

A DEVELOPING MULTIFUNCTIONAL AGRICULTURE TRAINER ROBOT

By

MAHDI HASAN NILOY

ID: 171-15-1254

MD. RONY AHMED

ID: 171-15-1301

&

ABDULLAH AL MUNAIM

ID: 171-15-1235

This Report Presented in Imperfect Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering.

Supervised By

Ohidujjaman

Senior Lecturer, CSE

Department of Computer Science and Engineering

Daffodil International University.



DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

14 JANUARY, 2021.

APPROVAL LETTER

The Project titled ‘**A Developing Multifunctional Agriculture Trainer Robot**’ submitted by Mahdi Hasan Niloy, Md. Rony Ahmed, Abdullah Al Munaim to the Department of Computer Science and Engineering, Daffodil International University, has been allowed as gratifying for the deficient perfection of the essential for the degree of B.Sc. in Computer Science and Engineering (B.Sc.) and allowed as to its method and agenda. The presentation has been taken on 14 January, 2021.

BOARD OF EXAMINERS

Professor Dr. Touhid Bhuiyan

Chairman

Professor and Head

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University

Dr. S. M. Aminul Haque

Internal Examiner

Assistant Professor & Associate Head

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University

Ohidujjaman

Internal Examiner

Lecturer

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University

Dr. Mohammad Shorif Uddin

External Examiner

Professor

Department of Computer Science and Engineering

Jahangirnagar University

DECLARATION

We have mentioned here that this project has been done by us under the supervision of Ohidujjaman, Senior Lecturer, Department of CSE Daffodil International University. We also indicate that no other graduate or diploma has been applied to this project or to any portion of this project.

Supervised by:

Ohidujjaman

Senior Lecturer

Department of CSE

Daffodil International University

Submitted by:

Mahdi Hasan Niloy

ID: 171-15-1254

Department of CSE

Daffodil International University

Abdullah Al Munaim

ID: 171-15-1235

Department of CSE

Daffodil International University

Md. Rony Ahmed

ID: 171-15-1301

Department of CSE

Daffodil International University

ACKNOWLEDGEMENT

Above all, we offer our earnest thanks and thankfulness to Almighty God for His magnificent blessing that makes it conceivable to successfully end a year ago's drive.

We genuinely thank and acknowledge Ohidujjaman, Senior Lecturer, Department of CSE, Daffodil International University, Ashulia, Dhaka. To achieve this activity, we have profound information on the field of "Arduino" and one of a kind fascination. His ceaseless constancy, scholastic course, unflinching encouragement, enduring and exuberant management, gainful investigation, critical counsel, comprehension of various sub-drafts, and modifying them at all stages are relied upon to end this activity.

We might want to communicate our true gratitude to Dr. SM Aminul Haque, Assistant Professor, Department of CSE, for his liberal help to our staff and other staff and CSE Department staff at Daffodil International University.

We might want to thank our full schoolmates at Daffodil International University who partook in this discussion while finishing the course work.

Eventually, we need to perceive our immovable help and the correct thought of our kin's patients.

ABSTRACT

In the advanced world, computerization robots are utilized in numerous fields of safeguard, observation, clinical field, industry, and so in this investigation, mechanical frameworks are utilized to build up the way toward developing agrarian land without utilizing labor. The objective of the paper is to decrease labor, time, and increment efficiency. All fundamental mechanization robots work like weeds, gatherers, etc. Here planning frameworks, for example, furrowing the land, and planting seeds, watering or showering compost on plants, and moving vehicles are favored by this independent robot utilizing a microcontroller. In light of the development of this robot on the ground, the ultrasonic sensor helps in distinguishing deterrents, subsequently turning the situation of the robot to one side or right or forward. The routing part has been reenacted with the assistance of Protas. Numerous technologists are attempting to refresh another advancement dependent on mechanization that works thoroughly, profoundly productively, and in a brief timeframe. Reformist development in the farming framework is turning into a significant assignment as the interest for quality horticultural items is expanding and the accessibility of work in rustic agribusiness is declining. The framework planned is to convey rural robot seeds and compost utilizing a microcontroller. The reason for the planned framework is to plant seeds, treat, and check soil pH, temperature, stickiness, moistness. The robot is constrained by a distance. In the planned framework the robot effectively explores the objective and plays out the above errands.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Especially in the agricultural sector, the vast majority of the nations of the present age do not have enough talent and influence the development of farming nations. So the time has come to mechanize the area to conquer this issue. Bangladesh is 80% subject to horticulture. So we need to contemplate agribusiness. The creative thought of our task is to mechanize the way toward planting and planting seeds, for example, sunflower, maize, peanuts, and vegetables, for example, beans, rice, fingers, pumpkin, and wheat seeds.

