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An Innovative Approach to Control Pesticide Sprayer Using Solar Based Bluetooth Device

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ABSTRACT: Agriculture is a profession of farmers, which consists of many tedious processes and practices, one of which is the sprinkling of insecticides in the farm fields. A different farms field requires extensive spraying every 3-4 days in the summer and every 5-6 days in the rainy season. Already methods in use, we know are like: a person carrying a sprayer and manually actuating a to generate pressure and pump the pesticide through a tube or a mobile vehicle carrying an inbuilt compressor and sprayer unit which has to be including manually driven by a human operator. These methods are working under fuel consuming. Another major disadvantage in human operated systems is that the operator is exposed to the harmful chemicals while spraying. Long term exposure, can be extremely detrimental to the operator's health. In this paper is presented, a viable alternate to these methods. The Automatic sprayer is a four wheeled vehicle which sprays pesticide in any given fields with almost zero human assistance. The vehicle is powered using an onboard solar powered battery which brings down the running cost. The control of the vehicle is achieved using an inbuilt microcontroller unit which is programmed to respond to the Bluetooth device.

KEYWORDS*:* Microcontroller, Solar panel, Battery, LCD, LDR, Motors, Relays, Bluetooth device.

I.INTRODUCTION

Agriculture is a profession of many tedious processes and practices, one of which is spraying of insecticides in the farm fields. Sprayers are mechanical devices that are specifically designed to spray liquids quickly and easily. They come in a number of different varieties. In this paper a solar operated mechanical sprayer is presented. A sprayer of this type is a great way to use solar energy. Solar based automatic pesticide sprayer are the ultimate cost effective solution at the locations where spraying is difficult. This automatic solar based pesticide sprayer system uses solar energy as source. Solar energy is first used to charge a storage battery. The solar energy stored in the battery is utilized to operate motor which functions as pump. In this paper we are trying to make a prototype model for farmers and cultivators for whom spraying of insecticides is harmful and hazardous. The proposed system Automatic Pesticide Sprayer Robot which is expected to achieve better results compared to the previous methods without using human assistance. This would be an automatic mechanical model that would work automatically powered by solar energy and reduce drudgery and also protect the farmers and cultivators from harmful pesticides and chemicals. The main objective of this system is to implement smart robot pesticides spray motor & mix pesticides using Bluetooth through android mobile, A LDR is used for illumination during night times. Solar panel is used for battery charging.

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II.SYSTEM MODEL AND ASSUMPTIONS

