



LEGS ROBOT FOR AUTONOMOUS REMOVAL OF UNWANTED CROPS IN AGRICULTURE USING RASPBERRY PI

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ABSTRACT

Automated processes in the field of agriculture have become more and more reliable and efficient. There are many difficulties faced when manpower is used. It is time consuming and becomes tedious. Robotic systems integrated with various control methods can be very useful in doing repetitive work, such as weed removing process where the same movement is continuous. In this paper, we have developed a Trainable automatic robot which helps in removing unwanted weed on agricultural fields using Raspberry PI for controlling purpose. The Robot removes the weeds by using the Image Processing Technology. It compares the image of the crop with reference image using the Raspberry PI. The rover which is a four-wheeled vehicle used for movement is replaced by the leg arms of the robot. So, the robot now can go through any congested field crops. It also reduces the human labour and the time consumed by the farmers. Hence, a robot is designed which removes the unwanted crops by Image Processing Technology is designed. This robot doesn't affect the human health as some weeding processes which are done by spraying herbicides.

Keywords: Agriculture, Manpower, Robotic, Raspberry PI.

INTRODUCTION

In this digitalized world, many technological innovations are trying to reform and create new techniques based upon automation which performs in a highly efficient manner and less time-consuming. Now the approach of this project is to develop trainable-automatic equipment which will do the things which are taught to that by gesture control with high precision. The application of robots has become more widespread. Now a days Robots have been widely in substitute human workers to perform high precision and hazardous works. The aim of this project is to develop a base vehicle and controlling setup with the use of most developed Sensors. Now a days the availability labours for the work in agricultural fields are reducing day to day and also demands of food products are also increasing due to increase in populations hence we are in the hard situation to overcome this situation. The need for the production of agricultural products is increasing and in the world market Competition is getting elapsed with new technological instruments and devices which are used by the other countries for the agricultural activities, hence the Indian farmers should able the use the new instruments to sustain their self in the market. On the other hand, days are changing the people's view on their health increasing hence they are seeking natural products to maintain their good health. Hence the products should be chemical fertilizers free as much as possible.

Many new concepts are being developed in few recent years. In some respects how we done these tasks in the past to how we could do them using GSM. That is we are interested to make the GSM based system to

reduce the important factor to the farmer is wastage of time, money, manpower and also the errors which made by the humans. In our system we get the information about percentage wetness of grapes bed, rainfall by GSM and accordingly this information we irrigate for the grapes and tunnel the grapes garden. Many new concepts are being developed to allow grapes automation to nourish and deliver its full potential. In some respects how we done these tasks in the past to how we could do them using GSM. That is we are interested to make the GSM based system to reduce the important factor to the farmer is wastage of time, money, manpower and also the errors which made by the humans.

II RELATED WORK

The existing system focusing on fabrication of the robot which can dig the soil, leveler to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. In recent years the development of the autonomous vehicles in the agriculture has experienced increased interest.

The vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people.

III PROPOSED METHOD

The Working of our proposed system is .used to developing a robot for unwanted crops in land and also used for agriculture purpose.

The main objective of our robot is monitoring a crops and weeds of area.

The unwanted crops are removed by user. The robot fully controlled by user android app it will work based on user Input. The PIR Sensor detect the human detection and it will live streamed by camera to the user and it will monitored by IOT Server. Our Robot is designed with two leg function. It will continuously monitoring a land and lively monitored by the user. Initially the PIR Sensor detect the human detection in land and it will live streamed by camera. The cutting Operation is controlled by user android app and the relay is operate two leg robot and the weeding cutting application is done by use of Servo Motor. The continuous monitoring is done by Camera and IOT Server.

