AUTOMATION IN ARECA LEAF PLATE MANUFACTURING INDUSTRY

A PROJECT REPORT

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In partial fulfillment of the requirements

for the award of the degree

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BACHELOR OF ENGINEERING IN

ELECTRICAL AND ELECTRONICS ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

KONGU ENGINEERING COLLEGE

(Autonomous)

PERUNDURAI ERODE – 638060

JUNE 2022

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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JUNE 2022

BONAFIDE CERTIFICATE

This is to certify that the project report entitled **"AUTOMATION IN ARECA LEAF PLATE MANUFACTURING INDUSTRY"** is the Bonafide record of project work done by **ABINASH.A (19EER002), GOPINATH.R (19EER022), GUHAN.P (19EER025), GURUPRASAD.G (19EER026)** in partial fulfillment of the requirements for the award of the Degree of Bachelor of Engineering in Electrical and Electronics Engineering of Anna University, Chennai during the year 2021-2022.

SUPERVISOR **HEAD OF THE DEPARMENT**

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Date:

Submitted for the end semester viva voce examination held on_____

EXAMINER I **EXAMINER II**

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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DECLARATION

We affirm that the project report titled **"AUTOMATION IN ARECA LEAF PLATE MANUFACTURING INDUSTRY"** is being submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering is the original work carried out by us. It has not formed the part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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ABSTRACT

The disposable plates and food packing materials manufactured from easily available areca nut palm leaves is a better substitute for disposable polythene and paper plates. The Govt. is restricting the use of plastic materials and hence eco-friendly products are preferred to plastic products. These elegant, disposable party plates made from Areca leaf are an eco-friendly alternative to conventional disposable plates. These biodegradable areca leaf plates are a natural and renewable resource. Areca Leaf that are naturally discarded from the areca tree are collected from the forest floor and no trees are cut. Areca leaf plates are made from the naturally shed leaf sheaths of Areca Nut Tree. The areca leaves are simply collected, pressure washed, scrubbed, sun dried and then with the application of heat and pressure formed into appropriate shaped plates. Areca is used for treatment of a mental disorder called schizophrenia and an eye disorder called glaucoma; as a mild stimulant; and as a digestive aid. Some people use areca as a recreational drug because it speeds up the central nervous system (CNS).

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We take extreme delight in expressing our loving gratitude to our cherish parent's trustworthy friends for their constant support and confidence in or abilities.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The disposable plates and food packing materials manufactured from easily available areca nut palm leaves is a better substitute for disposable polythene and paper plates. The Govt. is restricting the use of plastic materials and hence eco-friendly products are preferred to plastic products. These elegant, disposable party plates made from Areca leaf are an eco-friendly alternative to conventional disposable plates. These biodegradable areca leaf plates are a natural and renewable resource. Areca Leaf that are naturally discarded from the areca tree are collected from the forest floor and no trees are cut. Areca leaf plates are made from the naturally shed leaf sheaths of Areca Nut Tree. The areca leaves are simply collected, pressure washed, scrubbed, sun dried and then with the application of heat and pressure formed into appropriate shaped plates. Areca is used for treatment of a mental disorder called schizophrenia and an eye disorder called glaucoma; as a mild stimulant; and as a digestive aid. Some people use areca as a recreational drug because it speeds up the central nervous system (CNS).

1.2 EXISTING METHOD

- There is no motors in the cutting unit.
- The Areca leaf cannot be cut neatly and softly.
- This is now manually done by the worker by pressing pedals.
- Exact compressing time is difficult to monitor manually.

CHAPTER 2

LITERATURE REVIEW

"A Review paper on Kinetic Energy System for Vehicle Suspension" by Suhail A, Wani. In this paper the suspension system is one of the most important components of a vehicle. It consists of tires, springs, linkages, shock absorber, struts, and other parts according to the specification of the vehicle. A shock absorber is a part of the suspension system that is designed to smooth out or damp shock impulse, and convert kinetic energy to another form of energy (usually thermal energy, which can be easily dissipated by the fluid inside shock absorbers). Ideally, a shock absorber is a damper that is designed to damp shock impulses generated in a moving vehicle. On application, the shock absorbers of a vehicle undergo linear movements that are otherwise not utilized as such. The idea of saving energy came into light from the 20th century. Since then, the concept of energy efficiency has gained attention in the automobile industry. Therefore, unlike traditional energy-regenerative suspension, which can only absorb vibration passively, the energy regenerative suspension system is being introduced which can be used to store in the form of electrical energy. A regenerative suspension system can be used in the suspension assembly to attenuate or eliminate the energy generated by the excitation vibration in the vertical direction. This system can be used to convert mechanical energy into electromagnetic energy through a rack and pinion mechanism, and the electromagnetic energy is stored by energy storage elements, which can reduce vibration and recover excess energy. After extensive research of over 40 years, the system has been introduced in hybrid and pure electric vehicles, and it greatly improves fuel economy

