FABRICATION OF BIRDS AND ANIMAL REPELLENT IN AGRICULTURE LAND

A MINOR PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

BONAFIDE CERTIFICATE

Certified that this project report "FABRICATION OF BIRDS AND ANIMAL REPELLENT IN AGRICULTURE" is the Bonafide work of "VENAY SOLAN S (927622BME100),VISHAAK R S (927622BME102),SARANKUMAR P (927622BME319) who carried out the project work during the academic year 2023 – 2024 under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report 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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INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

We affirm that the Project titled “FABRICATION OF BIRDS AND ANIMAL REPELLENT IN AGRICULTURE” being submitted in partial fulfillment of for the award of Bachelor of Engineering in Mechanical 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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ACKNOWLEDGEMENT

Our sincere thanks to Thiru. **M.Kumarasamy**, Chairman and **Dr. K. Ramakrishnan, B.E,** Secretary of M. Kumarasamy College of Engineering for providing extra ordinary infrastructure, which helped us to complete the project in time.

It is a great privilege for us to express our gratitude to our esteemed Principal **Dr.B.S Murugan M.Tech, Ph.D** for providing us right ambiance for carrying out the project work.

We would like to thank **Dr.M.Loganathan M.E., Ph.D,** Head, Department of Mechanical Engineering, for his unwavering moral support throughout the evolution of the project.

We offer our whole hearted thanks to our internal guide **Mr.S.Saravanakumar M.Tech(Ph.D),** Department of Mechanical Engineering, for his constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We offer our whole hearted thanks to our project coordinator **Dr.S.Saravanakumar M.E, Ph.D.** Assistant Profssor, Department of Mechanical Engineering, for his constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We glad to thank all the Teaching and Non-Teaching Faculty Members of Department of Mechanical Engineering for extending a warm helping hand and valuable suggestions throughout the project.

Words are boundless to thank Our Parents and Friends for their constant encouragement to complete this project successfully.

INSTITUTION VISION & MISSION

Vision

- To emerge as a leader among the top institutions in the field of technical education.

Mission

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- Create a diverse, fully engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT VISION, MISSION, PEO, PO & PSO

Vision

- To create globally recognized competent Mechanical engineers to work in multicultural environment.

Mission

- To impart quality education in the field of mechanical engineering and to enhance their skills, to pursue careers or enter higher education in their area of interest.
- To establish a learner-centric atmosphere along with state-of-the-art research facility.
- To make collaboration with industries, distinguished research institution and to become a center of excellence.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

The graduates of Mechanical Engineering will be able to

- PEO1: Graduates of the program will accommodate insightful information of engineering principles necessary for the applications of engineering.
- PEO2: Graduates of the program will acquire knowledge of recent trends in technology and solve problems in industry.
- PEO3: Graduates of the program will have practical experience and interpersonal skills to work both in local and international environments.
- PEO4: Graduates of the program will possess creative professionalism, understand their ethical responsibility, and commit towards society.

PROGRAM OUTCOMES

The following are the Program Outcomes of Engineering Graduates: Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The following are the Program Specific Outcomes of Engineering Graduates: The students will demonstrate the abilities.

1.Real world application: To comprehend, analyze, design and develop innovative products and provide solutions for real-life problems.

2.Multi-disciplinary areas: To work collaboratively on multi-disciplinary areas and make quality projects.

3.**Research oriented innovative ideas and methods**: To adopt modern tools, mathematical, scientific and engineering fundamentals required to solve industrial and societal problems.

Course Outcomes	**At the end of this course, learners will be able to**:	**Knowledge Level**
CO-1	Identify the issues and challenges related to industry, society and environment.	Apply
CO-2	Describe the identified problem and formulate the possible solutions	Apply
CO-3	Design / Fabricate new experimental set up/devices to provide solutions for the identified problems	Analyze
CO-4	Prepare a detailed report describing the project outcome	Apply
CO-5	Communicate outcome of the project and defend by making an effective oral presentation.	Apply

MAPPING OF PO & PSO WITH THE PROJECT OUTCOME

Course Outcomes	**ProgramOutcomes**												**Program Specific Outcomes**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO - 1	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 2	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 3	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 4	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 5	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3

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CHAPTER 1

ABSTRACT

The solar panel has solar as a renewable energy, charging the battery for continuous operation. The relay motherboard serves as the control hub, managing the interaction between components. When triggered, the system activates the speaker and LED light to create a deterrent effect, discouraging birds and animals from the targeted area. This eco-friendly solution aims to mitigate bird-related issues in agricultural settings, reducing the reliance on conventional power sources. The integration of sustainable technology not only enhances efficiency but also aligns with a broader commitment to environmentally conscious practices. This work showcases the potential for innovative, self-sufficient bird repellent solutions in addressing challenges faced by various birds and animals in the agricultural land by the farmers. This project is about protecting the land from animal and bird so we have introduced our new animal and bird repellent system. It consists of a solar panel connected with a light and a speaker which produces sounds using lithium battery and an IR sensor which detects the animal around 5 m and automatically switch on the light that blinks and avoid the animal to enter the land. In morning speaker is used to repel birds with the sound waves. And the solar panel absorb the energy from the sunlight. Then provides the energy to the light to blink on night.