A. TRANSMITTER SECTION

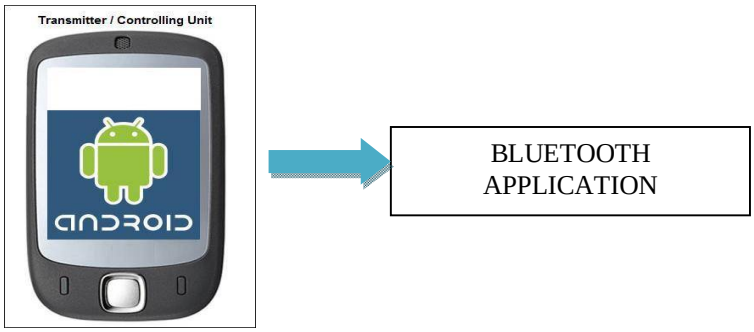

FIG A

B. RECEIVER SECTION

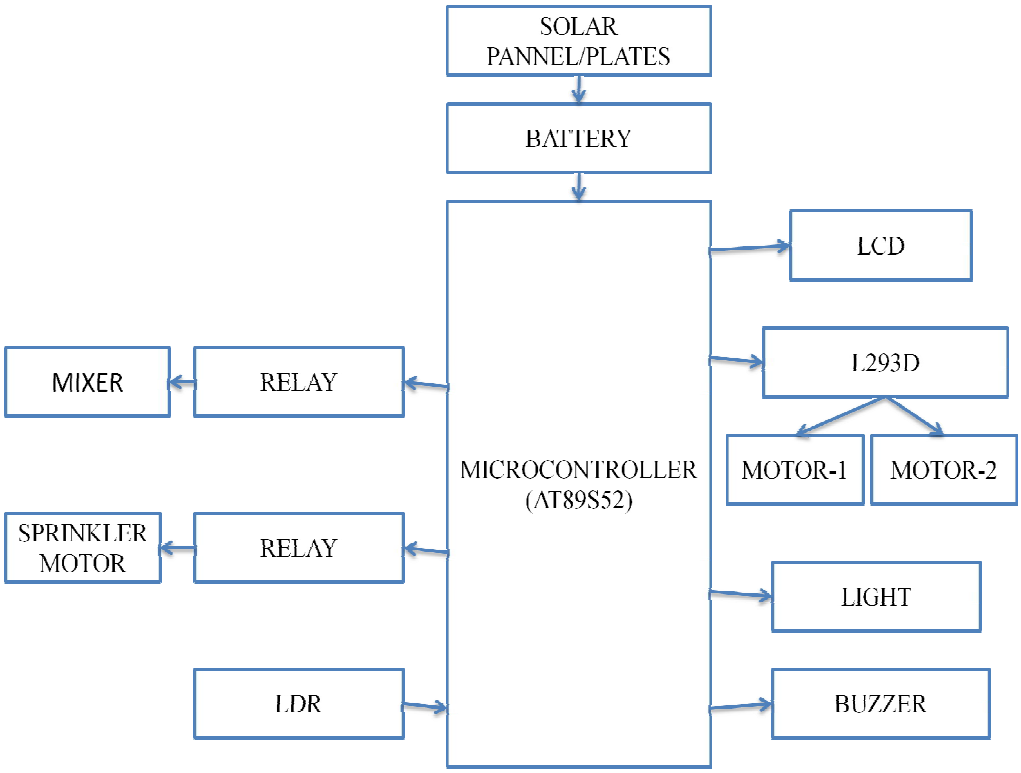

FIG B

FIG A & B SHOWS THE PROPOSED SOLAR BASED SPRAYER SYSTEM

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III. WORKING PROCESS

Microcontroller is the mother unit of the complete system. It consists of two parts one is transmitter and another is receiver. In transmitter part it consists of Bluetooth device. The Solar panel, Bluetooth and Storage battery make the input of the system. The receiver part consists of Microcontroller, LCD, Relays, Buzzer, Light, LDR, L293D Motors, Sprinkler motor, Mixer. LCD, Sprinkler motor, Mixer makes the output of the model. The sun rays are collected by the solar plates, where it converts solar energy into electrical energy and it is stored in the battery. We can also use direct electrical energy for spraying whereas battery can be used as backup for night time's usage. Bluetooth is used to send instructions to the microcontroller unit.

The microcontroller unit displays commands on LCD display for complete operation of sprinkler motor, mixer and L293D motors .Two relays are used, one to operate mixer for mixing the chemicals and another for motor to spray the pesticides for agricultural fields.
The instructions used are:-
1-for MIXER ON, 2-for MIXER OFF, 3-for MOTOR ON,
4-for MOTOR OFF, F-for FORWARD MOVING,
B-for BACKWARD MOVING, R-for TURN RIGHT,
L-for TURN LEFT.

When pesticide level in the tank is less, then the buzzer indicates this and "PESTICIDES LOW" is indicated in the LCD display as well as in Bluetooth also. If the pesticide tank is full, LCD displays "NORMAL" also in Bluetooth applications. Generally during nighttimes where there is a drop of sunlight LDR senses and illuminates. This is the process which can be repeated for spraying the field's infinite number of times.

IV.METHODOLOGY

Manual operated sprayers are dangerous to the human's life and fuel consuming. With the help of the above proposed system we can overcome above said problems. The solar plates convert solar energy into electrical energy and electrical energy is stored in battery. Using Bluetooth application instructions are sent to the receiver side, where it displays the instructions on the LCD display and operation starts accordingly. Two Relays are used, one to operate mixer for mixing chemicals and another to run sprinkler motor for spraying the fields. The buzzer indicate sprayer level for spraying and LDR to sense the dark light intensity. With the help of the above system we can overcome the problems faced by farmers previously and it has greater advantage upcoming technology.

V. ADVANTAGES

1. Low fuel usage, running cost is low due to solar energy process.
2. Easy to operate, simple to manufacture, longer lifetime.
3. Less pollution.
4. It prevents the human's exposure to harmful chemicals and pesticides.
5. It is more efficient than type of other sprayers.

VI.FUTURE SCOPE

This type of sprayer is mainly used for operating liquid chemicals. The same concept can be used to design the automatic spray painting robot. The developed system can be used for spraying fertilizer, fungicides and so on. The pesticide sprayer operates with zero pollution. The same technology can also be extended for all types of different power sprayers in future. There is a huge advantage with this technology.

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VII.CONCLUSION

The proposed system fulfills the farmers need for spraying the pesticide in farm fields with ease compared to old methods of pesticide sprayers. This method is more effective with minimal health hazards.

VIII.ACKNOWLEDGEMENT

The proposed project gives protection for user against pesticides regarding health problems, help usage of solar energy, zero fuel consumption, and zero pollution and so on.

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