"An overview paper on Analysis and design of LVDT" by Dongwon Yun, Sangyong Ham. In this paper, analysis for LVDT has been performed to design and evaluate the performance of the sensor. To do this, finite element method (FEM) is used and parametric analysis is conducted. From the analysis, performance of a LVDT sensor can be investigated precisely before actual manufacturing. Linear differential variable transformer (LVDT) is a kind of inductive sensors. Inductive sensors are based on changes in mutual inductance, self-

inductance or magnetic resistance. LVDTs are encapsulated in a stainless-steel housing, making insensitive to mechanical, electrical and magnetic

"A Review on Design of a Linear Variable Differential Transformer with high rejection to external inferring magnetic field" by Michele Martino, Alessandro Danisi. In this paper the sensitivity of linear variable differential transformer (LVDT) position sensors to external slowly varying magnetic fields represents a critical issue when these sensors are installed close to high-current cables or electrical motors with significant fringe fields. The resulting position error can reach several hundreds of micrometers against a specified uncertainty normally below a few micrometers. In this paper, the design of a LVDT position sensor with high rejection to external constant or slowly varying magnetic fields is addressed by exploiting the finite element method (FEM) simulator FLUX. A shield, isolated from the sensor's magnetic circuit, has been considered to reduce the effect of magnetic fields on the secondary voltages of the LVDT. In addition, a dc current is used in order to polarize the magnetic circuit to reduce the sensitivity of the sensor to external interferences.

"An overview on A Low-cost, real-time monitoring system for PV plants based on ATmege 328P-Pu microcontroller" by M. Caruso, R. Miceli, P. Romano. In this paper This paper presents a real-time monitoring system for PV power plants based on a microcontroller Atmega328P-PU. The proposed system, whose performances can be relatively close to those achieved with commercial monitoring systems, is simple, low-cost and open source technology-based. In addition, a user interface, capable to communicate through a wireless network by using a standard communication protocol IEEE 802.15.1, is here presented. From the experimental tests described and discussed in this paper it is demonstrated that the proposed monitoring system provides, with adequate accuracy, all the information about the operating status of the PV plant, even during fault conditions.

"A Review paper Working principle of an Arduino by Yusuf Abdullahi Badamasi. In this paper we shall take a brief look at the Arduino microcontroller and some of its applications and how it can be used in learning. Arduino is an open-source microcontroller used in electronic prototyping. Arduino hardware and its components shall be looked at. Software and the Environment that Arduino runs on are both looked at too. Some applications will be taken as examples that can help make learning Arduino more interesting. This can be

used as a major way to encourage students and others to learn more about electronics and programming. Arduino is an open-source physical computing platform based on a simple microcontroller board and a development environment that implements the Processing language . It was originally meant for artists and designers to create electronic prototypes. They would be able to create these designs easily with a little knowledge of programming and electronics without going too deep into it. Electronic prototyping was traditionally only associated with engineering and engineers.

"A Review paper Arduino as a Learning tool" by Ahmad Adamu Galadima. In this paper we shall take a brief look at the Arduino microcontroller and some of its applications and how it can be used in learning. Arduino is an open-source microcontroller used in electronic prototyping. Arduino hardware and its components shall be looked at. Software and the Environment that Arduino runs on are both looked at too. Some applications will be taken as examples that can help make learning Arduino more interesting. This can be used as a major way to encourage students and others to learn more about electronics and programming. Arduino is an open-source physical computing platform based on a simple microcontroller board and a development environment that implements the Processing language. It was originally meant for artists and designers to create electronic prototypes. They would be able to create these designs easily with a little knowledge of programming and electronics without going too deep into it. Electronic prototyping was traditionally only associated with engineering and engineers.

"An overview on Performance studies for Lead Acid Batteries for Transport Vehicles" by M.J. Lencwe, S.P. Daniel Chowdhury, T.O. Olwal. In this Paper Currently, Transport Vehicles (TVs) use Lead-Acid Batteries (LABs) for starting, lighting, igniting (SLI) and energy storage. Unfortunately, LABs face significant performance failure rate due to over-charging, under-charging, degradation of protection systems amongst other issues. It is due to these reasons that the proposed research study seeks to enhance the performance of LABs for TVs (LABs-TVs). This will be done by developing a strategy for enhancing the performance in terms of lifespan, storage capacity and efficiency for LABs-TVs. The technical solution will be proposed by first analyzing the existing technologies deployed around the world (i.e., Europe, China, South Africa, United Kingdom and America). The

research study will then identify emerging technologies regarding battery charging/ discharging and storage mechanisms for LABs-TVs. The research will then develop a new strategy for enhancing the performance of LABs-TVs. This strategy will be based on an automatic charging/ discharging level control technique characterized by the chemical composition of existing LABs-TVs. The strategy developed will comprise of the new algorithm for charging/ discharging LABs on single charger regardless of their chemical compositions. This new algorithm will control the charging current and voltage as well as the operating environmental temperature for LABs. The proposed strategy will then be validated using MATLAB/Simulink tool. Because of the inherent technical advantages that will be derived from the literature, resulting strategy is most likely expected to improve the performance of LABs-TVs.

