IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 12, Issue 4, April 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.317

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|

||Volume 12, Issue 4, April 2023||

|DOI:10.15662/IJAREEIE.2022.1204026 |

WEEDING ROBOT

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ABSTRACT: In farms the farmers grow plants to harvest it. They water and fertilize the plants to make good yield.Along with farming plants unwanted plants grow along in the fields. These unwanted plants are called weeds, they grow along the plants by nutrients given to the main plant. So these plants affect the growth of the main herbs. One type of method is by plucking weeds, this method is efficient for all types of soil, but we cant use this method in clay soils because they are strongly bonded with weeds so we use herbicides to clear these weeds. In ancient method of using herbicides farmers spray manually so this may affect the health of the farmers. So we develop a robot to detect the weeds and spray the herbicides efficiently without any wastage of herbicides.

KEYWORDS: Agriculture, Weeding, Herbicides, Robot

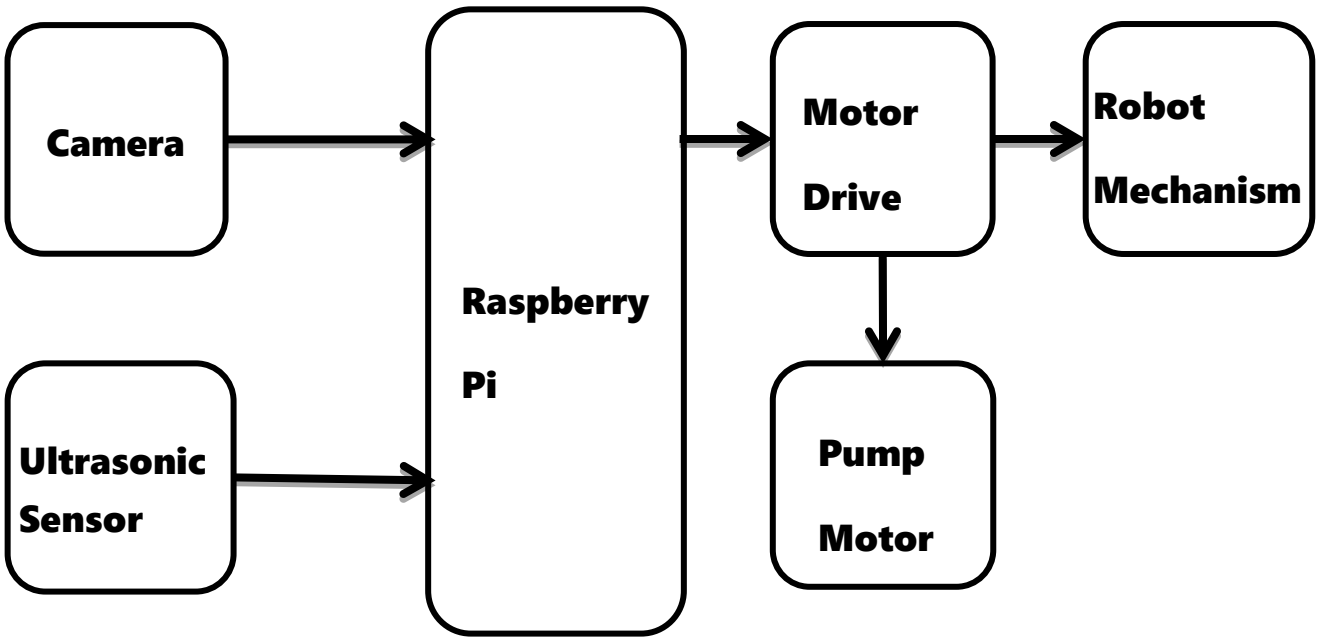
I. INTRODUCTION

Agriculture, Weeding, Herbicides, Robot

Proposed system

We had produced a model of robot which automatically detects the weed in banana farm by using camera, it also uses ultrasonic sensor as second step verification as not to spray herbicides in banana tree. We used raspberry pi as the controller to use image processing in camera with the predefined image in the system

BLOCK DIAGRAM



BLOCK DIAGRAM DESCRIPTION

In this project, 5V is given to Raspberry pi and 12 V is given to the motor drive. Raspberry pi acts as the controller of the robot. Ultrasonic sensor and camera are connected as input with the Raspberry pi and motor drive as output of the controller. Motor drive controls the robotic wheels and also the pump motor.

