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Solar Based Automatic Pesticide Spraying Robot Using RFID

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ABSTRACT

Organophosphates and carbonates, affect the nervous system. Others may irritate the skin or eyes. Some pesticides maybe carcinogens others may affect the hormone or endocrine system in the body. Children, and indeed any young and developing organisms, are particularly vulnerable to the harmful effects of pesticides. Even very low levels of exposure during development may have adverse health effects. Pesticide exposure can cause a range of neurological health effects such as memory loss, loss of coordination, reduced speed of response to stimuli, reduced visual ability, altered or uncontrollable mood and general behavior, and reduced motor skills. There are many types of pesticides sprayer are available in India. But mostly used sprayer is backpack type sprayer which is used by farmers because it is cheaper, easy to use and main thing about it is less costly. With the help of this machine farmer spray pesticides in their farm, but it requires lot of time and thus high operational cost. This paper presents an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the confined space of agriculture field. This is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in Agriculture field.[2]

INTRODUCTION:

India is a country where nearly 70% of people lives in rural area and main source of their income is farming, directly or indirectly. 70% of people in India are connected with farming directly or indirectly, instead of that we are not producing the crop of which we having capacity to produce. Reason behind this is we farmers of our country are not using technology very well. So we have to make machines that can help then to save their time and money and to increase the production

rate and their profit. We have to make economic machineries so farmers can purchase it as per capita income of our country's farmers are low and our country per capita income is low that of compared to other country as our[1] country is developing country. Present scenario in agricultural field in India related to sprayer is that farmers are using hand operated sprayer or motorized sprayer.

Effects of Organophosphates and Pyrethroids:

Acute organophosphate and carbonate exposure causes signs and symptoms of excess acetylcholine, such as increased salivation and perspiration, narrowing of the pupils, nausea, diarrhea, decrease in blood pressure, muscle weakness, and fatigue. Some organophosphates also have a delayed neurological reaction characterized by muscle weakness in the legs and arms. Among the most promising alternatives to organophosphates were synthetic pyrethroids. However, pyrethroids can cause hyper-excitation, aggressiveness, un-coordination, whole-body tremors, and seizures. Acute exposures in humans, usually resulting from skin exposure due to poor handling procedures, usually resolve within 24 hours. Pyrethroids can cause an allergic skin response, and some pyrethroids may cause cancer, reproductive or developmental effects, or endocrine system effects. In China, it's estimated that 500,000 people suffer pesticide poisoning annually, and some 500 of them die. Children seem to be greatly susceptible to the toxic effects of pesticides. The Natural Resource Defense Council has collected data which recorded higher incidence of childhood leukemia, brain cancer and birth defects. These results correlated with early exposure to pesticides.

EXISTING SYSTEM:

There are various methods that are implemented today in various parts of the world to reduce theconsequences caused to human beings (manual pesticide sprayers).

The ones in use today are:

1) Tractors (Deere) equipped with GPS system and huge sprayers which can automatically spray from the ground.

2) Using of a Remote Piloted Vehicle (RPV) for spraying pesticides (an RC helicopter). This method efficiently used the pesticides (10- 15% more efficient than manual spraying) and also could substitute 50 workers. Sadly this project was cancelled long ago.

3) Greenhouse pesticide spraying through pipelines and nozzle system.

4) Line following robot have been proposed to be an alternate.

Drawback of the existing System:

1) Tractors occupy a large area to maneuver thus eating up large areas that could be used for plantations.

2) The Remote Piloted Vehicle uses a RC helicopter which can be hard to control and spraying can be not even.

3) The greenhouse method of spraying pesticides through pipelines running through supports are not suitable in open fields, which will demand high power pumps to pump pesticides over long distances due to major losses. Also it will be difficult to actually build a pipe system in a particular area of pest infestation and spray only there. (It occupies more time to locate the area of pest infestation and build a piping system as it involves a lot of labor and time too.)

4) Line following robots may be hard to implement in an actual scenario as they are not good in rough and hilly terrains. Carrying the equipment and the pesticide can bring much complexity to maneuvering and controlling.

Proposed System:

In this project we are trying to make unique equipment for cultivation users. Mostly in the forming process pesticide spray is taking a critical role due to poison properties of chemical. So, in this paper we have committed to do something unique and useful equipment with non-conventional source technique. The machine consists of the main body frame, battery, Micro Controller, RFID Reader Module, DC Motor, Nozzles, Pipes, Wheels, Tank and DC Pump. This is the four wheel drive machine. All the four wheels are individually driven by 30 RPM DC Motor. Vertical arm is attached at centre of back side of main frame, carrying horizontal arm. The nozzles are fitted to the pipes which are attached with the vertical and horizontal arm. The tank is kept at the centre of the body. The DC Pump is kept at the back side of the tank while the battery is kept at the front side of same.

This 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 motors which functions as pump and also the motors which attached to the moving. As the name of the paper suggests, it deals with the discharge of pesticide, solar power, battery charging, as well as this is guided by RFID tags and non-conventional power controlling techniques. When vehicle moves forward then at the same time pump discharges liquid from tank towards the nozzle fitted to pipe. Nozzle angle for spraying is 90 degree so we can cover large area with a single nozzle.

Advantages of Proposed System:

As stated earlier the project is an agricultural application

Apart from agriculture, it can be used in roof gardens, lawns, home gardens for automatic pesticide spraying or water sprinkling.

Automation introduced in this field will reduce the human effort and increase the yield.

Complete elimination of manpower.

System can be switched to manual mode whenever required.