"A Review paper Advance Lead Acid Battery Design for Hybrid Electrical Vehicles" by D.B. Edwards, C. Kinney. In this paper, the authors present a high power, lead acid battery design that has demonstrated long life. The design uses horizontal plates with multiple lug connectors to deliver high power for hybrid electric vehicle applications. The horizontal plate configuration helps improve life by allowing for better thermal management and mechanical compression. They use computer models that were previously developed to estimate the specific energy performance of this battery when different conductive and/or nonconductive additives are mixed into the active material. They investigate both spherical as well as different aspect ratio additives. They show how the use of small, conductive additives could double the specific energy performance of lead acid batteries (i.e., from 30-35 Wh/kg to 60-70 Wh/kg). However, the exact size of the additive required to accomplish this improvement has never been verified. They therefore suggest some possible experiments to determine the particle size and the amount of additive material needed to make this dramatic improvement in specific energy. Lead acid batteries presently used in hybrid electric vehicles are only modified versions of batteries designed for other applications. As such, they are proving to be inadequate for this demanding application, both with respect to life and performance. For lead acid batteries to be successful in hybrid electric vehicles, they must be designed specifically for those applications. In addition, these batteries need to be thermally managed and their charging carefully controlled. The design of these batteries should also take advantage of this controlled operating environment.

"An overview paper on :Low-Cost Smart Energy Management based on ATmega 328P-PU microcontroller" by M. Caruso, V. Castiglia, A. Del Pizzo. In this paper the technological evolution of microcontrollers and their diffusion in different fields of industry has allowed to simultaneously perform different real-time activities. This progress has enabled the implementation of signal processing with reduced costs, high efficiency and high reconfigurability. The adoption of digital signal processing systems has several advantages among the use of analog processing systems, such as the lower sensitivity to tolerances, a better control of accuracy, and a high reproducibility . The adoption of real-time monitoring systems capable of measuring the main electrical quantities of a system could help to a smart and efficient management of electrical loads. The ability to achieve low-cost, easy installation and reliable performance measurement systems could accelerate the spread of such systems that optimize energy usage . The purpose of this work consists in the design and realization of a low cost, flexible and open-source monitoring system. The hardware structure of the system has been realized through means of an accurate investigation on the technical features of the commercially available components. The proposed system has been properly designed in both its hardware and software components in order to reduce costs and to maintain an adequate accuracy, if compared with commercial devices. Therefore, the components have been chosen in order to obtain a technical-economic compromise with the aim of achieving a good quality system.

"An overview paper on Design of circuit for battery charging of electric vehicles from renewable energy sources by Abhinav Bhattacharjee D. Elangovan G. Arunkumar. In this paper Electric vehicles and plug-in hybrid electric vehicles are two concepts that are gaining popularity in order to reduce our dependence on fossil fuels. In this paper, a full bridge, current fed, interleaved, isolated DC-DC converter is proposed for battery charging of electric vehicles from solar PV or fuel cells. It boosts voltage of around 36 V to 270 V. Interleaving leads to lesser input current ripple, a factor crucial for sources like solar PVs and fuel cells and lesser stress on switches. The concept of soft switching is used to reduce switching losses. Simulation results are presented for a power level of 3.45 kW. A scaled down, 200 W hardware model of the circuit was built and tested. A closed loop feedback system was also designed using k factor method to provide constant output voltage.

CHAPTER 3

PROPOSAL OF THE PROJECT

3.1 OBJECTIVE

- To implement the automatic servo motor.
- To cut the leaf in correct time by rotating the shaft of the directional control valve by servo motor. (A servo motor is a rotary actuator that allows for precise control of angular position)
- To reduce the manual effort.

3.2 PROPOSED METHOD

Here we proposed a method to automate the areca leaf cutting machine by connecting the shaft of the servo motor to the directional control valve.

3.3 ADVANTAGES

1. Low maintenance
2. Reduced man power
3. Increased efficiency
4. Productivity is increased
5. Wastage of plate is reduced

CHAPTER 4

PROJECT DESCRIPTION

4.1 COMPONENTS USED

These are the components used for our project and they are discussed below

- AC-DC Adapter (12V – 1.5A)
- Buck Boost converter (DC-DC CA-2596)
- Arduino UNO
- Servo motor (SG90)
- Push button
- Connecting wires

4.2 BLOCK DIAGRAM

The generalized block diagram of the project as shown in the fig 4.1.

