IOT BASED SMART AND SOLAR OPERATED MULTI TASKING AGRICULTURE ROBOT

DR.HARIKRISHNA KAMATHAM,

PROFESSOR&PRINCIPAL

ANKUSHARAO PRATHYUSHA, KUCHALA KAVITHA,

BOYAPALLYNAVEEN KUMAR, KASIREDDY MANASA

UG SCHOLAR

K. SOWMYA

FACULITY

DEPARTMENT OF ECE, AVN INSTITUTE OF ENGINEERING AND TECHNOLOGY, RAMDAS PALLY, HYDERABAD, TELANGANA 501510

ABSTARCT:

Agriculture is done in every country from ages. Agriculture is the science and art of cultivating plants. Agriculture was the key development in the rise of sedentary human civilization. Agriculture is done manually from ages. As the world is trending into new technologies and implementations it is a necessary goal to trend up with agriculture also. IOT plays a very important role in smart agriculture[9][10][11]. IOT sensors are capable of providing information about agriculture fields. we have proposed an IOT and smart agriculture system using automation. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocolAgriculture is the backbone of Indian economy. About half of the total population of our country has chosen agriculture as their chief occupation. The states like Maharashtra, Punjab, and Kerala, Assam are highly involved in agriculture. It all started due to the impact of, “Green Revolution” by means of which farmers came to know about the various techniques involved in farming and the advantages in it. As centuries passed, certain modern techniques were invented in agriculture due to the progress in science. These modern techniques included the use of tractors for ploughing the field, production of pesticides, invention of tube-wells etc. Since water is the main necessity in this scenario, techniques were discovered which would help in watering the field easily, consume less water and reduce human efforts. These discoveries improved the standard of living of farmers. Agro-Technology is the process of applying the technology innovation occurring in daily life and applying that to the agriculture sector which improves the efficiency of the crop produced and also to develop a better Mechanical machine to help the agriculture field which reduces the amount and time of work spent on one crop. Hence in this work of project we decided to design a better mechanical machine which is available to the farmers at a cheaper rate and also which can sow and seed the crop at the same time. This project consists of the better design of the machine which can be used specifically for sowing of soybean, maize, pigeon pea, Bengal gram, groundnut etc. For various agricultural implements and non-availability of sufficient farm labor, various models of seed sowing implements becoming popular in dry land regions of India. The success of crop production depends on timely seeding of these crops with reduced dull work of farm labor. The ultimate objective of seed planting using improve sowing equipment is to achieve precise seed distribution within the row