Lessen human exertion and increment yield. The distance between the two seeds is controlled and fluctuated utilizing a microcontroller. At the point at the end of the field, we can change course with the help of a remote switch. A microcontroller restricts the entire cycle. The firm and seed furrow is our everyday life on the ranch by a work vehicle. Notwithstanding, additional time is required for this, and there has been a nonstop labor emergency. The principle necessity of robotizations is to decrease the labor in our nation; Buzzwords of all modern organizations incorporate electronic, electronic segments just as mechanical parts. Robotization spares a ton of dull manual work and accelerates creation measures.

These days we need labor. The energy needed for this machine is not as much as that of a work vehicle or any rural hardware contamination is additionally a major issue that is killed utilizing sun based plates. A manual firm invests more energy and prompts more contamination. So the time has come to plant the seeds and robotize the planting cycle. The other is to speed up the activity. The advancement of a robot that can perform alleviation and seed planting undertakings consequently permits the rancher to explore physically and settle the dampness of the climate. Mechanical technology and robotization can assume a significant part in expanding the interest for farming creation. Individuals can computerize exercises like planting and planting seeds.

In the advanced world, little landowners currently use work bulls to get ready the majority of the land. Their utilization in other farming exercises like furrowing, nerve racking, manure application, planting, and weeding can be expanded and made more prudent. Improved hand instruments will likewise make ranch work simpler. A diversion can be utilized to pull a truck

during the time that keeps them in preparing. Furrows, edges, seeds, and weeds are altogether occasional instruments. The manual strategy for planting brings about lower yields, lower seed planting, lower crop yields, and an extreme build-up of the rancher which restricts the size of land that can be planted. The expense of imported grower has gone past the buying intensity of the vast majority of our ranchers. Ranchers can do a great deal to expand crop yields, particularly if the grain can be decreased or totally eliminated from their planting exercises. Development of any harvest normally includes different advances like seed choice, land planning, compost, planting, water system, germination, diminishing and filling, weed expulsion, plant stage, blooming stage, pesticide shower, natural product or case arrangement stage, crop assortment, and sifting. . Ranchers need to utilize diverse agrarian devices and work to make various strides, our point is to consolidate all the extraordinary apparatuses to give ranchers adaptable instruments that apply all the methods of logical cultivating and all the seeds are reasonable for seed development in this task with least expense. The work centers on the plan and manufacture of adaptable apparatuses that are utilized for land planning, planting, treating, and leveling, and weed evacuation. Multi-crop grower can furnish a reasonable seed with equivalent profundity and uniform dividing between seeds. The seed grower comprises of a centralized server, flexible handle, seed container, seed metering plate, customizable wrinkle opener, close to movable wrinkle, drive wheels, and seed tube. The seed metering circle was planned as tradable for planting various assortments of seeds. Flexible cultivating devices are anything but difficult to utilize, different changes are handily made, and it is without upkeep.

1.2 Motivation

In our country 80% people depend on agriculture. Most of the farmers have not perfect knowledge about the agriculture. But our robot gives them perfect knowledge about the agriculture in Bangla language, how to cultivate the crops and how to implement their benefits. Robots can perform tasks more quickly than humans, so more products can be made.

1.3 Objectives of the projects

- To design and develop intelligent robot for agriculture purpose.
- To communicate with rural farmers in Bangla language.
- To create multifunction smart robot for soil test, diagnosis and remedy of crops.

1.4 Expected Outcomes

- Developing and intelligent robot to serve the farmers of Bangladesh.
- Communication in Bangla language will benefit many rural farmers.

1.5 Limitation

The work of this project is all done and as a result, turning on or off the electronic equipment is not limited to the family machine and sends a critical message showing the new current situation with the machine. But During the pandemic situation COVID-19 whole world has been faced lockdown situation for this reason we could not purchase high quality equipment and we are unable to collect data from field properly.