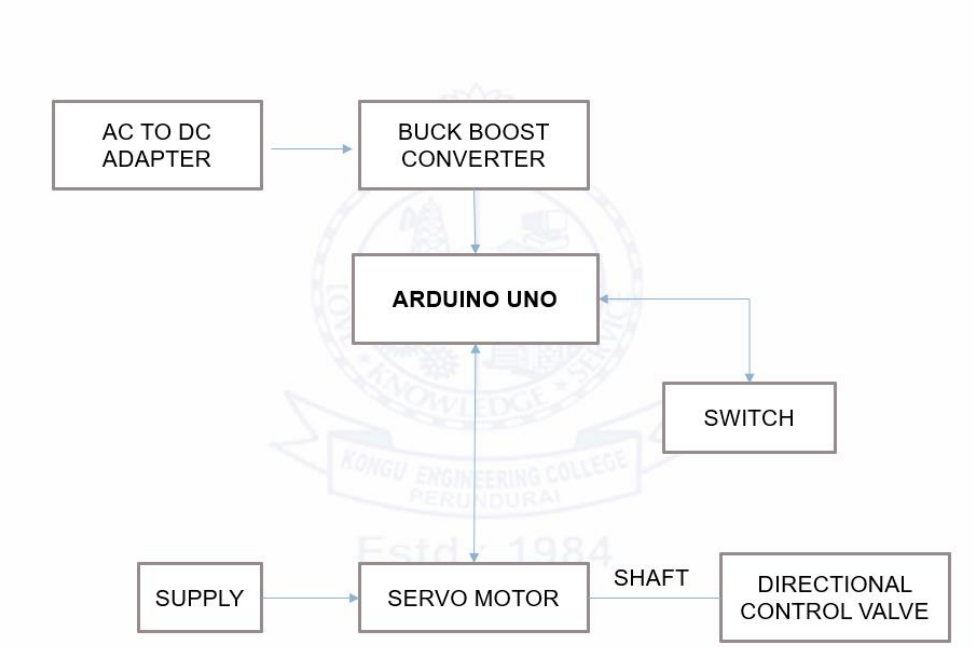

Figure 4.1 Block diagram

Here, we use servo motor to control the directional control valve. The angular rotation of the servo motor is done by the Arduino UNO. The supply for the servo motor is fed by the AC-DC adapter and the buck boost converter is used to reduce the voltage to the desired level. The switch is used here to start the process of rotation. We've connected the shaft of the servo motor to the directional control valve. The motor should rotate in clockwise for 3 second and return back to previous state(Pressing time).And it should wait for 1 minute(Heating time).Then it should rotate in anticlockwise for 3 second and return back to previous state(Releasing time).And the process is stopped until the switch is pressed.

Table 4.1 Components table

SI. No	COMPONENTS	QUANTITY
1.	AC-DC Adapter	1
2.	Buck Boost converter	1
3.	Arduino UNO	1
4.	Servo motor	1
5.	Push button	1
6.	Connecting wires	Req numbers

4.3 ARDUINO UNO

An Arduino is shown in figure 4.2. The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board. Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms. The IDE is common to all available boards of Arduino.

Figure 4.2 Arduino UNO

4.3.1 COMPONENTS IN DETAIL:

- **ATmega328 Microcontroller**- It is a single chip Microcontroller of the ATmel family. The processor code inside it is of 8-bit. It combines **Memory (SRAM, EEPROM, and Flash), Analog to Digital Converter, SPI serial ports, I/O lines, registers, timer, external and internal interrupts, and oscillator.**
- **ICSP pin** - The In-Circuit Serial Programming pin allows the user to program using the firmware of the Arduino board.
- **Power LED Indicator**- The ON status of LED shows the power is activated. When the power is OFF, the LED will not light up.
- **Digital I/O pins**- The digital pins have the value HIGH or LOW. The pins numbered from D0 to D13 are digital pins.
- **TX and RX LED's**- The successful flow of data is represented by the lighting of these LED's.
- **AREF-** The Analog Reference (AREF) pin is used to feed a reference voltage to the Arduino UNO board from the external power supply.
- **Reset button**- It is used to add a Reset button to the connection.
- **USB**- It allows the board to connect to the computer. It is essential for the programming of the Arduino UNO board.
- **Crystal Oscillator**- The Crystal oscillator has a frequency of 16MHz, which makes the Arduino UNO a powerful board.
- **Voltage Regulator**- The voltage regulator converts the input voltage to 5V.

- **GND**- Ground pins. The ground pin acts as a pin with zero voltage.
- **Vin**- It is the input voltage.
- **Analog Pins**- The pins numbered from A0 to A5 are analog pins. The function of Analog pins is to read the analog sensor used in the connection. It can also act as GPIO (General Purpose Input Output) pins.