CHAPTER 2

INTRODUCTION

In response to the increasing challenges posed by bird intrusion in various environments, a sophisticated and eco-friendly solution has emerged: a bird repellent system powered by solar energy. This innovative device integrates a solar panel, battery, relay motherboard, speaker, and LED light to create a comprehensive avian deterrent.

Harnessing the abundant energy of the sun, the solar panel serves as the primary power source, emphasizing sustainability and reducing the environmental impact. The harvested solar energy is stored in a high-capacity battery, ensuring continuous operation even during periods of low sunlight. This self-sustaining power system not only enhances efficiency but also promotes a greener approach to bird control.

The heart of the system lies in the relay motherboard, acting as the central intelligence hub. It orchestrates the seamless coordination between the various components, optimizing the device's overall performance. The motherboard interprets inputs, processes data, and triggers the appropriate responses, creating a dynamic and responsive bird repellent mechanism.

To deter birds effectively, the system employs a combination of auditory and visual stimuli. The integrated speaker emits carefully crafted sounds that discourage avian presence, mimicking predatory calls or signals associated with danger. Simultaneously, the LED light provides a visual deterrent, creating an environment that is unappealing to birds.

This holistic approach to bird control not only addresses the immediate challenge of unwanted avian presence but does so in a sustainable and humane manner. By utilizing solar energy, the device exemplifies a commitment to environmental responsibility while delivering from a harmers to agriculture land.

CHAPTER 3

WORKING PRINCIPLE

It's a project based on helping to save the agricultural field from birds and animals. It works with a solar power panel, that includes a light and a speaker with sensor (that produces lighting and sound effect).

The light is connected to the solar panel and a sensor. In daytime there is only possible birds would damage the agricultural field.so the speaker gives the sound to repel the birds from the field. The speaker gives more sound, and it doesn't cause any dangerous effect to the birds. It is based on that the speaker is used to repel the birds from the field.

The solar panel saves the energy in whole day. In night times, only animals would damage the fields like forest pig, elephant etc..,. The light uses the saved energy from the solar panel and produces light supply by blinking, then repel the animals in the opposite direction of the field.

If it's a big animal means we can switch on sound system also (recorded with crackers sound) it makes some much better to repel the big animals.

If in the place there only small animals like rats be threatening, if it would come near to the field the sensor will activated, it reflects the light supply by blinking and it repels the animals. We make the light supply blinking because if the light is on, too long.

It attracts the insects to the field. By blinking there is not a much possible way, the insects will come and damage the fields.

This integrated approach creates an effective bird repellent system, relying on sustainable solar power for eco-friendly functionality. The solar panel ensures autonomous operation, making it a low-maintenance solution for bird control in various environments.

CHAPTER 4
MAJOR COMPONENTS

4.1. FRAME

4.2. BATTERY

4.3. LED LIGHT

4.4. SOLAR PANNEL

4.5. CIRCUITS (IR SENSOR, MOTHER BOARD, RELAY)

4.6. SPEAKER

4.1 FRAME

Material: Mild steel

Mild steel is a type of carbon steel with a low amount of carbon; thus, the terms low-carbon steel and mild steel are generally used interchangeably. Carbon steels are metals that contain a small percentage of carbon (max 2.1%) which enhances the properties of pure iron. The carbon content varies depending on the requirements for the steel. Low-carbon steels contain carbon in the range of 0.05 to 0.25%. There are different grades of mild steel. But they all have carbon content within the above-mentioned limits. Other elements are added to improve useful properties like corrosion resistance, wear resistance and tensile strength.

Fig.4.4.1 Black carbon steel

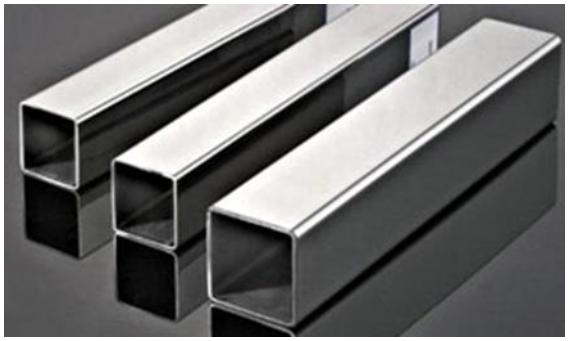


Fig 4.4.2 Mild steel

Less carbon means that mild steel is typically more ductile, machinable, and weldable than high carbon and other steels, however, it also means it is nearly impossible to harden and strengthen through heating and quenching. The low carbon content also means it has very little carbon and other alloying elements to block dislocations in its crystal structure, generally resulting in less tensile strength than high carbon and alloy steels. Mild steel also has a high amount of iron and ferrite, making it magnetic.The lack of alloying elements such as those found in stainless steels means that the iron in mild steel is subject to oxidation (rust) if not properly coated. But the negligible amount of alloying elements also helps mild steel to be relatively affordable when compared with other steels.

4.2 BATTERY

Fig.4.2.1 Lithium -ion battery

A battery is a device that converts chemical energy directly to electrical energy. It consists of several voltaic cells; each voltaic cell consists of two half cells connected in series by a conductive electrolyte containing anions and cations. One half cell includes electrolyte and the electrode to which anions migrate, i.e., the anode or negative electrode; the other half-cell includes electrolyte and the electrode to which cations migrate, i.e., the cathode or positive electrode. In the redox reaction that powers the battery, reduction occurs to cations at the cathode, while oxidation occurs to anions at the anode. The electrodes do not touch each other but they are electrically connected by the electrolyte. Some cells use two half-cells with different electrolytes. A separator between half cells allows ions to flow but prevents mixing of the electrolytes. Each half cell has an electromotive force determined by its ability to drive electric current from the interior to the exterior of the cell. The net EMF of the cell is the difference between the EMF of its half-cells, as first recognized by Volta. Therefore, if the electrodes have EMF and, then the net EMF is in other words, the net EMF is the difference between the reduction potentials of the half-reactions.