KEY WORDS: Eye Blink, Rain Sensor, DHT Senesor,Arduino,Wifi

1. INTRODUCTION

India record of progress in agriculture over the past four decades has been quite impressive. The agriculture sector has been successful in keeping pace with rising demand for food. The contribution of increased land area under agricultural production has declined over time and increases in production in the past two decades have been almost entirely due to increased productivity. Contribution of agricultural growth to overall progress has been widespread. Increased productivity has helped to feed the poor, enhanced farm income and provided opportunities for both direct and indirect employment. The success of India's agriculture is attributed to a series of steps.The major sources of agricultural growth during this period were the spread of modern crop varieties, intensification of input use and investments leading to expansion in the irrigated area. In areas where 'Green Revolution' technologies had major impact, growth has now slowed. New technologies are needed to push out yield frontiers, utilize inputs more efficiently and diversify to more sustainable and higher value cropping patterns". At the same time there is urgency to better exploit potential of rain fed and other less endowed areas. Given the wide range of agro ecological setting and producers, Indian agriculture is faced with a great diversity of needs, opportunities and prospects. Future growth needs to be more rapid, more widely distributed and better targeted. These challenges have profound implications for the way farmers' problems are conceived, researched and transferred to the farmers. "On the one hand agricultural research will increasingly be required to address location specific problems facing the communities on the other the systems will have to position themselves in an increasingly competitive environment to generate and adopt cutting edge technologies to bear upon the solutions facing a vast majority of resource poor farmers".The robotic systems play an immense role in all sections of societies, organization and industrial units. The objective of the project is to develop a microcontroller based system at helps in on-farm operations like seeding and fertilizing at pre-designated distance and depths with all applicable.Agriculture comes from two Latin words: Ager which means a field. Culturia which means cultivation, Due to traditional methods of agricultural process the Indian farmer faces many problems about productivity of agricultural product than others. It is due to unbalance feeding of fertilizer without knowing the actual requirement of nutrient to a particular crop.Digital models of biological objects have proven to deliver new facilities for the analysis of structural and functional interrelationships as well as developmental processes in a spatial or spatio-temporal context .We are working towards the generation of a generalized 3-D anatomical atlas of developing barley (Hordeum vulgare) grains at different developmental stages. Serving as reference framework for the integration, visualization, and exploration of various data modalities, such inter-individual atlases significantly promote the analysis of developmental gradients and dynamics. Traditional methods include broadcasting manually, opening furrows by a country plough and dropping seeds by hand, and dropping seeds in the furrow through a bamboo/meta funnel attached to a country plough (Pora). For sowing in small areas dibbling i.e., making holes or slits by a stick or tool and dropping seeds by hand is practiced. Multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers.In the current generation most of the countries do not have sufficient skilled man power specifically in agricultural sector and it affects the growth of developing countries. So it's a time to automate the sector to overcome this problem. In India there are 70% people dependent on agriculture. So we need to study agriculture. Innovative idea of our project is to automate the process of sowing crops such as sunflower, baby corn, groundnut and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc & to reduce the human effort and increase the yield.The plantation of seeds is automatically done by using DC motor. The distance between the two seeds are controlled and varied by using Microcontroller. It is also possible to cultivate different kinds of seeds with different distance. When the Robot reaches the end of the field we can change the direction with the help of remote switches. The whole process is controlled by Microcontroller. Seed plantation is our day to day life is done by tractor in farms. The conventional method for seeding is the manual one. But it requires more time & the man power shortage is faced continuously. India is agrarian economies and most of rural populations depend on agriculture to earn their livelihood. Agriculture is the largest livelihood provided in India mostly in the rural areas. The farmers are in need of seeds for ploughing & cultivation. The seeds are available in packets & many industries deal in manufacture of such seed packets. In Modern world, Automation robot is used in many of the fields such as defence, surveillance, medical field, industries and so on. In this paper, the robot system is used to develop the process of cultivating agricultural land without the use of man power. The aim of the paper is to reduce the man power, time and increase the productivity rate. All the basic automation robot works like weeding, harvesting and so on. In current generation most of the

countries do not have sufficient human factor in agricultural sector and it affects the growth of developing countries so it's time to automate the sector to overcome this problem. In India, there are 70% people dependent on agriculture. So we need to study the agriculture. Innovative idea of our project is to automate the process of sowing crops such as groundnut, sunflower, and baby corn and so on. The farming system like ploughing, cultivating, weeding, harvesting, etc is the different process. All the processes are advance to modifying the mechanism in farming which works automatically without the man power requirement.The small machine would be assembled from existing mass produced components without the need of specialized design and tooling. Also energy require to this machine is less as compared with tractors or any agricultural instrument. Seeding preparation is our day to day life we use tractor in farms. But it requires more time and the man shortage is faced continuously. Now a day soil is tested in laboratory and proper analysis of soil is done and amount of various contains and their ratio are measured but laboratories are normally in district places and it is little bit time consuming process. This proposed system contributes to give contain of NPK in soil within some minutes.N (Nitrogen) - for growth of leaves and vegetation. P (Phosphorus)-for root and growth.K (Potassium)-regulation of water.Nutrient in plantcell, flowering, fruiting.Seeding is one of the main process of farming activity. Italso takes more power that can be reduced with this system, seeding is automated which helps linear way of seeding and time consumption is reduced.The NPK value is measured and compared with the standard value for particular crop is known so the difference amount of fertilizer is dispensed by robot