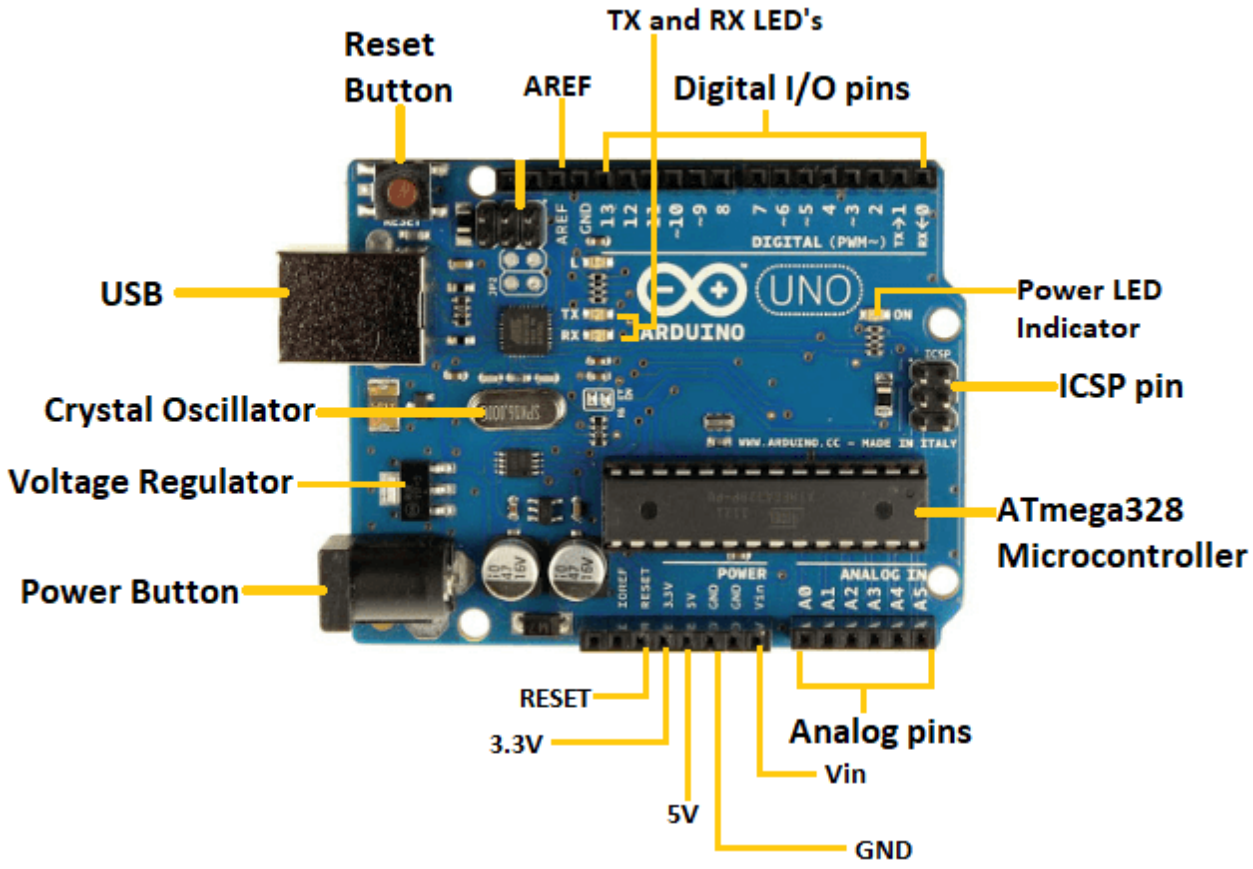

Figure 4.3 Arduino UNO Pin Configurations

4.3.2 TECHNICAL SPECIFICATIONS

- Microcontroller: Microchip ATmega328P
- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14 (of which 6 can provide PWM output)
- PWM Pins: 6 (Pin # 3, 5, 6, 9, 10 and 11)

- UART: 1
- I2C: 1
- SPI: 1
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB of which 0.5 KB used by bootloader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm
- Weight: 25 g
- ICSP Header: Yes
- Power Sources: DC Power Jack & USB Port

4.4 BUCK BOOST CONVERTER

The buck–boost converter is a type of DC-to-DC converter that has an output voltage magnitude that is either greater than or less than the input voltage magnitude. It is shown in figure 4.3

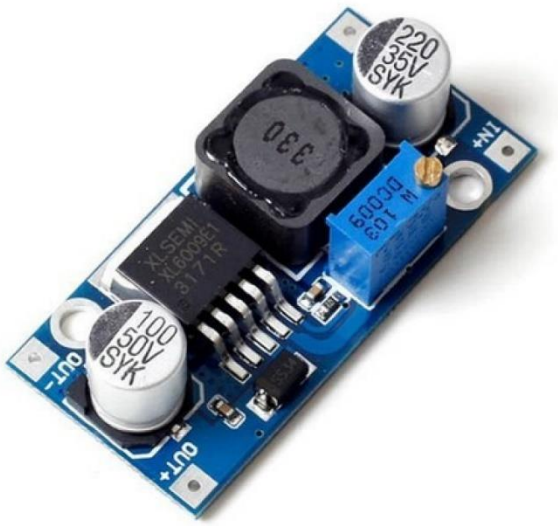

Figure 4.3 Buck Boost Converter

It is used to “step up” the DC voltage, similar to a transformer for AC circuits. It is equivalent to a flyback converter using a single inductor instead of a transformer. Two different topologies are called buck–boost converter. DC-DC converters are also known as choppers. Here we will have a look at **Buck Boost converter** which can operate as a DC-DC Step-Down converter or a DC-DC Step-Up converter depending upon the duty cycle, D. The input voltage source is connected to a solid-state device. The second switch used is a diode. The diode is connected, in reverse to the direction of power flow from source, to a capacitor and the load and the two are connected in parallel. The controlled switch is turned on and off by using Pulse Width Modulation (PWM). PWM can be time based or frequency based.