4.3 LED LIGHT

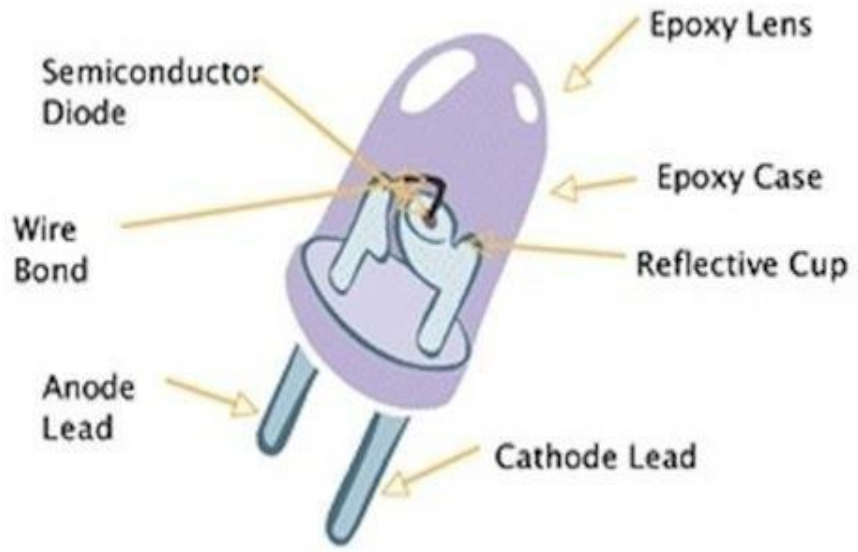


Fig.4.3.1 Led light components

Fig.4.3.2 Led light

A **LED lamp** or **LED light bulb** is an electric light for use in light fixtures that produces light using light-emitting diode (LED).

The initial cost of LED is usually higher. Degradation of LED dye and packaging materials reduces light output to some extent over time. Some LED lamps are made to be a directly compatible drop-in replacement for incandescent or fluorescent lamps.

An LED lamp packaging may show the lumen output, power consumption in watts, color temperature in kelvins or description (e.g. "warm white", "cool white" or "daylight"), operating temperature range, and sometimes the equivalent wattage of an incandescent lamp of similar luminous output.

Most LEDs do not emit light in all directions, and their directional characteristics affect the design of lamps, although omnidirectional lamps which radiate light over a 360° angle are becoming more common.

The light output of single LED is less than that of incandescent and compact fluorescent lamps; in most applications multiple LEDs are used to form a lamp, although high-power versions are becoming available.

LEDs, as their name suggests, operate as diodes and run on direct current (DC), whereas mains current is alternating current (AC) and usually at much higher voltage than the LED can accept. Although low voltage LED lamps are available now a days.

4.4 SOLAR PANNEL

We recommend a solar array created from individual solar cells as opposed to one made of prefabricated solar panels. It enhances the students' learning and can result in a lighter solar array. Cells can be bought from either Siemens or ASE Americas. Both sell the terrestrial-grade cells that are permitted in the Winston Solar Challenge, and the cost for terrestrial-grade cells are much lower than space grade cells, though terrestrial-grade is less efficient. Each solar cell should produce .5 volts at about 3 amps at peak sunlight. The number of cells to use depends on their size and the allowable solar area per Winston rules. Solar cells should be wired in series on a panel and should be divided into several zones. For example, if you have 750 solar cells, you might want to wire 3 sets of 250 cells, each zone producing about 125 volts. If one zone fails, two other zones are still producing power.

Solar panel refers either to a photovoltaic module, a solar hot water panel, or to a set of solar photovoltaic (PV) modules electrically connected and mounted on a supporting structure. A PV module is a packaged, connected assembly of solar cells. Solar panels can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications.

Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts.The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. There are a few solar panels available that are exceeding 19% efficiency.

A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes a panel or an array of solar modules, an inverter, and sometimes a battery and/or solar tracker and interconnection wiring.

Fig.4.4.1 solar panel

Solar modules use light energy (photons) from the sun to generate electricity through the photovoltaic effect. Most modules use wafer-based crystalline silicon cells or thin-film cells based on cadmium telluride or silicon.

Flexible thin film cells and modules are created on the same production line by depositing the photoactive layer and other necessary layers on a flexible substrate.

The structural (load carrying) member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture. Most solar modules are rigid, the cells are assembled into modules by laminating them to a transparent colorless fluoropolymer on the front side (typically ETFE or FEP) and a polymer suitable for bonding to the final substrate on the other side. The only commercially available (in MW quantities) flexible module uses amorphous silicon triple junction (from Unisolar).

Flexible thin-film panels are optimal for portable applications as they are much more resistant to breakage than regular crystalline cells, but can be broken by bending them into a sharp angle. They are also much lighter per square foot than standard rigid solar panels.

