FARMER FRIENDLY SOLAR ELECTRIC FENCE FOR AGRICULTURE LAND

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Abstract — Crops are vulnerable to animals. Because of this it is very essential to monitor the surrounding area of farm, where the presence of animals. In this paper we present a method to protect farm from animals by using microcontroller based electric fence circuit using other peripheral devices like ADC, GSM system, PIR sensor, buzzer. The developed system is not harmful to animal and human being.

Key words: Solar Panel, Microcontroller, ADC, voltage sampler, rechargeable battery, speaker, fence,

1. INTRODUCTION

Solar Electric fencing is one of the efficient periphery systems to protect your property than conventional barbed wire fencing. When an animal or human being comes into contact with the electric Fence they receive a sharp, short, painful but safe electric shock. The shock does not cause any physical damage. After a period of conditioning, the mere presence of the fence acts as an effective barrier even if it is not powered ‘ON’. Electric fence can be made to detect a fault on the fence like shorting or cutting of the wire due to tampering on the fence with the Alarm system. Nano Bright Solar offers customized solutions for solar electric fencing according to your needs.

2. LITERATURE SURVEY

the economy of many countries is dependent upon agriculture. In spite of economic development agriculture is the backbone of the economy. Agriculture is the main stay of economy. It contributes to the gross domestic product. Agriculture meets food requirements of the people and produces several raw materials for industries. Electric fence was first used in Texas in 1888. To implement this project we have used microcontroller for much flash memory for project operation. When farmer send message to the microcontroller through GSM and then fence is ON. Disadvantages of this project is there is possibility of short circuit in rainy seasons or feeding water to farm, so reducing this problem grounding should be
done properly. IN this project we use solar energy for supply power to the fence circuit, by using this renewable energy we conserve conventional sources.

3. BLOCK DIAGRAM

- This fence system is powered by a 12V rechargeable battery. A solar panel is connected to the battery to charge on day time. The battery is connected to the inverter. This inverter is used to convert the 12 Volt D.C to the 230 Volt A.C. This 230 Volt A.C voltage is used to activate the loads. Here we are also using Conventional Battery Charger Unit to recharge the battery.
- AT89S52 micro controller is the heart of the circuit as it controls all the functions.
- A voltage sampler is interfaced with the system using ADC 0808 to get the DC voltage generated from solar panel stored in battery as a display on a 16X2 LCD.
- Depending on electric fence, alert will be announced by speaker through prerecorded voice module.
- This Conventional power source uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.
4. Description of block diagram component

A. Solar panel: Solar panels are devices that convert light into electricity. Solar panels make use of renewable energy from the sun, and are a clean and environmentally sound means of collecting solar energy.

A solar panel is a collection of solar cells. Lots of small solar cells spread over a large area can work together to provide enough power to be useful. The more light that hits a cell, the more electricity it produces.

B. Rechargeable battery: A rechargeable battery or storage battery is a group of one or more electrochemical cells. They are known as secondary cells because their electrochemical reactions are electrically reversible. Rechargeable batteries come in many different shapes and sizes, ranging anything from a button cell to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of chemicals are commonly used, including: lead-acid, nickel cadmium (NiCd), nickel metal hydride (NiMH), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer).

C. Inverter: An inverter is an electrical device that converts direct current (DC) to alternating current (AC); the converted AC can be at any required voltage and frequency with the use of appropriate transformers, switching, and control circuits. Solid-state inverters have no moving parts and are used in a wide range of applications, from small switching power supplies in computers, to large electric utility high-voltage direct current applications that transport bulk power. Inverters are commonly used to supply AC power from DC sources such as solar panels or batteries.

D. Analog to digital converter: Analog-to-digital converters are among the most widely used devices for data acquisition. Digital systems use binary values, but in the physical world everything is continuous i.e., analog values. Temperature, pressure (wind or liquid), humidity and velocity are the physical analog quantities.

E. AT89S52 MICROCONTROLLER: The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

F. LCD: LCD stands for Liquid Crystal Display. LCD is finding widespread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

- The declining prices of LCDs.
- The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
● Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.

● Ease of programming for characters and graphics.

G. Speaker :- Speakers are popular output devices used with computer systems. They receive audio input from the computer's sound card and produce audio output in the form of sound waves. Most computer speakers are active speakers, meaning they have an internal amplifier which allows you to increase the volume, or amplitude, of the sound. Speakers usually come in pairs, which allows them to produce stereo sound from two separate audio channel. Speakers are one of the most common output devices used with computer systems.

5. ADVANTAGES

● Protected animals
● Renewable Energy Opportunities on the Farm.
● Effective and active crop and asset protection
● Safety
● Durability
● Convenience to operate
● Low maintenance
● Designed to work on solar energy and hence independent of grid power
● Significantly reduces man-animal conflicts
● Effective wildlife management tool for park managers
● Cost effective and return on investment starts

6. APPLICATION

● Security of agriculture crops from animals
● Strangers can be prohibited from entering into the Agri-field.
● Electric fence systems have varied application in Agriculture, Industrial and Forestry Or Plantation sectors. With increasing crime in urban areas, this proven technology has now been adapted for domestic security applications, too.

● **Industrial:** Security Electric Fence systems provide 100% protections against theft, Pilferage, arson, sabotage............. The fence systems can also be integrated with other security devices like sirens, flood lights etc., making it impenetrable.

● **Domestic:** The wall top system for residential applications is sleek, aesthetic and ideal for compounds, rooftops, farm houses and apartments.
7. DISADVANTAGES

- Electric fence can be real danger for small children and pets.
- Mechanical assembly is complex.
- Battery voltage required to inspect continuously.
- Vulnerability to power outages.

8. CONCLUSION

The project “FARMER FRIENDLY SOLAR BASED ELECTRIC FENCE PROTECTION FOR RURAL AGRICULTURE” is designed such that it can be installed on any surface. It is much easy and cost effective than increasing the height of the wall. The project is easily expandable and can be used by farmer to increase the security of the land from animals, and compatible with all types of additional security gadgets.

9. FUTURE SCOPE

This project can be base made on image processing. If animal come towards the farm then the image of animal can be detect by using camera. This process can be done through wireless network. We can use LDR it detects light intensity. If it is less it will focus the light, so that wild animals will not enter into the farm.

10. REFERENCES


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