4.4.1 TECHNICAL SPECIFICATIONS

- Module Properties: Non-isolated boost (BOOST)
- Rectification: Non-Synchronous Rectification
- Input Voltage Range: 3V ~ 32V
- Output Voltage Range: 5V ~ 35V (Note: If you want to get the max voltage, you should make the input current as least 3A)
- Input Current: 4A (max), no-load 18mA (5V input, 8V output, no-load is less than 18mA. Higher the voltage, the greater the load current.)
- Conversion efficiency: <94% (greater the pressure, the lower the efficiency)
- Switching frequency: 400KHz
- Output Ripple: 50mV (the higher the voltage, the greater the current, the greater the ripple)
- Load Regulation: ± 0.5%
- Voltage Regulation: ± 0.5%
- Operating Temperature: -40 ? ~ +85 ?
- Dimensions: 43mm * 21mm * 14mm (L * W * H)

While performing the analysis of the Buck-Boost converter we have to keep in mind that

1. The inductor current is continuous and this is made possible by selecting an appropriate value of L.
2. The inductor current in steady state rises from a value with a positive slope to a maximum value during the ON state and then drops back down to the initial value with a negative slope. Therefore the net change of the inductor current over any one complete cycle is zero.

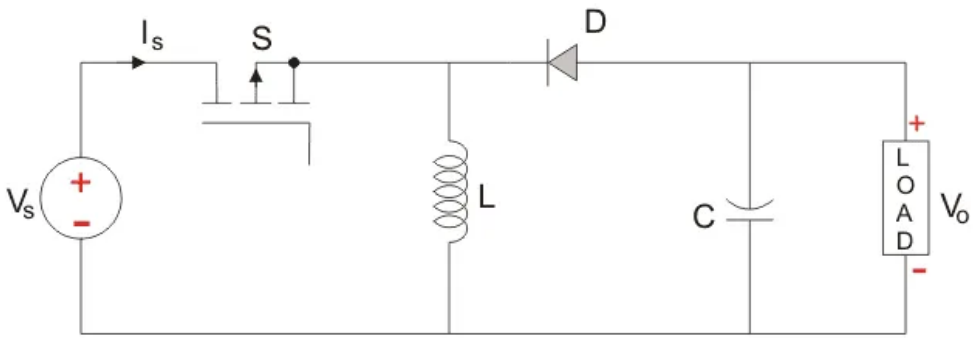

Figure 4.4 Buck Boost Converter Circuit Diagram

4.5 AC – DC ADAPTER

An AC-DC power supply or adapter is an electrical device that obtains electricity from a grid-based power supply and converts it into a different current, frequency, and voltage. AC-DC power supplies are necessary to provide the right power that an electrical component needs shown in figure 4.5. 12V power supplies (or 12VDC power supplies) are one of the most common power supplies in use today. In general, a 12VDC output is obtained from a 120VAC or 240VAC input using a combination of transformers, diodes and transistors.

Figure 4.5 AC-DC Adapter – 12V

What happens if you don't use an AC-DC power supply?

While it's true that some household and commercial electrical items only use AC power, many other applications demand DC power. What happens if you try to supply AC power to an electrical device that requires DC electricity?

The short answer is simple: bad things will happen! Electrical devices with electronic components will almost certainly get destroyed, and some high AC voltage equipment may even explode or catch fire.

There's also the risk to human life if you apply AC power to an electrical device that requires Direct Current. That's why it's always essential to use an AC-DC power supply when the electrical requirements demand it.

4.6 CONNECTING WIRES

Figure 4.6 Connecting Wires

The DC wires are mostly double insulated because it is mostly used for outdoor applications. Direct current is used in any electronic device with a battery for a power source. It is also used to charge batteries, so rechargeable devices like laptops and cell phones come with an AC adapter that converts alternating current to direct current. The current carrying capability of DC cable is better than the AC cable. DC current, however, does not change polarity. It flows in one direction only, and passes evenly through the cable with no alternating characteristics. These differences in the current entail different choices of cables too. Electricity travels more easily in highly conductive elements like copper, silver or gold, the less conductive the material, the larger the diameter has to be to carry the same current load.