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Components used

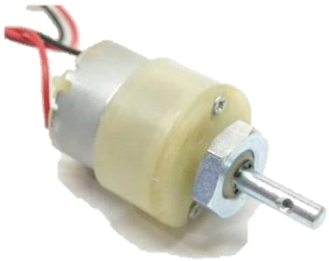
Raspberry Pi :

Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as for weather monitoring,[19] because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists, due to its adoption of the HDMI and USB standards.

After the release of the second board type, the Raspberry Pi Foundation set up a new entity, named Raspberry Pi Trading, and installed Eben Upton as CEO, with the responsibility of developing technology.[20] The Foundation was rededicated as an educational charity for promoting the teaching of basic computer science in schools and developing countries.

There are three series of Raspberry Pi, and several generations of each have been released. Raspberry Pi SBCs feature a Broadcom system on a chip (SoC) with an integrated ARM-compatible central processing unit (CPU) and on-chip graphics processing unit (GPU), while Raspberry Pi Pico has a RP2040 system on chip with an integrated ARM-compatible central processing unit (CPU).

Motor



DC Motor

A coil of wire with a current running through it generates an electromagnetic field aligned with the centre of the coil. The direction and magnitude of the magnetic field produced by the coil can be changed with the direction and magnitude of the current flowing through it.

A simple DC motor has a stationary set of magnets in the stator and an armature with one or more windings of insulated wire wrapped around a soft iron core that concentrates the magnetic field. The windings usually have multiple turns around the core, and in large motors there can be several parallel current paths. The ends of the wire winding are connected to a commutator. The commutator allows each armature coil to be energized in turn and connects the rotating coils with the external power supply through brushes. (Brushless DC motors have electronics that switch the DC current to each coil on and off and have no brushes.)

The total amount of current sent to the coil, the coil's size, and what it is wrapped around decide the strength of the electromagnetic field created.

Ultrasonic Sensor :

Ultrasonic sensor

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They have been successfully used in various applications, such as in medical, aerospace, nuclear instrumentation, and as a tilt sensor in consumer electronics or a pressure sensor in the touch pads of mobile phones. In the automotive industry, piezoelectric elements are used to monitor combustion when developing internal combustion engines. The sensors are either directly mounted into additional holes into the cylinder head or the spark/glow plug is equipped with a built-in miniature piezoelectric sensor.

Camera :

Camera

The rotary shutter and the film drive are like those used in cine cameras. When the shutter release is pressed, a light-blocking shield lifts and the shutter disc rotates a full turn exposing the film through its open sector; when the pressure is released the light-blocking shield returns to its position behind the lens, and the spring motor advances the film and recocks the shutter. This is almost instantaneous. With practice a photographer could take 4 or 5 pictures a second. Each winding of the spring motor was good for about 25 pictures, half a roll of film. Shutter speed was determined by spring tension and mechanical delay since the exposure sector was fixed. The Robot I had an exposure range of 1 to 1/500, and provision for time exposures.

The camera had other features not specifically related to action photography. The small optical viewfinder could be rotated 90 degrees to permit pictures to be taken in one direction while the photographer was facing in another. When the viewfinder was rotated, the scene was viewed through a deep purple filter similar to those used by cinematographers to judge the black and white contrast of an image. The camera had a built-in deep yellow filter which could be positioned behind the lens.

Motor Drive :

Motor drive means a system that includes a motor. An adjustable speed motor drive means a system that includes a motor that has multiple operating speeds. A variable speed motor drive is a system that includes a motor and is continuously variable in speed. If the motor is generating electrical energy rather than using it – this could be called a generator drive but is often still referred to as a motor drive.

Some prime movers have a range of operating speeds which can be varied continuously. However, efficiency may be low at extremes of the speed range, and there may be system reasons why the prime mover speed cannot be maintained at very low or very high speeds.

Before electric motors were invented, mechanical speed changers were used to control the mechanical power provided by water wheels and steam engines. When electric motors came into use, means of controlling their speed were developed almost immediately. Today, various types of mechanical drives, hydraulic drives and electric drives compete with one another in the industrial drives market.