1.1. PROBLEM STATEMENT In the present scenario most of the countries do not have sufficient skilled man power in agricultural sector and that affects the growth of developing countries. Therefore farmers have to use upgraded technology for cultivation activity (digging, seed sowing, fertilizing, spraying etc.). So it's a time to automate the sector to overcome this problem which inturn will also eliminate the requirement of Labors and also avoid the wastage of seeds

1.2 PROBLEM MOTIVATION As we are interested in Embedded Electronics based projects and there are many advantages of the embedded system as well in spite of the electronics based projects. We can control the speed of the DC motor which is an electrical component by using a delay in the source coding. We are motivated for doing this project because it is an autonomous agricultural based project and here we get to deal with the controller, its interfacing with the dc motors, interfacing with the ultrasonic sensor, a linear actuator which is used for opening and closing of the valve required for the dispension of seeds and so on.

2. LITERATURE REVIEW

COMPARATIVE PERFORMANCE OF SEEDING DEVICES WITH OTHER SOWING METHODS

Introduction In this multipurpose seeding machine equipment consists of cylindrical shape container in which the seeds can fill. The container is attached on the four wheeled carrier assembly. It consists of metering plate bevel gear mechanism and two holes at the bottom depending on seed size. The working as plate will rotate in container when the bottom holes of container and meter plate hole coincide seeds will flow through pipe to soil. Here the metering plate gets rotating motion by bevel gear assembly and the bevel gears get the motion by rear wheels with the help chain and sprocket assembly.

Crop yield Studies in different parts of the country have shown that seeding devices introduced in rainfed areas have increased crop yields by 10 to 20 percent over conventional methods of seeding due to better plant establishment and proper application of inputs. In most parts of Nortli India, seedcum fertilizer drills are used for sowing whereas seed drills are found in use mostly in the Southern parts of the country.

Energy saving It was reported that by using three row bullock drawn ferti-seed drill for wheat crop, a saving of 76.37 percent man hours and 59.92 per cent bullock-hours was obtained when compared with the behind the plough sowing. (Mehta and Varshney, 1970) Singh (1971) revealed that by using a ferti-seed drill for wheat crop, a saving of 69.96 per cent in man-hours and 55.17 percent in huliock hours was achieved when compared.

Drilling or Line Sowing: In this method seed is sown by seed drill or ferti-seed drill. With the help of this implement seeds drop at uniform depth and results in uniform germination and regular stand. Seed bed should be fine and well levelled free from clods and weeds for the use of seed drill or ferti-seed drill. Seed drills are

easily available in the market. They may be either bullock driven or tractor driven. Ferti-seed drill should be used wherever possible to ensure uniform depth of sowing, proper placement of fertilisers and good germination.

Dibbling: It is the placing or dibbling of seeds at cross marks (+) made in the field with the help of maker as per the requirement of the crop in both the directions. It is done manually by dibbler. This method is followed in crops like Groundnut, Castor, and Hy. Cotton, etc. which are having bold size and high value. This method is used in case where supply of seed is limited. Sowing is done with the help of a small implement known as 'Dibbler'. It is a wooden or iron frame with pegs. The frame is pressed in the field and lifted and then one or two seeds are dropped by hand in each of the hole. It is not a common method because it is a very time consuming process.

Putting seeds behind the plough: A majority of farmers use this method. This method consists of dropping the seeds by hand into the furrows that have been opened with local plough. When seed is dropped in furrows by hand, it is called 'Kera' method and when it is dropped through a Pora or Nai or Hazara a special attachment with local plough it is called 'Pora' method. In this method seeds are dropped at a depth of 5-6 centimetre and germination is satisfactory. Manual sowing has the problem of not giving adequate spacing between row to row and plant to plant leading to less population of crops than recommended by the agronomists. Also there is the problem of placing the seeds at correct depth and correct soil coverage.