4.7 PUSH BUTTON

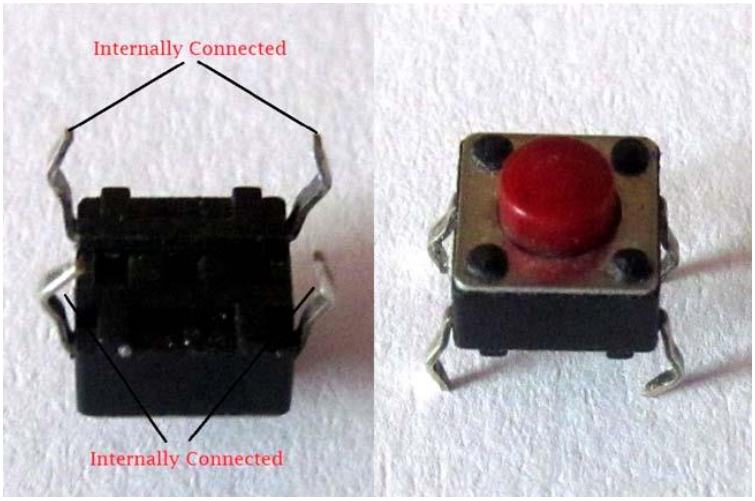

Figure 4.7 Push Button

A Push Button is a type of switch work on a simple mechanism called “Push-to-make”. Initially, it remains in off state or normally open state but when it is pressed, it allows the current to pass through it or we can say it makes the circuit when pressed**.** Normally their body is made up of plastic or metal in some types.

Push Button structure has four legs, two on one side and other two on another side. So, we can operate two lines of the circuit by single Push Button. Two legs on both the sides are internally connected as shown in the figure 4.7.

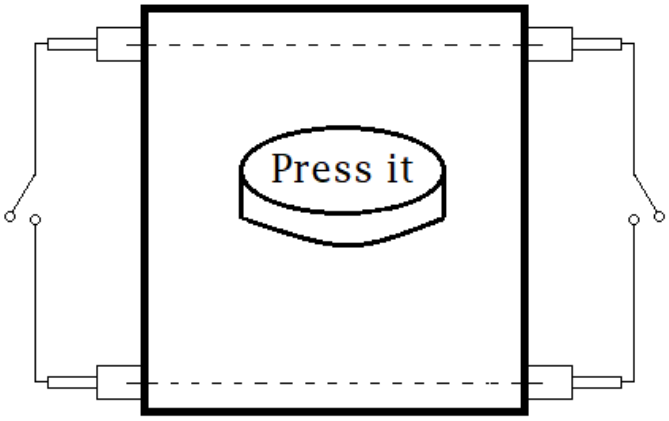

Figure 4.8 Working of Push Button

The working concept of Push Button is given above in figure 4.8, till the button pressed it conducts current through it or make the circuit. As the button released it break the circuit again.

4.8 SERVO MOTOR

CHAPTER 5
HARDWARE IMPLEMENTATION

Electric vehicles are a broad but very exciting and rapidly spreading topic concerning the following needs and factors to lower emissions in the environment, to use green energy sources, increased energy demand and consumption etc. Regenerative braking is a process of deceleration of an electric vehicle (plug-in or hybrid) by converting mechanical energy to electrical via generator operation of its motor, while also providing brake torque, and further accumulating it in storage systems.

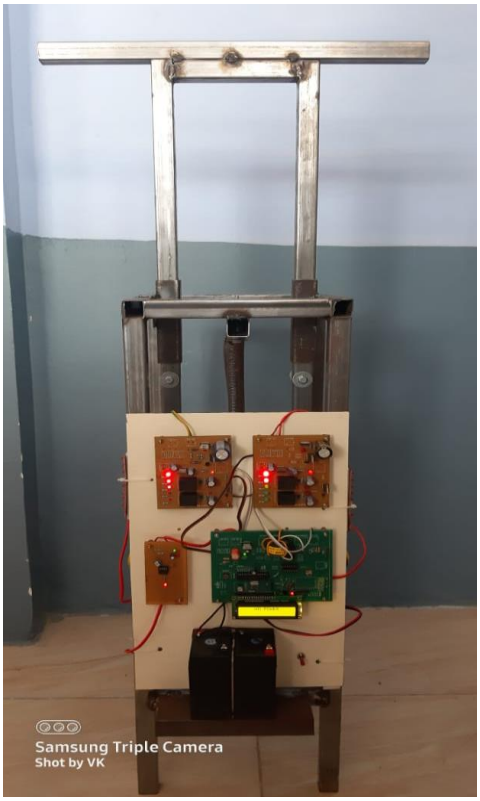

Figure 5.1. Circuit boards and Batteries

The hardware set up of our project consists of LVDT and DC generator, charging circuit, battery, voltage sensor, microcontroller and LCD display. LVDT and DC Generator shown in the figure 5.1 are fixed in the suspension of the vehicle to generate small amount of electrical energy i.e., mechanical energy is connected to electrical energy. LVDT and DC generator are connected to the charge circuit. The charge circuit is used to charge the battery. The battery in turn used to charge the vehicle. To sense the voltage the voltage sensor is connected to the charge circuit of LVDT and DC generator. To monitor the battery voltage the battery voltage sensor is connected to the battery. The voltage regulator is used to trigger the microcontroller. The microcontroller is connected to LCD. Liquid Crystal display is used to display the voltage generated in LVDT, DC generator and battery. If the arm moves upwards and downwards with the help of the rack and the pinion the secondary coil gets energized by the primary coil, where the primary coil is continuously energizing by giving voltage and also DC generator produce some voltage. The produced energy will be given to the charging circuit, here the voltage and current will be reduced or increased for the specification of the battery according to the pressure applied. Then it will be given to the LVDT and DC generator voltage sensor, here the voltage will be sensed and display the voltage in the LCD display through a micro controller and by using this method the performance of the EV vehicles has be increased. When the handle is pressed, the LED strip connected with the DC generator and LVDT blinks. This indicates the power generation from both DC generator and LVDT shown in the figure 5.2.