4.5 CIRCUITS

4.5.1 IR Sensor

An IR sensor is an electronic device that detects IR radiation falling on it. Proximity sensors (used in touchscreen phones and edge-avoiding robots), contrast sensors (used in line following robots), and obstruction counters/sensors (used for counting goods and in burglar alarms) are some applications involving IR sensors.

IR Sensor Working Principle:

An IR sensor consists of two parts, the emitter circuit, and the receiver circuit. This is collectively known as a photo-coupler or an optocoupler.The emitter is an IR LED and the detector is an IR photodiode. The IR photodiode is sensitive to the IR light emitted by an IR LED. The photodiode's resistance and output voltage change in proportion to the IR light received. This is the underlying working principle of the IR sensor.

The type of incidence can be direct incidence or indirect incidence. In direct incidence, the IR LED is placed in front of a photodiode with no obstacle.In indirect incidence, both the diodes are placed side by side with an opaque object in front of the sensor. The light from the IR LED hits the opaque surface and reflects back to the photodiode.

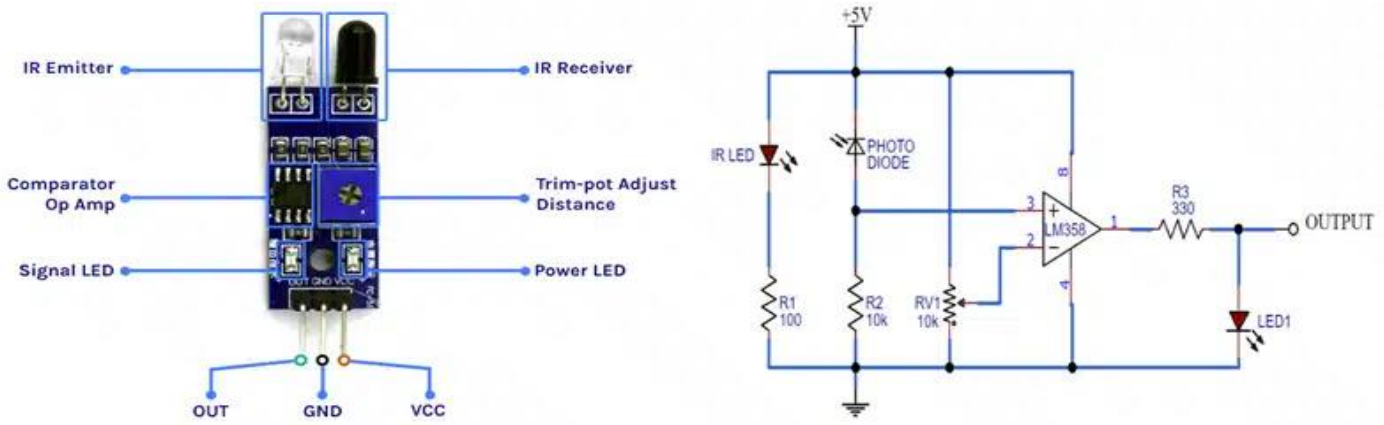


Fig.4.5.1 Parts and Circuit diagram of IR sensor

4.5.2 MOTHER BOARD (OR) AURDUINO

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

Arduino uses these libraries. The predefined libraries are written in C and C++. One can even write his software in C\C++ and use them on Wiring boards. The difference between writing a program in C/C++ and Wiring is that the Wiring Application Programmable Interface (API) has simplified programming style and the user doesn't require detailed knowledge of the concepts like classes, objects, pointers, etc. While sketching hardware you need to call the predefined functions and rest will be handled by the Wiring software.

The basic difference between the Processing and the Wiring is that the Processing is use to write the program which can be used on other computers while Wiring program is used on microcontrollers.

