage is difficult to change the blade amateur.

2.2.4 Vegetable Cutter for Commercial Kitchen

For developing Vegetable Cutter for Commercial Kitchen[4] materials which is been used for both outer layer and blade is Stainless Steel. The total weight of the machine is 30 Kg and the dimensions are "22" x 17" x 25"mm. The power supply provided to this machine is 230V and frequency is 50 Hz. Disadvantage is difficult to change the blade amateur.

2.2.5 VBENLEM Commercial Vegetable Cutter

The entire VBENLEM Commercial Vegetable Cutter machine[5] is constructed with stainless steel material and added with 4 litre capacity food fritter, 550W in power and total weight is 36Kg. Tempered glass cover is provided for clear observation of working status. A rubber lid is attached for adding in water/oil anytime you want. To make the cutting process faster and easier, a thickened 420 SUS blades are used with improved rigidity, producing fine and smooth result. For example, it takes 14s for meat, 16s for vegetables and 17s for nuts. Simple switch, start and stop buttons offer easy operation. For safety concerns, the machine will only work when cover is closed. For firm connection 2 slots are included below the barrel. Thick handles on both sides enable convenient movement. Rubber feet keep the machine stable while using. Rubber gaskets are provided to prevent leakage. Fast buckles improve sealing. The advantage is, efficient for cutting all kinds of vegetables, fruits, meat and grains and it is widely used in catering service business.

2.2.6 SS Disk Vegetable Cutter

This SS Disk Vegetable Cutter product[6] contains five disk blades, 5/64" and 5/32" two slicing disks and 5/42", 5/32", 1/8" three shredding disks. It's features are, a powerful 3/4 HP (550W) motor, dual hopper continuous feed system for vegetables, fruits and cheeses. It is safe and ergonomically friendly 45 degree angled work surface with auto stop food pusher. To make the cutting process faster and easier, a thickened 420 SUS blades are used with improved rigidity, producing fine and smooth result. Simple switch, start and stop buttons offer

easy operation. For safety concerns, the machine will only work when cover is closed. The material used is heavy duty cast aluminium construction and low maintenance belt drive. The advantage is, it is graded with USA standard.

2.2.7 DESIGN AND DEVELOPMENT OF AUTOMATED VEGETABLE CUTTING MACHINE

This paper[7] describes about the automation of the existing vegetable cutter. In this automation they using a microcontroller to control the overall process, Direction Control Valve to control the Pneumatic Cylinder, and Pneumatic Cylinder to chop the vegetables and also controls the entry of vegetables with the single bar mechanism. The air supply to the pneumatic cylinder and the pressure for different vegetables are controlled by the Direction Control Valve (DCV) and which is controlled by the microcontroller. The approach of this paper is, by using this system we can easily chop any kind and type of vegetables and fruits. The advantage of this system is, the cost is low, and it consumes less power, time and man power. The disadvantage of this system is, it uses a fixed type blade that is, it uses only one type of blade to chop the vegetables and it needs to change the blades by manually only, and there is no different shape of blades to chop the vegetables into different shapes.

2.2.8 Design and Development of a Tomato Slicing Machine

The approach of this paper[8] is to design and develop a tomato slicing machine. The objective of this system is to conserve the man power and reduce time which is been spent in slicing the tomato, to increase the hygienic level, to reduce material wastage, it has a high capability to slice the large amount of tomatoes and it uses locally available materials and technology to develop this system. This system is basically designed only for one vegetable “tomato”. The capacity of this system is 540gm per minute and performance is 70%. The materials that are used for the fabrication are wood, stainless steel and mild steel. The merits are, it can easily handle, it reduces cost, time and man power

and it cuts the tomatoes in 2cm thickness. The demerits, are only one vegetable tomato can be used, and multi-type blade is not available.

2.2.9 POTATO SPIRAL SLICER CUTTER

The usage of this potato slicer cutter[9] is slicing, spiralling, and chips. Material used for blade is Stainless Steel and cuts the spirals about 1/8" thick. The weight of the machine is 2.5kg and the dimensions are "280" x 120" x 140"mm and it is small and compact design. This machine uses single handed power operation. Input capacity of the machine is one potato. It can be used in hotels, restaurants, and home usages. Disadvantage is we can insert only one vegetable and consumes more time.

2.2.10 DESIGN OF AN AUTOMATED VEGETABLE CUTTER

Manual cutting and slicing of vegetables has proved to be very time consuming and is prone to the risk of contamination of the food leading to high rates of food borne diseases. Various methods have been implemented in the process of size reduction of vegetables ranging from manual, electric and automated. The desire to make a design[10] that simplifies, that saves time, that is relatively cheaper and efficient during the process of size reduction of vegetables was the main scope of the whole project. The contaminant free products will be produced through the use of U.V light and this machine will incorporate U.V light as its integral component. The principle of operation of the machine is attached to the theory of rotating hollow discs.

2.2.11 Industrial Multifunctional Vegetable and Fruit Cutting Machine

This machine[11] is suitable for vegetable and fruit cutting and processing, good choice for food processing factory, sauce maker, and group meals company. Double heads applied which can work simultaneously. This machine is good for cutting and processing vegetable and fruit like root vegetable, leafy vegetable, potato, sweet potato, various melons, onion, eggplant, bamboo shoot, celery, cabbage, apple, yellow peach, and banana. The weight of the machine is 80KG and it is made of up of stainless steel.

2.3 COMPARITIVE STUDY OF EXISTING SYSTEM

COMPARI TIVE METHODS	Material	Voltage	Weight	No. of blades can be inserted
HDS Stainless Steel Vegetable Cutter	Stainless Steel	240V	25KG	Single
The Pattish SS Vegetable Cutter	Stainless Steel	230V	30KG	Single
Vegetable Cutter for Commercia l Kitchen	Stainless Steel	230V	28KG	Single
Sirman Vegetable Cutter	Stainless Steel	230V	21KG	Single
VBENLEM Commercia l Vegetable Cutter	Stainless Steel	230V	36KG	Single
POTATO SPIRAL SLICER CUTTER	Stainless Steel	230V	2.3KG	Single

2.4 SUMMARY

From the above survey of all the products we found that, the common usage of all the products is to chop the vegetables. Every vegetable cutting machine has various features such as size, weight, capacity, load, power consumption, materials used, performance, durability, etc.,. The common flaws identified in the study of this existing system are, difficulty in changing the multi-type blades manually, increase in power consumption and difficulty to handle. Therefore, this proposed system work provides an alternative to the existing automatic vegetable cutter, eliminating power fluctuations and low initial investment. When compared to manual cutting, time consumption is very less and it reduces the difficulty in changing the cutting blade. This work provides the desired output and various cuts are made by using different cutting stages. Various dimensions of vegetable cutter were briefed in the survey paper. However, this proposal does have some disadvantage. The rest of the products were all similar with same features which might bring a sure change when designed.