Weed Mapping Weed mapping is process of recording the position and preferably the density (biomass) of different weed species using aspects of machine vision. One method is to just record the increased leaf area found in weedy areas as weeds are patchy and the crops are planted in rows (Pedersen 2001). Another more accurate method is to use active shape recognition, originally developed to recognise human faces, to classify weed species by the shape of their outline (Søgaard and Heisel 2002). Current research has shown that up to 19 species can be recognised in this way

Robotic Weeding Robotic weeding Knowing the position and severity of the weeds there are many methods that can kill, remove or retard these unwanted plants (Nørremark and Griepentrog 2004) Different physical methods can be used that rely on physical interaction with the weeds. A classic example is to break the soil and root interface by tillage and promote wilting of the weed plants. This can be achieved in the inter row area easily by using classical spring or duck foot tines. Intra row weeding is more difficult as it requires the position of the crop plant to be known so that the end effector can be steered away. Within the close-to-crop area, tillage cannot be used as any disturbance to the soil is likely to damage the interface between the crop and the soil. Non contact methods are being developed such as laser treatments (Heisel 2001) and micro-spraying. Controlled biodiversity is an opportunity that could be realised with robotic weeding. Non-competitive weeds can be left to grow when they are at a distance from the crop. This is part of the design parameters for the Autonomous Christmas Tree weeder being developed at KVL.

Micro Spraying Micro spraying within the close-to-crop area, great care must be taken not to damage the crop nor disturb the soil. One method of killing weeds close to the crop plants is to use a micro spray that delivers very small amounts directly on to the weed leaf. Machine vision can be used to identify the position of an individual weed plant and a set of nozzles mounted close together can squirt a herbicide on to the weed. Tests have shown that splashing can be reduced when a gel is used as a carrier rather than water (Lund and Søgaard 2005). Other trials have shown that when the right amount of herbicide is placed in the right way at the right time, the usage of herbicide can be drastically reduced to about 1 gram per hectare for an infestation of 100 weeds per square meter (Graglia 2004). A micro spray system is currently under development at DIAS Bygholm, in Denmark

Robotic Gantry Robotic gantry Traditional or macro spraying can be very efficient, especially when they cover large areas. Most equipment manufacturers are developing larger machines, with 42 meter booms currently under development (pers. com. Hardi International). When mounting booms this big, they have inherent stability problems as the tractor has a relatively small wheelbase and they tend to oscillate. One method to improve stability would be to mount a spray boom between two unmanned robots that travelled in adjacent tramlines. This robotic gantry could apply both liquid sprays and fertiliser and be able to regulate itself according to current weather conditions. If it became too windy then the gantry could just stop and wait

until conditions improved. Variable rate, patch spraying, minimising skips and overlaps could all be built into the original design specifications by controlling individual nozzles. Turning on the headland would be different, as it would not include rotation – just translation, as the robots could turn but the boom remains parallel to its working direction. Sensing systems could be mounted on a trolley that could move along the spray boom as in the crop scouting section.

Selective Harvesting Selective harvesting Selective harvesting involves the concept of only harvesting those parts of the crop that meet certain quality thresholds. It can be considered to be a type of pre sorting based on sensory perception. Examples are to only harvest barley below a fixed protein content or combine grain that is dry enough (and leave the rest to dry out) or to select and harvest fruits and vegetables that meet a size criteria. As these criteria often attract quality premiums, increased economic returns could justify the additional sensing. To be able to carry out selective harvesting effectively, two criteria are needed; the ability to sense the quality factor before harvest and the ability to harvest the product of interest without damaging the remaining crop. Most agricultural equipment is getting bigger and hence not suited for this approach. Smaller more versatile selective harvesting equipment is needed. Either the crop can be surveyed before harvest so that the information needed about where the crop of interest is located, or that the harvester may have sensors mounted that can ascertain the crop condition. The selective harvester can then harvest that crop that is ready, while leaving the rest to mature, dry, or ripen etc. Alternatively, small autonomous whole crop harvesters could be used to selectively gather the entire crop from a selected area and transport it to a stationary processing system that could clean, sort and maybe pack the produce. This is not a new idea, but updating a system that used stationary threshing machines from many years ago. Alternatively a stripper header could be used to only gather the cereal heads and send them for threshing

D.S.Suresh, Jyothi Prakash K V, Rajendra C J, "Automated Soil Testing Device", ITSI Transactions on Electrical and Electronics Engineering (ITSI-TEEE) ISSN (PRINT): 2320 – 8945, Volume - 1, Issue -5, 2013.

