

Artificial Intelligence Based Raserry pi using Plant Recognition Electric Weeder

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Abstract

Despite the belief humans might also additionally have concerning the rural technique, the fact is that these days's agriculture enterprise is facts-centered, unique, and smarter than ever. This paper is greater appropriate for agriculture then on this challenge we used Raspberry Pi, Webcam, Motor Driver and DC Motor. Ultrasonic Sensor is used for degree the gap of gadgets. The robotic primarily based totally technology redesigned nearly each enterprise which include "clever agriculture with AI" which moved the enterprise from statistical to quantitative approaches. Such progressive modifications are shaking the present agriculture strategies and growing new possibilities alongside a number of demanding situations. This article highlights the cappotential of wi-fi sensors and Robo Setup in agriculture, in addition to the demanding situations predicted to be confronted while integrating this generation with the conventional farming practices. Robo Setup gadgets and communique strategies related to wi-fi sensors encountered in agriculture programs are analyzed in detail. What sensors are to be had for precise agriculture application, like soil preparation, crop status, irrigation, insect and pest detection are indexed. How this generation supporting the growers at some stage in the crop levels, from sowing till harvesting, packing and transportation is defined. Furthermore, the usage of unmanned aerial automobiles for crop surveillance and different favorable programs together with optimizing crop yield is taken into consideration on this article. State-of-the-artwork Robo Setup-primarily based totally architectures and structures utilized in agriculture also are highlighted anyplace appropriate. Finally, primarily based totally in this thorough review, we become aware of modern and destiny developments of Robo Setup in agriculture and spotlight cappotential studies demanding situations.

KEYWORD: *Plant Recognition, Image Processing, Rasberry pi, Artificial Intelligence, Internet of things.*

1.INTRODUCTION

In this paper that proposes an idea to decorate the agricultural yield with fewer reasssets and difficult paintings efforts, fantastic enhancements were made during human records. Nevertheless, the immoderate population charge never permit the decision for and supply fit during a number of those times. According to the forecasted figures, in 2050, the arena population is expected to touch 9.8 billion, an growth of approximately 25% from the current figure. Almost the complete stated rise of population is forecasted to rise up maximum of the developing nations. On the opportunity side, the style of urbanization is forecasted to keep at an increased tempo, with about 70% of the arena's population predicted to be metropolis until 2050 (currently 49%). Furthermore, income levels may be multiples of what they're now, with a view to pressure the food name for further, especially in developing nations. As a result, the ones global places may be more careful about their diet and food first-class; therefore, consumer alternatives can float from wheat and grains to legumes and, later, to meat. In order to feed this larger, more metropolis, and richer population, food production want to double with the resource of the usage of 2050. Particularly, the current billion masses of annual cereal production want to touch approximately 3 billion masses, and the as soon as a 12 months meat production want to growth with the resource of the usage of more than two hundred million masses to fulfill the decision for of 470 million Not handiest for food, but crop production is