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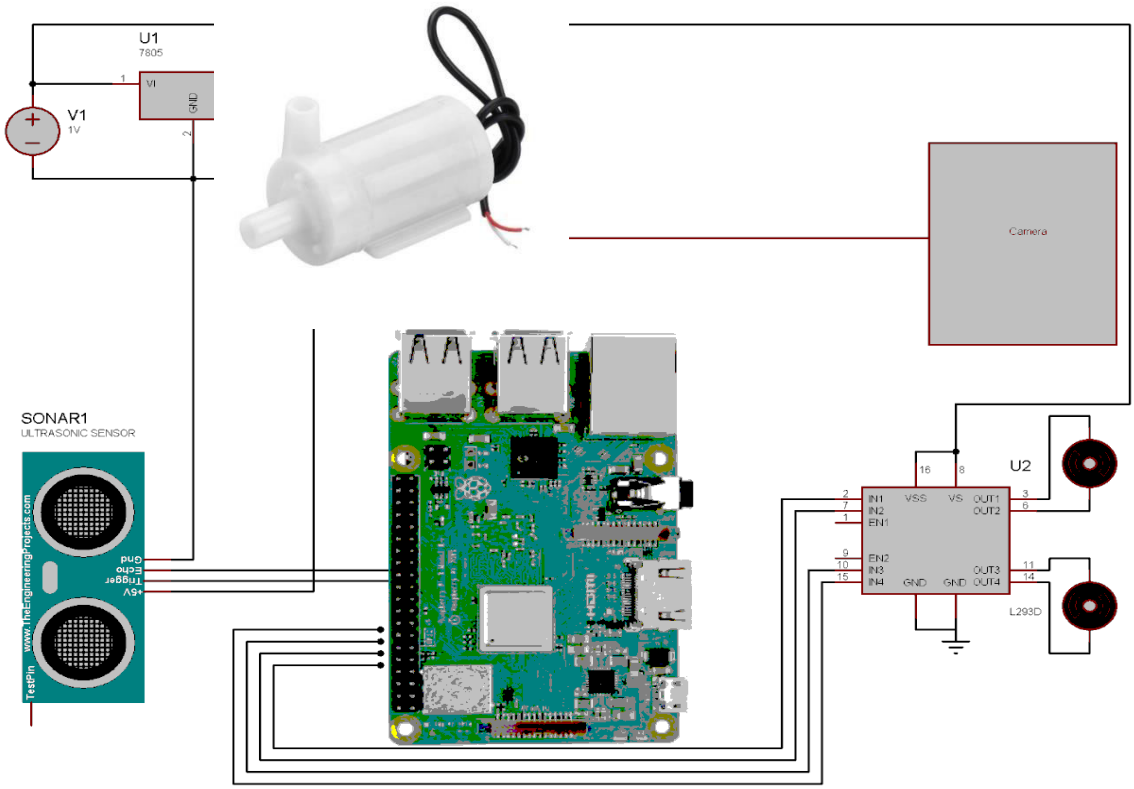
Pump Motor :



PumpMotor

Electric submersible pumps are multistage centrifugal pumps operating in a vertical position. Liquids, accelerated by the impeller, lose their kinetic energy in the diffuser, where a conversion of kinetic to pressure energy takes place. This is the main operational mechanism of radial and mixed flow pumps. In the HSP, the motor is a hydraulic motor rather than an electrical motor, and may be closed cycle (keeping the power fluid separate from the produced fluid) or open cycle (mingling the power fluid with the produced fluid downhole, with surface separation).

The pump shaft is connected to the gas separator or the protector by a mechanical coupling at the bottom of the pump. Fluids enter the pump through an intake screen and are lifted by the pump stages. Other parts include the radial bearings (bushings) distributed along the length of the shaft, providing radial support to the pump shaft. An optional thrust bearing takes up part of the axial forces arising in the pump, but most of those forces are absorbed by the protector's thrust bearing.

There are also screw-type submersible pumps, there is a steel screw which is used as a working element in them. The screw allows the pump to work in water with a high sand content and other mechanical impurities.

III. CONCLUSION

Plant protection practices are most important activities during crop production. Progress in spraying technology has been increase in recent past. Roboticsand automatic spraying technologies like variable rate sprayers, UAV sprayers,and electrostatic sprayers has gained more attention to enhance. These advancedspraying technologies not only reduces the labor cost effective in environmental protection. Researchers are conducting experimental studies on the design development and testing of precision spraying technologies for crops and orchards.

