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Farmer Friendly Solar Based Electric Fence for Rural Agriculture

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Abstract - : Agriculture provides all the people's food needsas well as a variety of raw materials for industry. However, there is a significant loss of crops due to animal intrusion in agricultural lands. Wild animals will wreak havoc on crops. As a result, it's critical to keep an eye out for animals in the region. Then various devices should be activated to repel the dangerous animals. Operational amplifier circuits are put in place primarily for the purpose of detecting animal intrusion into the farm. The completed protection system is responsible for providing early warning of potential wild animal intrusion and harm.

***Key Words*:** agriculture operational amplifier circuits farm

1.INTRODUCTION

Agriculture in India is the broadest economic sector and plays a significant role in the overall socio-economic factor of India. In such areas electric fencing system can be employed in which the animals experience a high voltage low current shock for a very short time. Usually, PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared" and "IR motion" sensors. A photoelectric sensor, or photo eye, is a device used to detect the distance, absence or presence of an object by using a light transmitter often infrared and a photoelectric receiver. They are used extensively in industrial manufacturing. There are three different functional types: opposed (through beam), R-reflective, and proximity-sensing (diffused). India has about 95 percent clear sunny days with average daily incidence of solar the solar photovoltaic system has certain disadvantages as relatively high initial investment, requires storage devices. Solar energy available at a place is not a constant local weather conditions effect on its reception; it is not in concentrated form hence collection and concentrating surfaces are required. The solar photovoltaic (SPV) system converts the sunlight directly into DC voltage. The solar power fencing system provides both an economical a day's being efficiently used for electric fencing purpose. Solar-powered fencing-system enables the control of animals by giving them a short, sharp but safe shock which is sufficiently memorable that they never forget it. Farmers are always exposed to various external risks like weather dependence, market prices, inputs availability etc. Another potent risk for farming is damage to crops by stray/wild animals. For Himachal Pradesh more than wild animals the farmers are exposed to risk of crop damage from monkeys. To protect crops from monkeys

2. PROBLEM STATEMENT

Improper fencing causes disturbance and irregular conditions in farms and agricultural fields. • Animals invading the fields in search of food is a major problem as it destroys the crops. • Dangerous accidents and deaths are the outcomes of careless fencing methods. • Protection of property or land can be improvised as the older fencing methods haven't proven to be much effective.

3. BLOCK DIAGRAM:

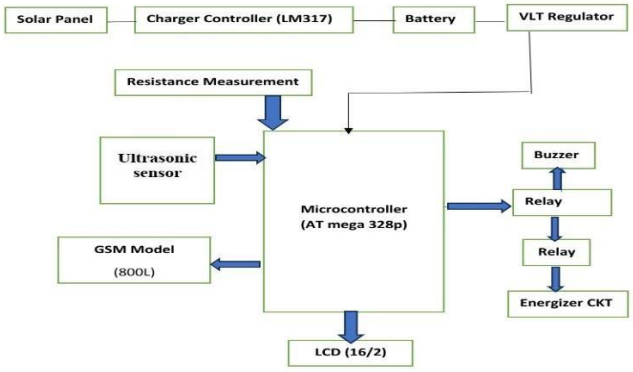
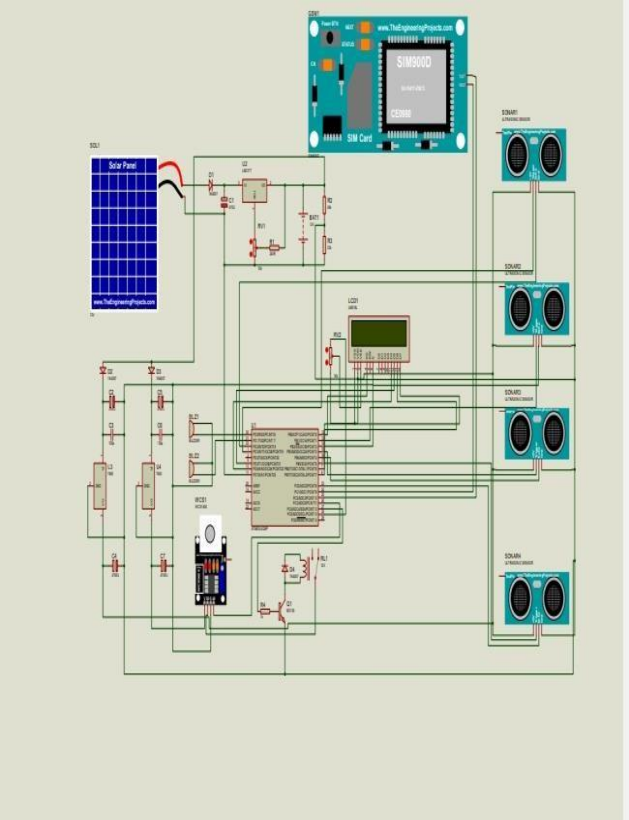