In country like India the economy is mainly based on agriculture, still we are not able to make optimal, profitable and sustainable use of our land resources. The main reason is the lack of knowledge regarding the soil analysis for the growth of crops. In every state around 9 to 10 lakhs soil samples have been received in laboratories and it is very difficult to test all the soil samples in time by the laboratories. By the time test reports are generated, harvesting is on the verge of completion. Hence there is a need for soil analysis to be made available to the farmer. The main objective of our work is to develop a testing system which can be used for soil analysis, which in term helps the farmers to cultivate and produce the proper crop. The wireless communication system has been incorporated to interact with the experts Automated Soil Testing Device is an electronic device, which can be used to measure N (Nitrogen) P (Phosphorous) K (Potassium) & pH (Potenzy hydrogen) values to ensure the fertility of soil in the field of agriculture to select the suitable crop and also the type of fertilizer to be used. The ionic particles present in the soil sample are sensed by the sensor and the out put of the sensor is processed by signal conditioning circuit. The Microcontroller is used to compare the pre-stored value with the actual values and the measured values are displayed on the LCD. The wireless trans-receiver transmits the data to a remote location or designated authority in the agriculture department for further analysis & suggestions. Automated Soil Testing Device is a portable device which can be used either in laboratories or on the identified spot selected for farming so that the farmer need not take the pain of visiting the soil testing laboratories which are normally located in district headquarters. Automated Soil Testing Device is a simple &user friendly device so that any person can test the soil without the presence of an operator, it is an economical device & thus a common man can easily afford it.

Sneha J. Bansod, ShubhadhaThakre, "Near Infrared Spectroscopy based Soil Nitrogen measurement", International Journal of Current Engineering and Technology E-ISSN 2277 – 4106, P-ISSN 2347 – 5161

Spectroscopy is an emerging technology, having vast applications in food industry and agriculture. The unique quality of Spectroscopy to characterize material from the reflection or absorbance has been used in the current paper to measure soil Nitrogen content. Taking into account the advantages of Near Infrared (NIR) region over other regions of electromagnetic spectrum, NIR Spectroscopy was decided to be employed for Soil Nitrogen measurement. An expensive, bulky, non-portable Spectrometer was successfully replaced by a small, portable assembly consisting of six LEDs (940, 1050, 1100, 1200, 1300, 1550) corresponding to six