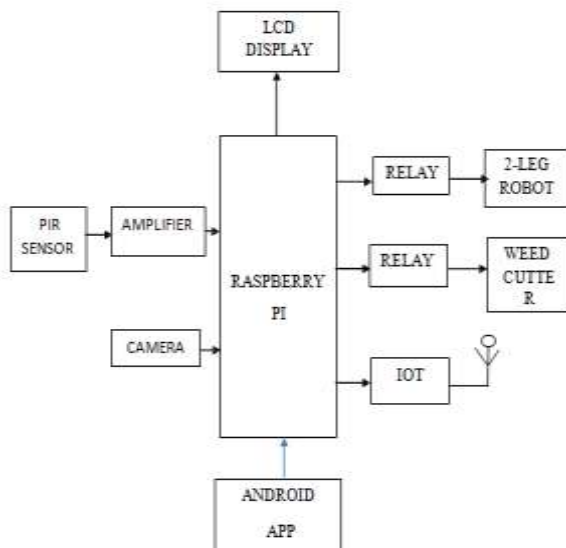


Fig: 1 Weed Removing Robot System Block Diagram



IV PROJECT DESCRIPTIONS

This system includes a four degree of freedom robotic arm with a grabbing two claw end effector also known as a gripper. A 12V 1.3Ah rechargeable battery is used to power the mechanisms, Controllers and Sensors. An IC 7809 voltage controller is being used for the purpose of regulating the voltage from 12V to 9V for proper powering of the total system.

The Raspberry Pi board is the central module of the whole embedded image capturing and processing system. Its main parts include main processing chip unit, memory, power supply HDMI out that is VGA display, Ethernet port, and USB ports. The main signal processing chip unit used in Raspberry Pi system is a Broadcom 2835 700MHz Chip in which CPU core is a 32 bit ARM1176JZF-S RISC processor designed by Advanced RISC Machines. This main processing chip connects a camera and display.

V COMPONENTS REQUIRED

- Raspberry Pi
- PIR Sensor
- PI Camera
- LCD Display

RASPBERRYPI

Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer.

Fig 2 Raspberry Pi

PIR SENSOR

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.



Fig 3 PIR Sensor

PI CAMERA

The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs.

The PI



camera module is a portable light weight camera that supports Raspberry Pi

Fig 4 PI Camera

LCD DISPLAY

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs does not emit light directly. They are used in a wide range of



applications including: computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc.

Fig 5 LCD Display

VI RESULTS AND DISCUSSIONS

The weeds along with the crops may damage its production and growth. So, it's necessary to

remove those weeds from the field to improve and enhance the growth of the plants. The Raspberry Pi is connected with the Pi Camera which updates the live stream in the agricultural field.

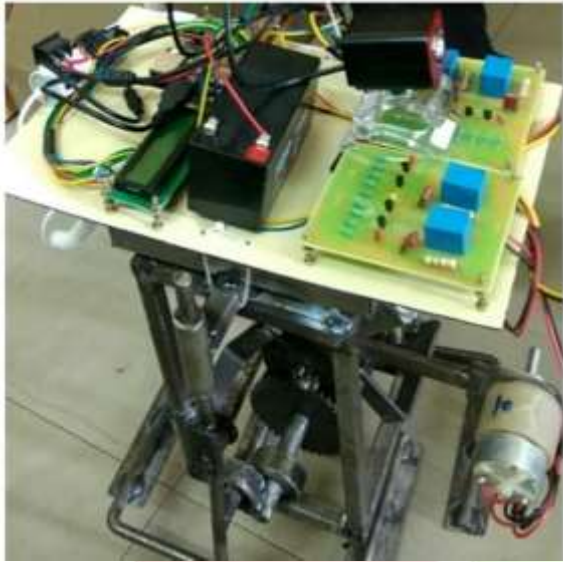


Fig 6 Weed Removing Robot

VII CONCLUSIONS

The images of the crops are updated to the former using livestream. Hence, the former can control the robot to cut the crops using IOT Technology. A robot with two leg arms will be developed and designed for future enhancement. It will be controlled using IOT Technology where we can control the robot from anywhere.

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