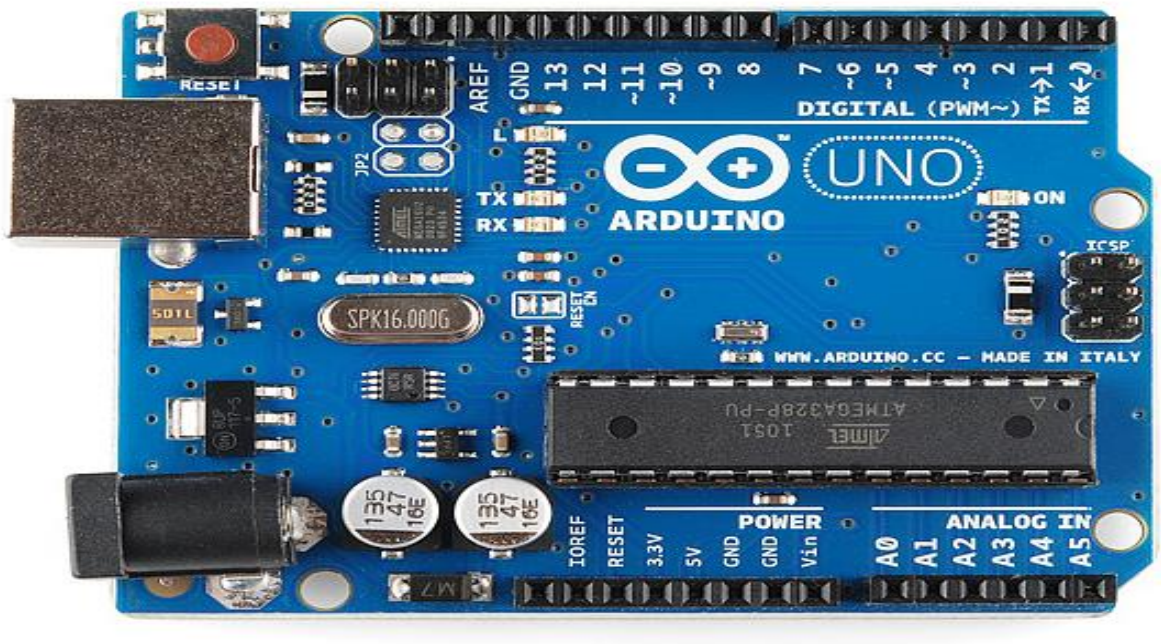


Fig.4.5.2 Mother Board

4.5.3 RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.

The coil current can be on or off, so relays have two switch positions, and they are double throw (changeover) switches. Relays allow one circuit to switch to a second circuit which can be separated from the first.

For example, a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages.

Most ICs (chips) cannot provide this current, and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.

Fig.4.5.3(a)Types of relay coils

Relays are usually SPDT or DPDT but they can have many more sets of switch contacts, for example relays with 4 sets of changeover contacts are readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic relay.

The animated picture shows a working relay with its coil and switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. There is one set of contacts (SPDT) in the foreground and another behind them, making the relay DPDT

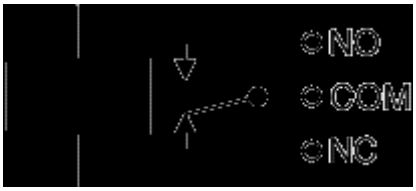


Fig.4.5.3(b) Relay diagram

The relay's switch connections are usually labeled COM, NC and NO:

• COM = Common, always connect to this, it is the moving part of the switch.

• NC = Normally Closed, COM is connected to this when the relay coil is off.

• NO = Normally Open, COM is connected to this when the relay coil is on.

Pin Diagram:

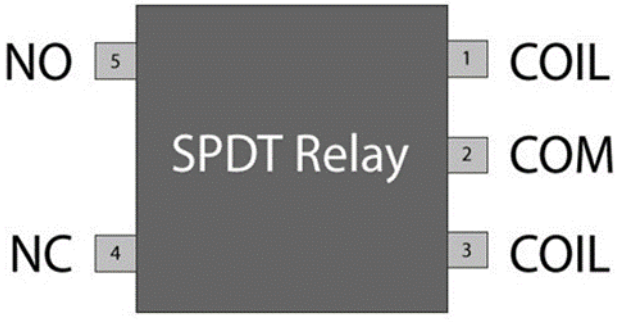


Fig.4.5.3(c) SPDT Relay Pin Diagram

4.6 SPEAKER

Fig.4.6 speaker

A loudspeaker, also known as a speaker, is a device that converts electrical signals into sound waves. Its primary function is to reproduce audio content with clarity and fidelity, making it an integral component in audio systems ranging from small portable devices to large concert venues.

At its core, a loudspeaker consists of several key elements, each playing a crucial role in the overall sound reproduction process. The most fundamental part is the diaphragm, often a cone or dome-shaped structure, which is responsible for generating the sound waves. The diaphragm is typically made of lightweight and rigid materials, allowing it to vibrate efficiently in response to electrical signals.

Surrounding the diaphragm is a frame, or basket, that provides structural support and houses other components. The voice coil, a wire wound around a cylindrical former, is attached to the diaphragm. When an electrical current flows through the voice coil, it interacts with a magnetic field produced by a magnet within the speaker, causing the diaphragm to move back and forth rapidly. This movement creates changes in air pressure, generating sound waves that replicate the original audio signal.

Loudspeakers are often categorized based on their design and usage. Two common types are dynamic (or moving coil) speakers and electrostatic speakers. Dynamic speakers, the most prevalent type, utilize a diaphragm attached to a voice coil, as described earlier.

CHAPTER 5

FABRICATION PROCESS

Fabrication processes are the steps through which raw materials are transformed into a final product. The fabrication process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Fabrication processes can include treating (such as heat treating or coating), machining, or reshaping the material. The process fabrication also includes tests and checks for quality assurance during or after the fabrication , and planning the production process prior to manufacturing. These process includes:

i. Sawing
ii. Welding
iii. Soldering
iv. Circuit board connection
v. Solar panel connection
vi. Batter connection

5.1 SAWING

Cold saws are saws that make use of a circular saw blade to cut through various types of metal, including sheet metal. The name of the saw has to do with the action that takes place during the cutting process, which manages to keep both the metal and the blade from becoming too hot. A cold saw is powered with electricity and is usually a stationary type of saw machine rather than a portable type of saw.