Nitrogen sensitive wavebands and six photo-detectors. The detailed structure design and experimental procedure has been described in the paper. Device was calibrated using the most commonly used Partial Least Square Regression (PLSR) analysis which acquired a calibration coefficient of determination (R2) 0.875 and Validation R2 0.803.For increasing crop production, soil testing is helpful for recommending the type of fertilizer and its quantity to be added to the soil. This leads to an efficient fertilizer use, Environment protection, product quality enhancement and increase in yield. The conventional soil testing methods, namely laboratory analysis methods are time consuming, expensive and require expert operator in chemical analysis. At the same time these methods won't be helpful in on-line monitoring processes. Thus, there is an insistent demand for investigating a reliable and cost effective method for instantaneous analysis. Overcoming these disadvantages, Spectroscopy has shown promising results for estimation of soil constituents. Spectroscopy is a rapid, timely, less expensive, nondestructive analytical technique which can be reliably used to estimate different soil properties without the need of chemicals [14]. It is an analytical technique that characterizes the materials according to their absorbance or reflectance in the specific wavelengths. The estimation of constituents is achieved from the soil spectrum, obtained by directing radiation containing all relevant frequencies in the particular range to the sample. Depending on the constituents present in the soil, the radiation will cause individual molecular bonds to vibrate, either by bending or stretching, and the light absorption will correspond to a specific energy quantum equivalent to the difference between two energy levels. Because of its particular bonds and molecular structures, each chemical species produces a unique IR absorption spectrum, which can be used for analytical purposes [15]. Near infrared reflectance (NIR) spectroscopy, with electromagnetic spectrum region from 780-2500nm wavelength, has been used for analysis of minerals, forages, plant material and grains as well as for some soil materials. The NIR region is dominated by weak overtones and combinations of fundamental vibrations due to the stretching and bending of N-H, O-H and C-H groups [14]. NIR is well supported commercially, is well suited to field portability, remote sensing, copes better with moist samples and can deal with larger bulk soil samples because of its more intense sources and sensitive detectors. The main reason for sensing nitrogen in the farm fields is to determine the amount of fertilizer applied to meet the needs of the crops and to prevent over-applying so as to diminish nitrate leaching down in groundwater reservoirs. Nitrogen is said to be a best indicator of soil fertility. Nitrogen is an essential element of all amino acids, which are the building blocks of proteins. It is also a key component of nucleic acids and chlorophyll. A plant receiving sufficient nitrogen will typically exhibit higher photosynthesis rate and vigorous plant growth. From the surveillance, it is inferred that NIR region of the spectrum is most suitable for predictions of soil Nitrogen contents [14]. In recent decades, Spectroscopy technique has been increasingly used in agricultural and food industries. Many experiments and research has been done to develop spectroscopy based reliable, portable and cost effective device. Felipe et al. [6] developed a low-cost IR absorption spectroscope based on linear variable filter (LVF) technology for the automated detection of gases and vapours, and the semi-automated detection of liquids. Sudduth and Hummel et al. [16] used a portable near infrared spectrophotometer for estimation of soil organic matter with an R2 of 0.89 and a standard error of prediction of 0.40%. Similarly, NIRS has been used for soil total Nitrogen detection by Dalal and Henry et al. [5] using MLR calibration with correlation coefficient R2 of 0.92 over 1100-2500. Reeves and McCarty (2001) used PLSR with R2 of 0.94 in wavelength range 1100-2300. They all employed various spectrophotometers for estimation of soil nutrients through the spectra obtained. But, use of spectrophotometers made the device bulky and very expensive. Replacing the spectrophotometers with LEDs and detector, An et al. (2011) suggested six wavelengths (1550, 1300, 1200, 1100, 1050, and 940 nm) as the sensitive wavebands for soil Nitrogen [16]. The estimation model was obtained using the FT-NIR analyzer with calibration R2 of 0.85, and the validation R2 of 0.77. Further, XiaofeiAn et al. [18] developed the BP-NN estimation model having soil TN content R2 0.88 and the validation R2 0.75. As, these estimation models had a very good accuracy, the six LEDs are used in the present design

NODE MCU:

NodeMCU is an open source LUA based firmware developed for ESP8266 wifi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e. NodeMCU Development boardSince NodeMCU is open source platform, their hardware design is open for edit/modify/build.NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The **ESP8266** is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266,

you can refer ESP8266 WiFi Module.There is Version2 (V2) available for NodeMCU Dev Kit i.e. **NodeMCU Development Board v1.0 (Version2)**, which usually comes in black colored PCB.

Fig: NodeMCU Development Board

DHT:

These sensors are very basic and slow, but are great for hobbyists who want to do some basic data logging. The DHT sensors are made of two parts, a capacitive humidity sensor and a thermistor. There is also a very basic chip inside that does some analog to digital conversion and spits out a digital signal with the temperature and humidity. The digital signal is fairly easy to read using any microcontroller.

Humidity is the measure of water vapour present in the air. The level of humidity in air affects various physical, chemical and biological processes. In industrial applications, humidity can affect the business cost of the products, health and safety of the employees. So, in semiconductor industries and control system industries measurement of humidity is very important. Humidity measurement determines the amount of moisture present in the gas that can be a mixture of water vapour, nitrogen, argon or pure gas etc… Humidity sensors are of two types based on their measurement units. They are a relative humidity sensor and Absolute humidity sensor. DHT11 is a digital temperature and humidity sensor.