becoming further critical for enterprise; truly flora like cotton, rubber, and gum are playing critical roles within the economies of many global places. Furthermore, the food-flora-based totally absolutely bioenergy market started out to growth recently. Even in advance than a decade, handiest the producing of ethanol carried out a hundred and ten million masses of coarse grains (approximately 10% of the arena production). Due to the developing utilization of food flora for bio-fuel production, bio-power, and distinctive enterprise usages, food safety is at stake. These wishes are resulting in a further growth of the strain on already scarce agricultural reassets. Unfortunately, handiest a confined part of the earth's ground is suitable for agriculture uses due to various limitations, like temperature, climate, topography, and soil first-class, or maybe most of an appropriate areas aren't homogenous. When zooming the versatilities of landscapes and plant kinds, many new versions start to emerge that can be difficult to quantify. Moreover, the available agricultural land is further fashioned with the resource of the usage of political and economic elements, like land and climate patterns and population density, while fast urbanization is constantly posing threats to the deliver of arable land. Over the past decades, the general agriculture land carried out for food production has professional a decline. In 1991, the general arable region for food production have become 19.5 million square miles (39.47% of the arena's land region), which have become reduced to approximately 18.6 million square miles (37.73% of the arena's land region) in 2013. As such, the gap amongst name for and supply of food is becoming more giant and alarming with the passage of time. Further examination showed that every crop field has extremely good trends that can be measured separately in terms of every first-class and quantity. Critical trends, like soil type, nutrient presence, flow of irrigation, pest resistance, etc., define its suitability and capability for a specific crop. In most of situations, the differentiations of trends can exist interior a single crop field, even though the same crop is being cultivated in complete farm; therefore, site-specific analyses are required for high-quality yield production. Further, consisting of the dimensions of time, specific flora within the same field rotate season-to-season and biologically achieve extremely good ranges of their cycle interior a 12 months in areas in which locational and temporal versions result in specific boom requirements to optimize the crop production. To reply to those needs with a number of issues, farmers want new generation-primarily based totally strategies to provide greater from much less land and with fewer hands. Considering the usual farming procedures, farmers want to go to the agriculture webweb sites regularly at some stage in the crop lifestyles to have a higher concept approximately the crop situations. For this, the want of clever agriculture arises, as 70% of farming time is spent tracking and know-how the crop states in preference to doing real discipline paintings. Considering the vastness of the agriculture enterprise, it fairly needs for technological and unique answers with the purpose of sustainability whilst leaving minimal environmental effect. Recent sensing and communicate technology offer a real far off "eye within the discipline" capacity wherein farmers can look at happenings within the discipline with out being within the discipline. Wireless sensors are facilitating the tracking of vegetation continuously with better accuracy and are capin a position to, maximum importantly, hit upon early levels of undesirable state. This is the cause why contemporary-day agriculture entails using clever gear and kits, from sowing to crop harvesting or even at some stage in garage and transportation. Timely reporting the use of a number of sensors makes the whole operation now no longer simplest clever however additionally price powerful because of its unique tracking talents. Variety of self reliant tractors, harvesters, robot weeders, drones, and satellites presently supplement agriculture equipment. Sensors may be set up and begin amassing facts in a quick time, that's then to be had on line for similarly analyses almost immediately. Sensor generation gives crop and site-precise agriculture, because it helps unique facts series of each site. Recently, the Internet-of-Things (Robo Setup) is starting to effect a big range of sectors and industries, starting from manufacturing, fitness, communications, and power to the agriculture enterprise, to be able to lessen inefficiencies and enhance the overall performance throughout all markets. If searching closely, one feels that the modern programs are simplest scratching the floor and that the actual effect of Robo Setup and its makes use of aren't but witnessed. Still, thinking about this progress, particularly within the close to beyond, we are able to expect that Robo Setup technology are going to play a key position in diverse programs of the agriculture area. This is due to the talents provided with the aid of using Robo Setup, which include the fundamental communicate infrastructure (used to attach the clever gadgets—from sensors, automobiles, to person cellular gadgets—the use of the Internet) and variety of services, together with neighborhood or far off facts acquisition, cloud primarily based totally clever records evaluation and selection making, person interfacing, and agriculture operation automation.

2.HARDWARE

Raspberry Pi, Webcam / Scanner, Ultrasonic Sensor, Cutter, Motor Driver, DC Motor

3.SOFTWARE

Python.