Fig.: Block Diagram of Solar Power Fencing Based on GSM Technology for Agriculture

3. CIRCUIT DIAGRAM



4. HARDWARE REQUIRED

GSM Modem: A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial USB or Bluetooth connection or it can be a mobile phone that provides GSM modem capabilities. For the purpose of this document the term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols

Fig. : GSM Modem

Solar Panel: Solar panels absorb the sunlight as a source of energy to generate electricity or heat. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar 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 365 Watts (W). A photovoltaic system typically includes an array of

Ultrasonic sensor This KY-008 Laser Module 650nm 5V is very easy to use, you can use Arduino control, do controllable laser pointer, theft detection, etc. interesting application devices. The laser head is composed of a light-emitting tube, condenser lens and adjustable copper sleeve and it is assembled when delivered; the focal length of the lens is adjusted glued by strong glue stick, which can work directly after connecting to a 5V DC power supply

Voltage Regulator: The voltage regulator IC maintains the output voltage at a constant value and provides +5V regulated supply which is required for the microcontroller. It may be use to regulate one or more AC or DC voltages.

Battery: An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device. When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver energy to the external circuit

Relay Driver: Relay**s** are electromechanical devices which are used as a switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The main advantages of using relay as a switch is that, they provide electrical isolation between inputs with the help of magnetic coupling and also we can handle a large power using a relay.

Buzzer: A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is used in the system for indication purpose. It indicates its alert when the unwanted person comes in contact with the fence area

5. WORKING PRINCIPLE:

A solar panel is made up of a number of photovoltaic cells connected in series. Electricity is generated by these cells. Combined into a solar panel, these cells can produce enough voltage to charge a regular 12-volt battery. The solar panel ensures that the battery remains charged at all times. The battery stores the energy generated by the panel, and powers the energizer 24 hours a day. The energizer is the device which transform the low voltage current from battery to high voltage (up to 10,000 volts) current and sends it to the electric fence. This way the fence is electrified and animals touching the fence receive the shock. Due to high voltage shock to the animals touching the fence, animals keep away from the fence and field is protected. The working of solar power fencing system is shown by fig. below

6. RESULT:

When the motion is detected by PIR motion sensor, the microcontroller gives the signal to the GSM module and buzzer. The GSM module send the message to authorized person and buzzer gives the indication. The microcontroller provides the delay of 6 second to turn on the relay and fencing circuit will on. The current flowing through the fencing wire is 0.6 mA, and the voltage across phase and neutral is 230-240 V. The microcontroller provides a delay of 5 second to turn off the relay and the fencing circuit will off. The red LED gives the on-off status of fencing circuit

7. CONCLUSION:

Thus, we are concluded the solar fencing system is designed and fabricated successfully. The project shows that the proposed system is simple and efficient one. We are saving cost in order to implement this project for security purpose as well as less time consume. In the existing system, the fencing is operated by passing continuous electric power supply. Due to continuous power flow in the fencing system, the living beings are affected. Disadvantage of existing system is the Electric power loss. There is need for government approval for giving current shock on the fence. Affect the Human beings. Instead of electric power supply, using sensor and GSM Modem to reduce powerlevel. Fence works on Solar Energy with backup facility to run uninterruptedly during the nights, as well as the cloudy days. Motor can be controlled by GSM. Advantage of our proposed system are Solar energy is used, Easy to control and maintain the fence, Less time consuming.

REFERENCES

[1] Electric fence reference Manual by G mckillop1, H W Pepper2, R Butt2 and D W Poole1. 1. Central Science Laboratory, Sand Hutton, York, YO41 1LZ 2. Forestry Commission, Alice Holt Lodge, Wrecclesham, Farnham, Surrey, GU10 4LH

[2] Electric fence Manual-Wildlife management series.

[3] Electric Fencing for Bears-Department of games and inland fisheries, Virginia.

[4] Solar Energy for Electric Vehicles, 2015 IEEE Conference on Technologies for Sustainability (Sus Tech).

[5] Justine Sanchez, Determining PV Array Maximum System Voltage, Home Power Magazine Issue #146, December / January 2012

[6] Paul Mink and John Berdner, Solar Pro Magazine, Issue 2.5, Aug/Sep 200