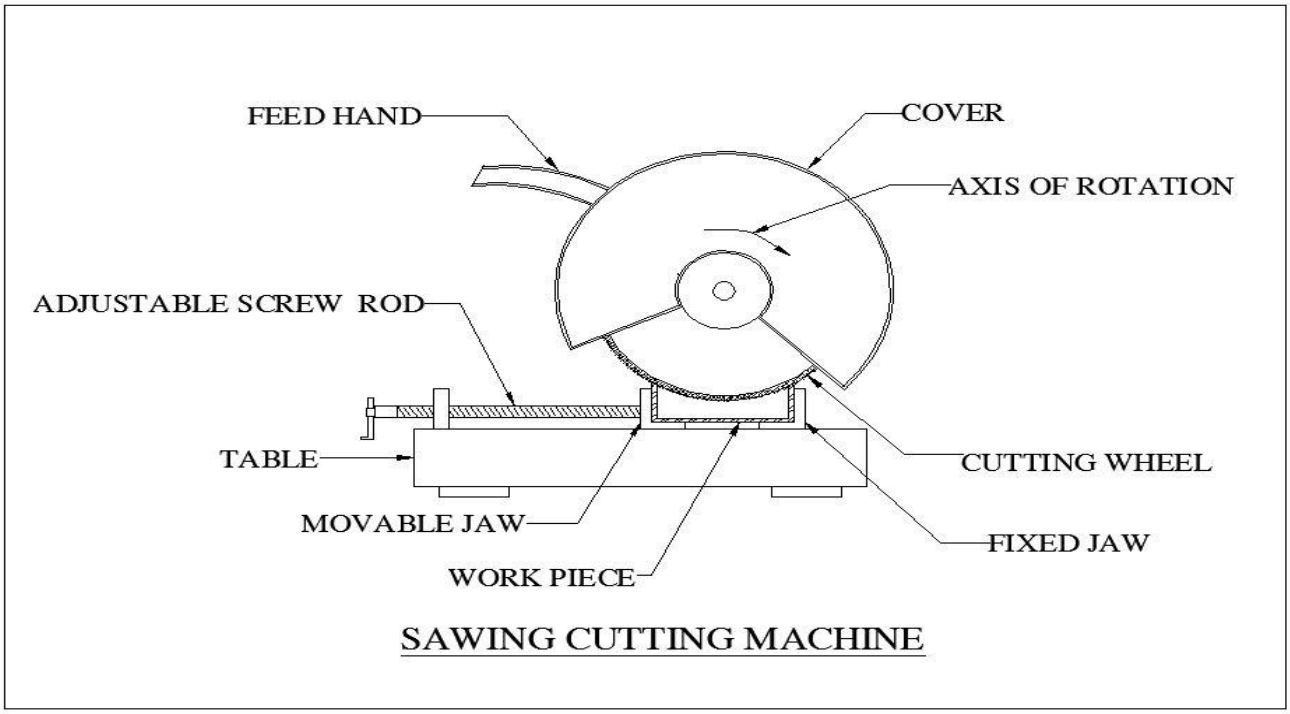


Fig 5.1 Sawing process diagram

5.2 WELDING

Welding is a process for joining similar metals. Welding joins metals by melting and fusing **1,** the base metals being joined and **2,** the filler metal applied. Welding employs pinpointed, localized heat input. Most welding involves ferrous-based metals such as steel and stainless steel. Weld joints are usually stronger than or as strong as the base metals being joined.

Welding is used for making permanent joints. We used mild steel for easy carrying component from one place to another .We had done a frame setup to assemble and mount our components in that frame setup.

5.2.1 OPERATION

Several welding processes are based on heating with an electric arc, only a few are considered here, starting with the oldest, simple arc welding, also known as shielded metal arc welding (SMAW) or stick welding.

In this process an electrical machine (which may be DC or AC, but nowadays is usually AC) supplies current to an electrode holder which carries an electrode which is normally coated with a mixture of chemicals or flux. An earth cable connects the work piece to the welding machine to provide a return path for the current.

The weld is initiated by tapping ('striking') the tip of the electrode against the work piece which initiates an electric arc. The high temperature generated (about 6000^{o}C) almost instantly produces a molten pool and the end of the electrode continuously melts into this pool and forms the joint. The operator needs to control the gap between the electrode tip and the work piece while moving the electrode along the joint.