4.BLOCK DIAGRAM

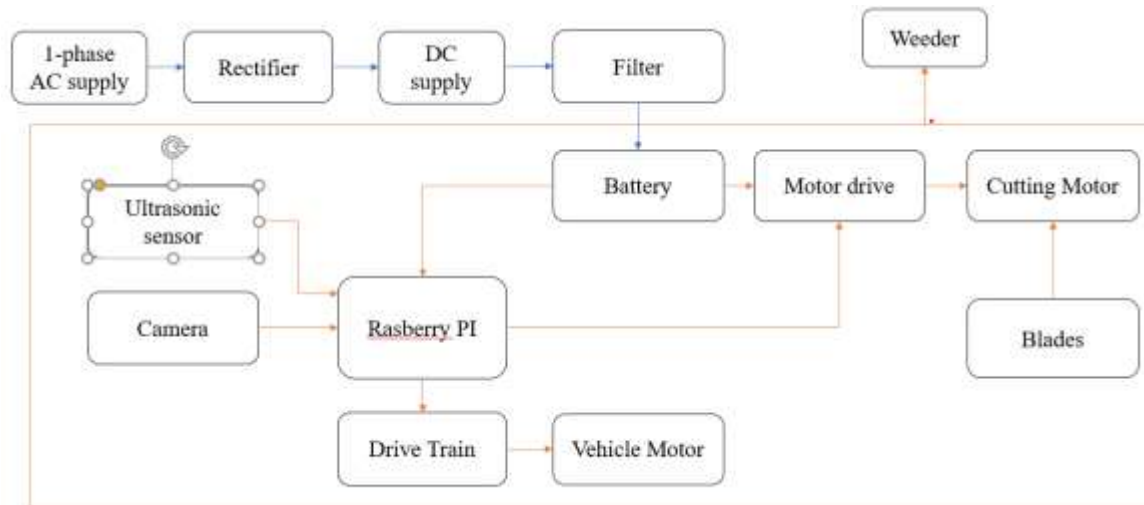


Fig-1: Block Diagram of Electric weeder

5.WORKING

The AC deliver is reborn to DC deliver the employment of the remedy and also the amended DC deliver is attached to filter out to stay down from the spikes etcetera additionally the clear out out is hooked up to the battery to save lots of the energy for the weeder. The Jeer Pi could be a low price, credit-card sized computer that entrappings right into a PC reveal and makes use of a preferred keyboard and mouse. The Raspberry Pi Model B has double center ARM11 processor with 512 MB SDRAM and powers via small USB socket of 5V. This processor is act as a coronary heart for this setup. and also the computer code program side on this processor is garçon that retailers the information and subscribe in with the help of exploitation garçon with the aid of using the employment of this net purpose or address person will get admission to everyplace. The affiliation among totally different enhances is outlined the use of the contrivance structure as presently because the contrivance is grew to return on, the method begins. The device Are confederated withinside the the front of the tool the sensor acquire the records of the records while transferring in the front of the device illustration distance and plant (legal crop or currently no longer). that's the information accession step. once the data is collected the records is reborn to be fed into the enter of the boo pi. The transformation step converts the analog to virtual shape. This records is given to boo pi for processing. If the data is in decide style of the pi exhibition to exchange at the blades to cut back the weed below the given distance with the help of exploitation (ultrasonic swells). and also the person will see the range of the precise crop additionally pi permits to touch the person with the help of exploitation webcam. The Raspberry Pi 3 Model B is that the fashionable product withinside the Raspberry Pi three variety, speech act a 64-bit quad center processor cardiopulmonary exercise at 1.4 gigacycle, double-band 2.4 GHz and five GHz wi-fi local area network, Bluetooth four.2/ BLE, in haste Ethernet, and poet practicality through a separate poet headgear. The double-band wi-fi LAN comes with standard compliance instrument, allowing the board to be designed into quit wares with immensely born wi-fi LAN compliance testing, enhancing every worth and time to business. The Raspberry Pi three Model B continues the equal mechanical footprint as every Raspberry Pi a pair of Model B and also the Raspberry Pi 3 Model B. associate un hearable device could be an tool that measures the gap to an item the employment of ultrasonic sound swells. associate ultrasonic sensor makes use of a electrical device to transmit and acquire ultrasonic beats that bear came back records roughly an item's contiguity. High-frequency sound swells replicate from limitations to grant miraculous echo styles. As established higher than the HC-SR04 un hearable (US) sensor is a four leg module, whose leg names are Vcc, Sensor, Echo and Ground singly. This sensor is a totally notorious device utilized in legion programs whereby activity distance or seeing contrivances are demanded. The module has eyes like tasks withinside the the front that forms the un hearable transmitter associated Receiver. The sensor works with the straightforward devilish council factors that $Distance = Speed \times Time$. The un hearable transmitter transmits an ultrasonic swell, this swell passage in air and whereas it receives protested with the help of exploitation any textile it