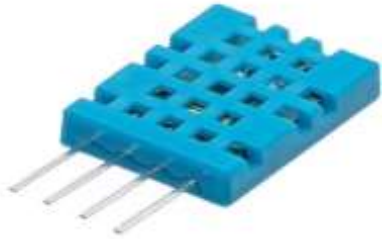
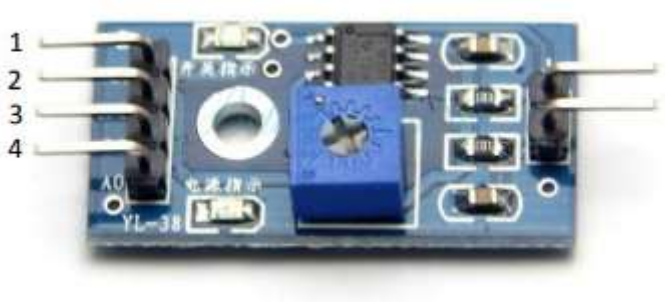


Fig: DHT Sensor

RAIN SENSOR:

A rain sensor or rain switch is a switching device activated by rainfall. There are two main applications for rain sensors. The first is a water conservation device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall. The second is a device used to protect the interior of an automobile from rain and to support the automatic mode of windscreen wipers. An additional application in professional satellite communications antennas is to trigger a rain blower on the aperture of the antenna feed, to remove water droplets from the mylar cover that keeps pressurized and dry air inside the wave-guides

The rain sensor module/board is shown below. Basically, this board includes nickel coated lines and it works on the resistance principle. This sensor module permits to gauge moisture through analog output pins & it gives a digital output while moisture threshold surpasses.



rain-sensor-module

This module is similar to the LM393 IC because it includes the electronic module as well as a PCB. Here PCB is used to collect the raindrops. When the rain falls on the board, then it creates a parallel resistance path to calculate through the operational amplifier.
This sensor is a resistive dipole, and based on the moisture only it shows the resistance. For example, it shows more resistance when it is dry and shows less resistance when it is wet.

Pin Configuration

The pin configuration of this sensor is shown below. This sensor includes four pins which include the following.

- Pin1 (VCC): It is a 5V DC pin
- Pin2 (GND): it is a GND (ground) pin
- Pin3 (DO): It is a low/ high output pin
- Pin4 (AO): It is an analog output pin

Specifications

The specifications of the rain sensor include the following.

Fig:Rain-sensor

- This sensor module uses good quality of double-sided material.
- Anti-conductivity & oxidation with long time use
- The area of this sensor includes 5cm x 4cm and can be built with a nickel plate on the side
- The sensitivity can be adjusted by a potentiometer
- The required voltage is 5V
- The size of the small PCB is 3.2cm x 1.4cm
- For easy installation, it uses bolt holes
- It uses an LM393 comparator with wide voltage
- The output of the comparator is a clean waveform and driving capacity is above 15Ma

APPLICATIONS

The applications of rain sensor include the following.

- This sensor is used as a water preservation device and this is connected to the irrigation system to shut down the system in the event of rainfall.
- This sensor is used to guard the internal parts of an automobile against the rainfall as well as to support the regular windscreen wiper's mode.
- This sensor is used in specialized satellite communications aerials for activating a rain blower over the opening of the aerial feed, to get rid of water droplets from the mylar wrap to keep pressurized as well as dry air within the waveguides.

DC Motor Driver:

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to allow for bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is planned to provide bidirectional drive currents of up to 600-mA at voltages of 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar maltreating motors, as well as other high-current/high up-voltage loads in positive-supply applications.