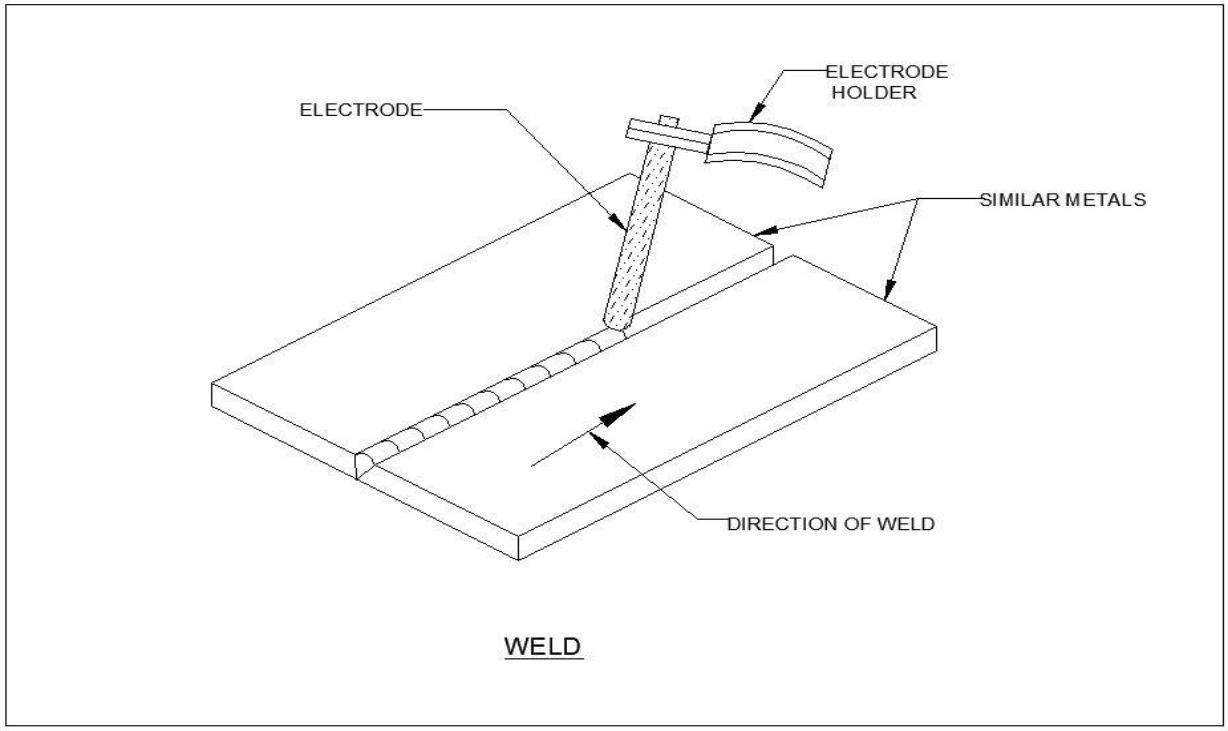


Fig 5.2(a) SMAW process diagram

5.3 SOLDERING

Soldering is a process used for joining metal parts to form a mechanical or electrical bond. It typically uses a low melting point metal alloy (solder) which is melted and applied to the metal parts to be joined and this bonds to the metal parts and forms a connection when the solder solidifies.

We had used soldering to connect the relay, speaker, Arduino and light with the IR sensor these soldering work is done to connect these NO , NC and COM units.

5.4 CIRCUIT BOARD CONNECTION

Step-by-Step Process:

Understand the IR Sensor and Relay Pinouts:

IR Sensor Module: Usually has three pins: Vcc, GND, and OUT (signal).Relay Module: Typically has three control pins (Vcc, GND, IN) and three or more output pins (NO, NC, COM for Normally Open, Normally Closed, and Common).Connecting the IR Sensor to the Microcontroller:

Vcc (IR Sensor): Connect to the 5V pin of the microcontroller.

GND (IR Sensor): Connect to the ground (GND) pin of the microcontroller.

OUT (IR Sensor): Connect to one of the digital input pins of the microcontroller (e.g., D2).

Connecting the Relay to the Microcontroller:

Vcc (Relay): Connect to the 5V pin of the microcontroller.

GND (Relay): Connect to the ground (GND) pin of the microcontroller.

IN (Relay): Connect to one of the digital output pins of the microcontroller (e.g., D8).

Powering the Components:

Ensure that your microcontroller is powered properly via USB or an external power source.

Both the IR sensor and the relay module will draw power from the microcontroller’s 5V and GND pins.

5.5 SOLAR PANEL CONNECTION

Connection of solar panel with the 12V battery. Use two diodes to not short circuit the solar panel. Expose the Solar Panel to Sunlight and Set Up the Multimeter by turning on the multimeter set the multimeter to measure DC voltage (V with a straight line and a dashed line beneath it).Select a voltage range that is higher than the maximum voltage rating of the solar panel (typically 20V or 200V).

Expose the Solar Panel to Sunlight we need to place the solar panel in direct sunlight or under a strong artificial light source to generate maximum voltage. Connect the Multimeter Probes with Connect the red (positive) probe to the positive terminal of the solar panel. Connect the black (negative) probe to the negative terminal of the solar panel.

Read the Voltage by Looking at the multimeter display to read the voltage output of the solar panel. This value represents the open-circuit voltage (Voc), which is the maximum voltage the panel can produce without a load connected. Turn on the multimeter, set the multimeter to measure DC voltage (V with a straight line and a dashed line beneath it).Select a voltage range that is higher than the maximum voltage rating of the solar panel (typically 20V or 200V.

Fig.5.5 An image of testing the solar Pannel with multimeter

5.6 BATTERY CONNECTION

Connection of positive terminal of solar panel and the circuit board with positive terminal of battery. Connection of negative terminal of solar panel and the circuit board with negative terminal of battery.

Storage of volts in solar panel is stored in battery ,it is eco- friendly to operate in night time for repelling the animals in night times.

CHAPTER 6
ADVANTAGES AND APPLICATIONS

ADVANTAGES

1) Solar panels uses solar as a renewable energy, making the system sustainable and cost-effective.

2) It is environmentally eco- friendly.

3) They themselves typically do not pose direct health hazards.

4) It doesn't cause any bad effect to the animals and birds. It can be helped not only in the agriculture field, wherever any problems are created by birds or animals, it is manufactured in low cost.

5) It saves our time and energy to repel the birds and animals.

6) It can be used in both day and night.It doesn't disturb during night times because, this is quiet interesting that at night time it uses only light to repel the animals.

APPLICATION

A bird repellent machine can be used in various settings, including agriculture, airports, industrial facilities, and public spaces. These machines are designed to deter birds from roosting or nesting in specific areas, helping to prevent damage to crops, protect structures, and maintain cleanliness in public spaces. The machines may use various methods such as sound, light, or physical deterrents to discourage birds from congregating in unwanted areas.