receives meditated came back within the direction of the sensor this meditated swell is discovered with the aid of using the un hearable receiver module HC-SR04 distance sensor is usually used with every microcontroller and silicon chip structures like Arduino, ARM, PIC, Raspberry Pie etcetera The antedating manual is immensely as a result of it should be accompanied anyhow of the shape of process tool used. Power the device the employment of a regulated 5V via the Vcc promotion Ground legs of the sensor. the trendy ate up with the help of exploitation the sensor is far not up to 15mA and thus could also be while not detention hopped-up with the aid of using the on board 5V legs (If to be had). The device and also the Echo legs are each I/ O legs and therefore they may be concerning I/ O legs of the microcontroller. to start the dimension, the cause leg should be created devilish for 10uS once that grew to return off. This movement can generate associate un hearable swell at frequency of 40Hz from the transmitter and also the receiver will anticipate the swell to travel back. Once the swell is once more after it obtaining meditated with the help of exploitation any item the Echo leg goes devilish for a particular volume of your time for you to be same to the time taken for the swell to go back came back to the sensor. the quantity of your time for the period of that the Echo pin stays extreme is measured with the resource of the usage of the MCU/MPU because it offers the data regarding the time taken for the wave to maneuver once more back to the device. exploitation this information the gap is measured as represented withinside the higher than heading. This device is employed to outline the distance amongst the perfect crop and device. unhearable Sensor Pin Configuration identification number Pin Name Description one VccThe Vcc pin powers the sensor, commonly with +5V a pair of Trigger Trigger pin is an Input pin. This pin need to be saved extreme for 10us to initialize measuring with the resource of the usage of causation US wave. 3 Echo Echo pin is associate Output pin. This pin goes immoderate for a term as some way to be adequate the time taken for America. A wave to maneuver once more back to the sensor. Four Ground This pin is installed to the Ground of the gadget.

Table-1:Ultrasonic Sensor Pin Configuration:

Pin Number	Pin Name	Description
1	Vcc	The Vcc pin powers the sensor, typically with +5V
2	Trigger	Trigger pin is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.
3	Echo	Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.
4	Ground	This pin is connected to the Ground of the system.

5.2MOTOR DRIVER

We have a large collection of exceptional (brushed) DC motor drivers for exceptional DC vehicles. This brushed DC motor cause pressure is the best of all and can be used for max programs. The DC motor pressure is a shape of amplifier or strength modulator that integrate a few of the controller and a DC motor. It takes the low present day and then converts it proper right into a immoderate present day that’s appropriate for the motor. DC pressure converts an Alternating Current (AC) into Direct Current (DC) to run a DC motor. Higher motor pace generates extra voltage withinside the tachometer and the pressure references this voltage to make certain the motor is running at the correct pace in retaining with-character settings. This is used specially for specific pace regulation, not un usual place starting, braking and reversing.

5.3DC MOTOR

Drive motor desire for use in robotics is a crucial interest and DC vehicles have positive abilities that motivate them to an ideal desire. There are several sorts of DC vehicles -about four essential types. Simply put, a DC motor converts direct present day electric powered strength into mechanical strength. This differs from an AC motor, which applies alternating present day to the electric motor. At the most essential level, DC vehicles work nicely in robotics because of the reality they allow the robot to be battery powered, which offers exceptional benefits for plenty of robotic programs, particularly cell and collaborative robots. That's now not to say that specific vehicles aren't used for robotics – like AC synchronous brushless servo vehicles, which facilitate specific manage of the robot's movements. The pressure electronics of these vehicles truly work from a DC source. Deciding on pressure vehicles requires first that create a robot profile to specify its length, its weight, its pace, what it's miles manipulation, the environment it will work in and on, and the articulated movements it'll need to make. All of these factors will inform in pressure motor desire. Primarily based totally definitely on this speak So for this format the usage of a DC motor for the pressure educate and reducing motor.

5.4 WEBCAMERA

This net virtual camera is a video virtual camera that feeds or streams an image or video in real time to or through a laptop to a laptop network, collectively with the Internet. Webcam software program application allows clients to file a video or circulate the video on the Internet. As video streaming over the Internet requires plenty of bandwidth, such streams commonly use compressed formats. Webcam does things, taking pictures the image or video and to interchange it to the predestined tool. Along with the digital virtual camera the ones moreover encompass the high-quality software program application to engage with the host tool. Software allows the man or woman to edit the pics and to file the movement images for specific duration. This software program application grabs the digital records from the virtual camera at certain intervals of time. Depending on the frame charge, the variety of pics or video streaming is displayed on the laptop or one of a kind display structures. Software receives the image frame from digital virtual camera, converts it into JPEG file and subsequently sends it to the net server using the file transfer protocol (FTP). So in advance than using this webcam, even as going for walks with the net, we need to carry out a bit configuration steps to feature the pics and movement images. By using image sensing can be CMOS or CCD, the preceding being dominant for low-charge cameras, but CCD cameras do now not continually outperform CMOS-based totally absolutely cameras withinside the low-fee variety. Most consumer webcams are capable of supplying VGA-choice video at a frame charge of 30 frames in step with 2d. Many greater current devices can produce video in multi-megapixel resolutions, and a few can run at immoderate frame charges collectively with the PlayStation Eye, that can produce 320×240 video at 100 and twenty frames In preserving with 2d. The Wii Remote contains an image sensor with a choice of 1024×768 pixels. Here this format had input one is Ultrasonic sensor to stumble on the distance and the another one is virtual camera this net virtual camera and its connects with the raspberry pi based totally absolutely on the tracking concept to feed the input records in photo form even as the weeding method is as quickly as start then the virtual camera turns on and study the sensing vegetation into default plant(given with the useful resource of the usage of man or woman) photo even as the two photo matches then the reducing blades get powered with the useful resource of the usage of pi if there no similarities method the blades goes to of state