All inputs are TTL compatible. Each output is a complete totem-pole drive circuit, with a Darlington transistor drop and a pseudo-Darlington source. Drivers are changed in pairs, with drivers 1 and 2 enabled near 1,2EN and drivers 3 and 4 enabled by 3,4EN.When an enable input is high, the linked drivers are enabled and their outputs are active and in phase with their inputs.When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the thoroughly data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293, international high-speed output clamp diodes should be used for inductive transient stifling. A VCC1 terminal, classify from VCC2, is provided for the logic inputs to minimize device power dissolution. The L293and L293D are characterized for operation from 0°C to 70°C.

Fig 3.22: L293D IC

3. APPLICATION, ADVANTAGE, DISADVANTAGE

APPLICATION

1) Farming The design of furrow openers of seed drills varies to suit the soil conditions of particular region. Most of the seed cum fertilizer drills are provided with pointed tool to form a narrow slit in the soil for seed deposition.

2) Gardening Seeds are broadcasted on the soil which results in the loss and damage of the seeds. As the cost of seeds is more and cannot be affordable for the farmers so there is the need for the proper placement of seeds in the soil.

3) Sport's Stadium The fluted roller seed cup is having the arrangement of seed cut-off and controlling flap to control the amount of seeds and fertilizers.

4) Agri Universities The Harrow is one of the important agricultural equipment which is used in the fields of agriculture for seed bed preparation and weed control. This is used before the seeds are sown in the field. This helps in the leveling of the soil and seeds can be sown in the prepare bed easily Polyhouse Seeds are broadcasted on the soil which results in the loss and damage of the seeds. As the cost of seeds is more and cannot be affordable for the farmers so there is the need for the proper placement of seeds in the soil.

ADVANTAGE

• Reduce the manual work Anyone that has ever had the task of relocating a fixed conveyor system knows that this can be a cumbersome undertaking. Through the use of advanced ASSR technology and wireless routing, vehicles can be quickly reprogrammed to change path or operation, eliminating the need for expensive retrofitting. New directions, tasks, and work cells can be created almost instantaneously without the need for physical equipment installation.

• Less skill technicians is sufficient to operate. Through the advancement of control systems ASSRs offer a safe and predictable method of delivery, while avoiding interference with human and building factors. ASSRs can operate almost around the clock, without the need for breaks and vacation time. In addition, ASSRs operate in conditions that may not be suitable for human operators, such as extreme temperatures and hazardous environments.

• Installation is simplified very much Automated Seed Sowing, combined with RF technology, interface with the Warehouse Control System or Warehouse Management System to improve accuracy and efficiency. ASSRs have little downtime, and operate at a fixed rate to meet a predictable metric for operational activity.

• Labor requirement reduces Optimization of transport flows in accordance with vehicle fleet, traffic and missions.Work flows distributed dynamically between the same ASSRs.Possibility of 24/7 operation without human intervention.

• Quantity of seeds reduces No conventional material-handling infrastructures required. Increase of ASSRs in line with the growth in volume of operations. Updating possible without shutting down the system.Easy reconfiguration of routes or addition of new machines.Reintroduction of vehicles after manual repositioning. Polyhouse Seeds are broadcasted on the soil which results in the loss and damage of the seeds. As the cost of seeds is more and cannot be affordable for the farmers so there is the need for the proper placement of seeds in the soil.

DISADVANTAGE

- Electronics component cannot sustain the vibrations and the high temperature.
- Accuracy should be reduces due to clod and mud.

4. CONCLUSION

The main focus of this system is its Automatic way of sowing the seeds. The seeds are been sowed in a proper sequence which results in proper germination of seeds. This automatic way of sowing seeds using a robot reduces the labor requirement. Here the wastage of seeds is also been reduced to a greater extent. This system has been developed for the sowing of seeds in an automatic way. Here with the help of a robot the seeds are been dispensed in the soil in a proper sequence hereby reducing the wastage of seeds The planting process of the onion crop only has been implemented by using this Seed Sowing V robot autonomously. This robot will help the farmers to do the farming process efficiently. The project can be enhanced to any other kinds of crop such as fruits, paddy, sugarcane etc. The robot can be designed with chain roller instead of normal wheel. Hence, it can be applicable to the real time agricultural field

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