CHAPTER 7

MATERIAL USED

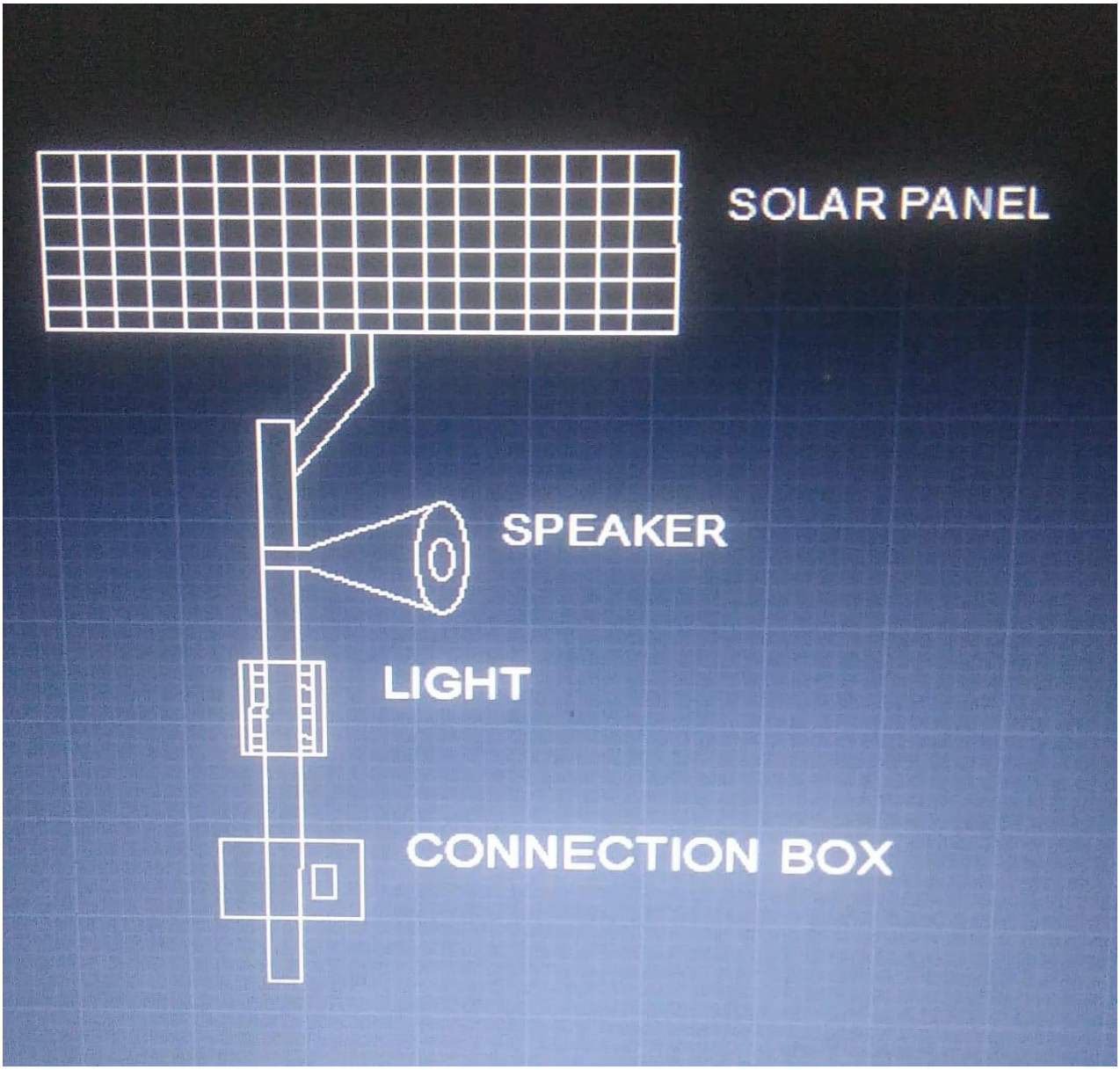
S.No	DESCIRPTION	QTY	MATERIAL
1	BATTERY	1	ELECTRICAL
2	LED LIGHT	1	ELECTRICAL
3	SOLAR PANNEL	1	ELECTRICAL
4	FRAME	AS PER REQUIRMENT	MILD STEEL
5	CIRCUIT;	AS PER REQUIREMENT	ELECTRICAL
6	RELAY	1	ELECTRICAL
7	MOTHER BOARD	1	ELECTRICAL
8	IR SENSOR	1	ELECTRICAL
9	SPEAKER	1	ELECTRICAL

COST ESTIMATION

S.NO	DISCRIPTION	COST Rs:
1	BATTERY (Li-ion)	1200
2	LED LIGHT	150
3	SOLAR PANNEL	670
4	FRAME AND WELDING	600
5	CIRCUITS(RELAY, MOTHER BOARD, IR SENSOR)	2000
6	SPEAKER	650
7	TOTAL	5270

CHAPTER 8

AUTOCAD 2D DIAGRAM



CHAPTER 9

CONCLUSION AND REFERENCE

CONCLUSION

In conclusion, the birds and animal repellent help the farmers to protect the land from animals and birds. It reduces the manpower and saves the time and energy. It is environmentally eco- friendly. They themselves typically do not pose direct health hazards. It doesn't cause any bad effect to the animals and birds.

It can be helped not only in the agriculture field, wherever any problems are created by birds or animals, it is manufactured in low cost.

It saves our time and energy to repel the birds and animals. It can be used in both day and night.It doesn't disturb during night times because, this is quiet interesting that at night time it uses only light to repel the animals.

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