6. CIRCUIT DIAGRAM

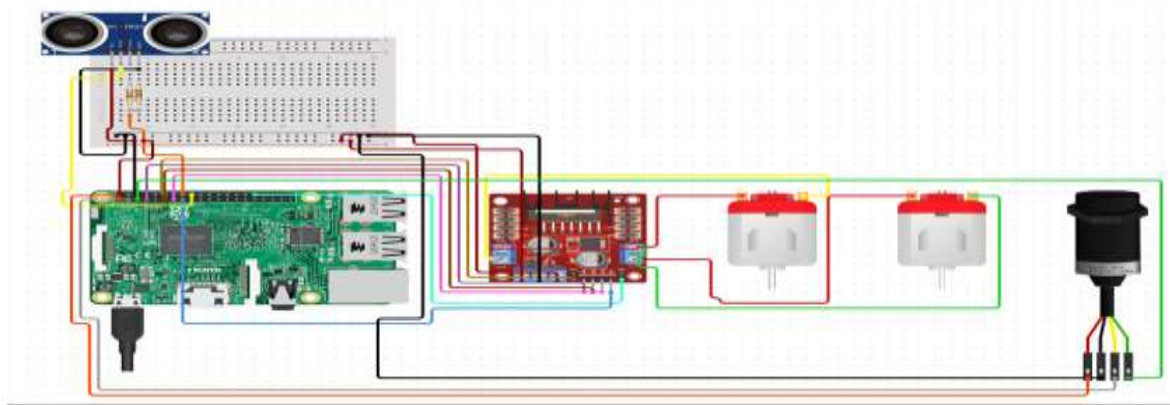


Fig-2: Circuit

7.CONCLUSION

Agricultural development plays essential operate as a cause pressure of rural financial condition reduction. The attempt needed to growth a weeder can meet the choice for of farmers. the performance of weeder need to be high-exceptional and it's simple to perform. It became quicker than the standard methodology of doing away with weed electrical weeders are an outstanding chance to nasty chemical materials that might contaminate the surroundings, hurt pets and wild animals and rate a fortune. the recognition on smarter, higher, and a lot of inexperienced crop growing methodologies is needed that enables you to fulfill the growing food name for of the developing international population withinside the face of the ever-shrinking cultivatable land. the event of recent techniques of up crop yield and handling, you'll with out troubles see presently: generation-weaned, progressive bigger younger masses adopting farming as a profession, agriculture as a fashion for independence from fossil fuels, pursuit the crop growth, safety and vitamins labeling, partnerships amongst growers, suppliers, and stores and This paper thought-about variety of these additives and highlighted the situation of various generation, specially Robo Setup, that enables you to create the agriculture smarter and a lot of inexperienced to fulfill future expectations. For this cause, wireless sensors, UAVs, Cloud-computing, speech generation are noted thoroughly. Furthermore, a deeper belief on modern analysis efforts is provided. In addition, various Robo Setup-based utterly architectures and systems are supplied with apprehend to agriculture programs. A outline of contemporary-day traumatic conditions going via the commercialism and future expectations are listed to supply steerage to researchers and engineers. supported all this, it should be ended that each in. of farmland is significant to maximize crop manufacturing. However, to deal with every inch accordingly, victimization property Robo Setup-based completely sensors and conversation generation isn't frequently optional—it's miles necessary.

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