Figure 5.2. LVDT and DC Generator

There are two set up in our project. They are charging circuit LVDT and DC Generator circuit. The LCD display will show 5 readings they are,

- No power
- LVDT Voltage
- DC Generator (or) Suspension Voltage
- Both LVDT and Suspension Current
- Battery Voltage

Here we took three cases according to the pressure applied the power will be generated in these cases and the power may be increased or decreased it depends on the force that applied. We pressed approximately for 1 to 2 Hrs.; the battery voltage gets increased from 6.13 V to 6.18 V stored in battery. The current produced by the LVDT and DC generator gets added and the power is calculated by using the generated voltage and current.

. Formula

$$V=V1+V2$$

From Ohms Law we know that ,

P=V/I

Where

P =Power

V1= LVDT Voltage

V2 =DC Generator Voltage (or) Suspension Voltage

I =Both LVDT and DC GeneratorCurrent

PRACTICAL CALCULATION

V=V1+V2

=3.10+8.30 =11.4V

I =279mA = 0.27A

P=V*I

=11.7*0.27

=3.07W

5.1 CASE 1: LOW PRESSURE

The indication of No power is displayed in LCD before the pressure is applied. When the low pressure is applied to the handle the LVDT voltage of 3.30V, Suspension voltage of 8.30V, both LVDT and Suspension current of 0.279A, battery voltage & Power of 6.13 V & 3.07 W is generated and it is shown in the figure 5.3.

Figure 5.3. Readings at Low Pressure Condition

5.2 CASE 2: MEDIUM PRESSURE

The indication of No power is displayed in LCD before the pressure is applied. When the low pressure is applied to the handle the LVDT voltage of 3.30V, Suspension voltage of 8.00V, both LVDT and Suspension current of 0.31A, battery voltage & Power of 6.18 V & 3.5 Wis generated and it is shown in the figure 5.4.

Figure 5.4. Readings at Medium Pressure Condition

5.3 CASE 3: HIGH PRESSURE

The indication of No power is displayed in LCD before the pressure is applied. When the low pressure is applied to the handle the LVDT voltage of 3.70V, Suspension voltage of 9.20V, both LVDT and Suspension current of 0.3A, battery voltage & Power of 6.25 V &3.87 W is generated and it is shown in the figure 5.5.

Figure 5.5. Readings at High Pressure Condition

CHAPTER 6
APPENDIX

```
#include <Servo.h>

Servo myservo;


const int buttonPin = 2;

int buttonState = 0;
```

```
void setup()
{
  pinMode(buttonPin, INPUT);
  myservo.attach(3,600,2300);
}

void loop()
 {
  buttonState = digitalRead(buttonPin);
  if (buttonState == LOW)
{
    myservo.write(90);
    delay(1000);
    myservo.write(0);
    delay(3000);
     myservo.write(90);
    delay(5000);
     myservo.write(180);
    delay(3000);
     myservo.write(90);
    delay(300);
  }
}
```

CHAPTER 7

CONCLUSION

7.1 CONCLUSION

For the development of the industry, we've introduced the automation in the areca leaf plate industry. It provides automated angular rotation in the directional control valve through the servo motor. As we use this, the manual process is reduced and the plate is heated and the correct shape of the plate is

obtained through our automation. So, that the handicaps can operate the machine easily. The worker simply presses the button so that the whole process takes place through our automation by the use of Arduino UNO . Thus the work pressure is reduced.

REFERENCE

- 'A Review Of The Systemic Adverse Effects Of Areca Nut Or Betel Nut'

  Indian Journal Of Medical And Paediatric Oncology Vol:35(Issue1) Pn:3-9

  DOI:10.4103/0971-5851.133702

- Automatic Areca Nut Plate Making Machine

  Hindusthan College Of Engineering And Technology, Coimbatore,

TamilNadu, India

- International Journal For Research In Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538 Volume 10 Issue I Jan 2022
- 'Fiber optic distributed temperature sensing for the determination of air temperature'

  Atmospheric Measurement Techniques 8(1):335-339

  DOI:10.5194/amt-8-335-2015
- 'Areca leaf processing using PIC controller" International Journal of Advance Research in Science and Engineering – Vol 07 issue- 07
- 'A novel energy efficient machine for plate manufacturing from areca palm leaf sheath" Journal of Scientific & Industrial Research – Vol 67 pp 807-811
- Fiber optic temperature sensing for the determination of air temperature. A. P. de Jong, J. D. Slingerland, and N. C. van de Giesen distributed. Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, the Netherlands.
- Intelligent Devices and Microsystems for Industrial Applications Woodhead Publishing Series in Electronic and Optical Materials 2018, Pages 57-85