MATERIALS AND METHODS:

PIC microcontrollers are popular processors developed by Microchip Technology with built-in RAM, memory, internal bus, and peripherals that can be used for many applications. PIC originally stood for "Programmable Intelligent Computer" but is now generally regarded as a "Peripheral Interface Controller".

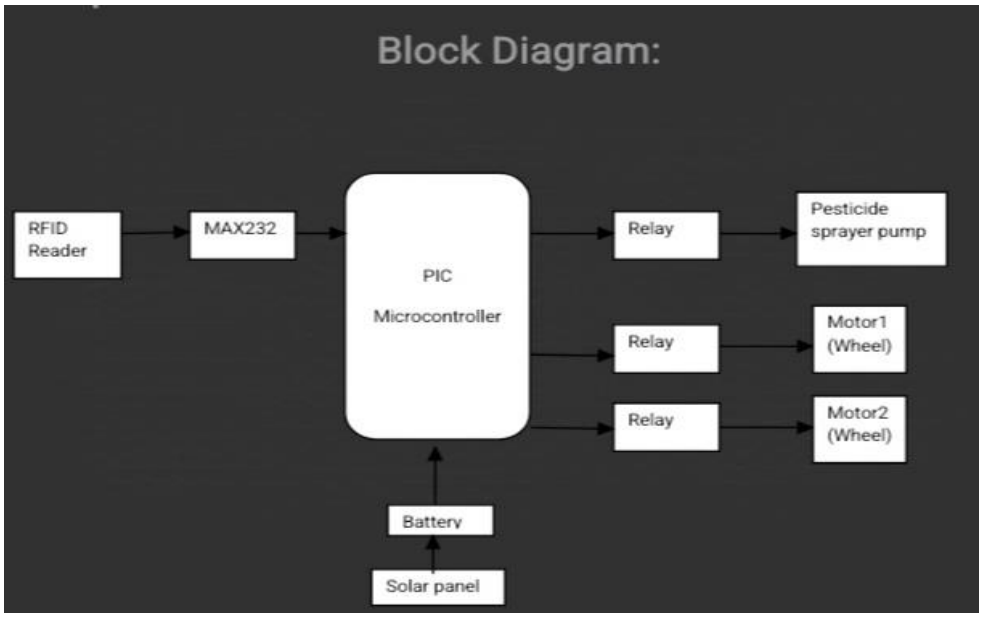

Fig.1 block diagram of Solar Based Automatic Pesticide Spraying Robot Using RFID

PIC microcontrollers are broken up into two major categories: 8-bit microcontrollers and 16-bit microcontrollers. Each category is further subdivided into product families as shown in the following table 1:

8-bit MCU Product Family	16-bit MCU Product Family
PIC10	PIC24F
PIC12	PIC24H
PIC14	dsPIC30
PIC16	dsPIC33
PIC18	

The microcontrollers in the PIC10 through PIC14 families are considered low-end microcontrollers. PIC microcontrollers in the PIC16 and PIC18 families are considered mid-level microcontrollers while 16-bit PICs are considered high-end microcontrollers.

- Does the project require analog input or output?
- Does the project require digital input or output?
- How many I/O pins are required?
- Does the project require precise timing?
- How much memory does the project require?

Is serial I/O required?

PICs also come in several types of packages:

- Plastic Dual Inline Package (PDIP)
- Small-Outline Transistor (SOT)
- Dual Flat No-lead (DFN)
- Mini Small Outline Package (MSOP)
- Thin Quad Flat Pack (TQFP)
- Plastic Leaded Chip Carrier (PLCC)
- Ceramic QUAD pack (CERQUAD)

The reason for the number of packages is that there are some PICs with 100 I/O pins! The microcontrollers are basically rectangular or square shaped. The easiest package to work with is DIP or PDIP because it is easily breadboardable and can easily be soldered.

NOTE: Use a mid-level dual inline package PIC microcontroller. You will not be able to burn software into a QUAD chip and SOP chips will require Schmartboards.

SAMPLE PREPARATION:

Solar Water Pumping Guide:

Overview

This guide is primarily about DC powered pumps, as used in typical solar electric systems. Information is also provided on using AC powered pumps on systems that have an inverter available. DC powered pumps are used for deep and shallow well pumping, stock tanks, irrigation, water pressure systems, and many other areas. This guide is recommended reading for installers, users, and well drillers – especially those that are new to solar electric pumping systems. DC pumps are different in many ways from the AC pumps that many people are used to.

Capabilities & Limitations

DC pumps come in a variety of types. One of the most common is the small pressure booster pumps (Shurflo) commonly used in RV's to supply water from the on board water tank. Others include diaphragm and piston positive displacement pumps for wells, booster (pressurizing) pumps, circulating pumps, ground water sampling pumps etc.

RESULTS:

Perhaps you've heard, RFID technology can improve your inventory accuracy to 99.99%. However, to reap the benefits of a strong, accurate supply chain, warehouse managers need to commit to RFID. They need to decide that RFID is fully worth the investment.

CONCLUSION:

RFID technology stands at the forefront of innovation, seamlessly aligning with corporate objectives and reshaping industries. From manufacturing efficiency to healthcare advancements, RFID's transformative influence is evident.

As we anticipate RFID future trends, including sustainability measures and flexible printing options, the horizon of possibilities expands. The integration of RFID into everyday life, coupled with market projections, emphasizes its pivotal role in the evolving technological landscape.

Embrace the future with Qodenext, your partner in unlocking the potential of RFID technology and staying ahead in this era of dynamic advancements and connectivity. RFID future trends await, and Qodenext is here to guide you through this exciting journey.

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