Simulation modeling studies are also conducting by the researcher to increase thesprayer's efficiency and to improve the design for better utilization. However, thereis still needed to conduct further studies to reduce the spray loss and health risksduring the pesticide application to the orchards.

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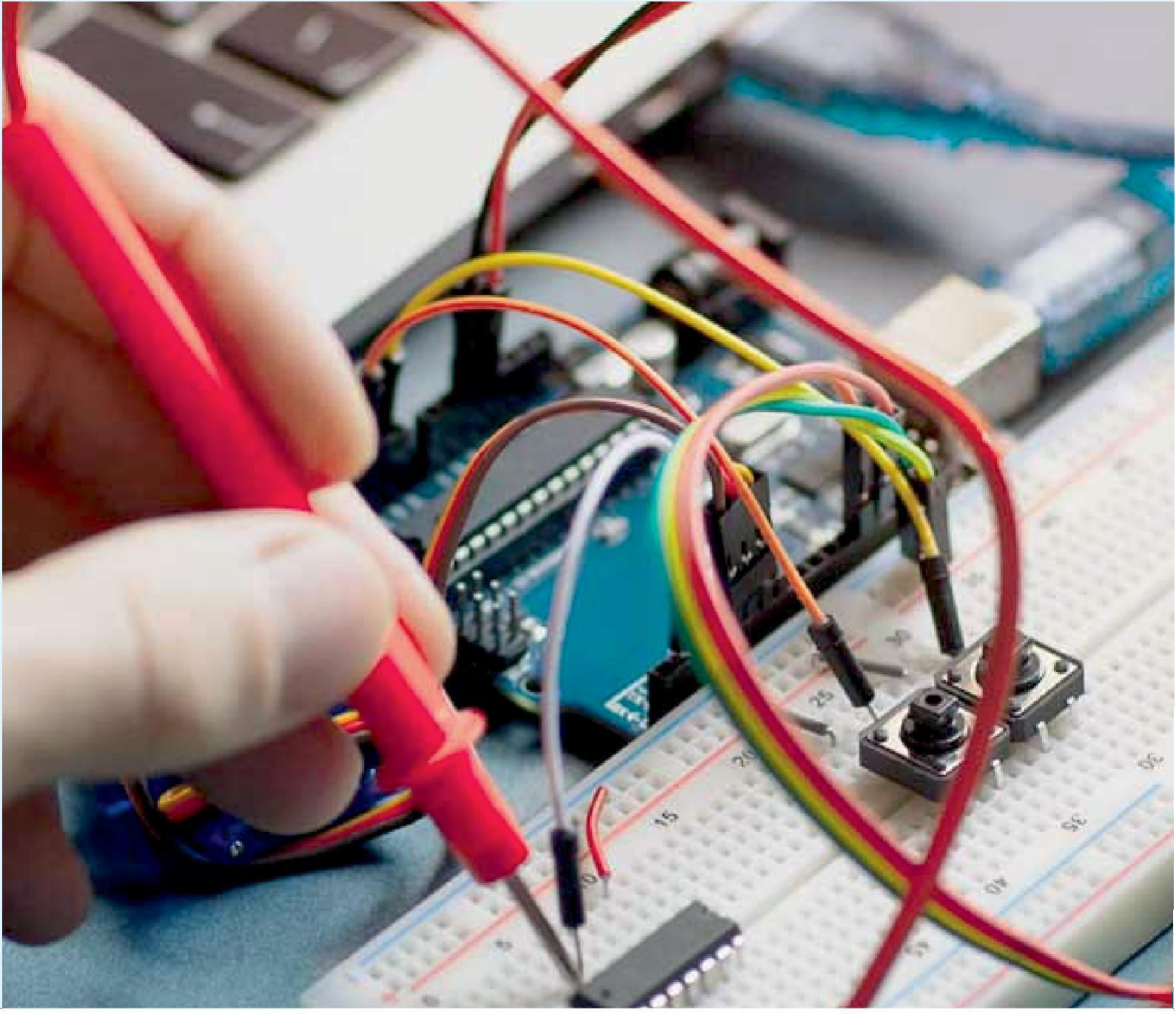

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International Journal of Advanced Research

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