1.6 Report Layout

Pictorial presentation of the task in an easy way with a parent that describes the total project, contents, and more. The task file carries 5 chapters. Outline of all the chapters with a summary is mentioned beneath via demographic representation:

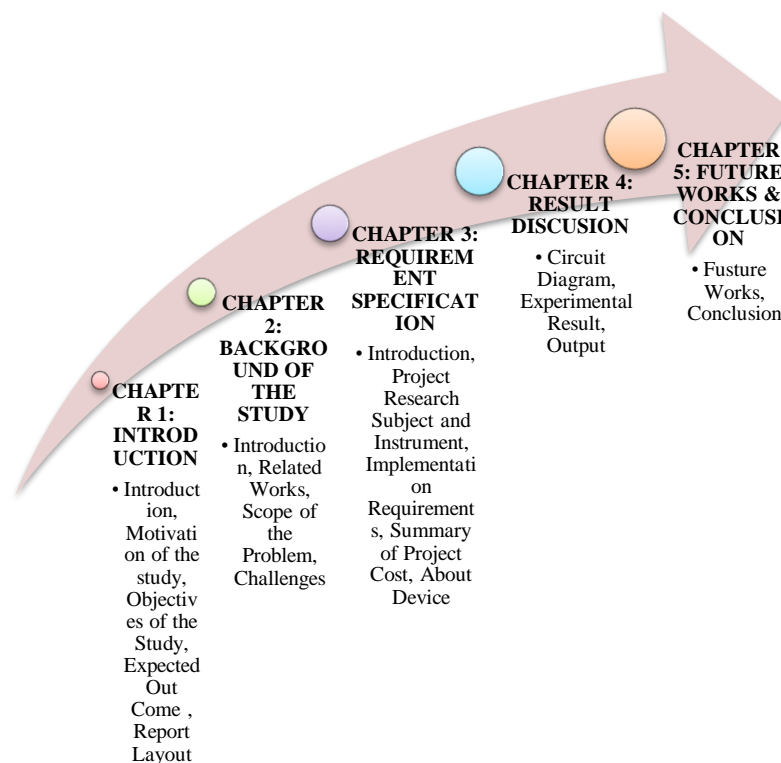


Fig 1.1: Outline the project

CHAPTER 2

BACKGROUND

2.1 Introduction

Innovation and Change In all OECD nations, horticulture has become a significant main thrust for development and improvement. Previously, the choice of developments and their assignment was to construct creation, effectiveness, and farm pay. All through the long haul, approaches for cultivation, trade, imaginative work, tutoring, planning, and guiding have firmly influenced the choice of development, the level of country creation, and cultivating. Agriculture is getting more planned into the pre-regular hierarchy and on the planet market, while laws related to the atmosphere, food security and standards and animal government help are similarly dynamically impacting the territory. It faces new challenges to satisfy the creating need for food, to be around the world genuine, and to convey first rate agricultural things. At the same time, it needs to achieve viable targets with respect to constant cultivating approach change, further trade headway, and the execution of multilateral natural plans as agreed by OECD ministers.

Today, ranchers, counsels, and policymakers are confronting complex decisions. Counting a wide scope of advancements accessible or being worked on; they should manage the vulnerability of both the effect of these new innovations over the agri-evolved way of life and the effect all in all arrangement of farming manageability. Likewise, there is developing tension on rural examination and warning spending plans that must be suitable.

The focal point of the venture was on the selection of possible innovations to add to practical farming. Embracing innovation is obviously an expansive idea. It is affected by the turn of events, proliferation, and utilization of existing and new natural, synthetic and mechanical strategies at the homestead level, which are all remembered for the capital and different data sources; it is impacted by instruction, preparing, counsel, and data which depends on the information on the ranchers. It likewise remembers innovation and practices for the whole agro-food area that have an effect at the ranch level. At long last, it should be recalled that the greater part of these new advances are intrinsic external the farming area

The possibility of plausible agribusiness implies the limit of cultivating after some an ideal opportunity to add to the overall success by giving agreeable food and various things and

organizations in a financially powerful and gainful, socially trustworthy atmosphere, similarly as improving natural quality. It is a thought that can have an assortment of suggestions for the proper innovation with regards to farming, agro-food area level, or with regards to the general homegrown or worldwide economy.

Agribusiness is going through a change driven by new advances, which appears to be exceptionally encouraging as it will empower this essential area to move to the following degree of farming and productivity [1]. Legitimate horticulture, which comprises of applying input (which is required) when and where it was required, has become the third rush of the advanced agrarian unrest (the main was automation and the second was its hereditary alteration [2]), including the green insurgency since it is being upgraded with the development of the ranch information framework. Additionally, while thinking about the climate, new advancements are being applied to developing homesteads to keep up ranch creation supportability. Nonetheless, there is vulnerability and compromises in embracing these advancements. As per market examination, the purposes behind embracing economical rancher innovation incorporate improved instruction and preparing of ranchers, data sharing, accessibility of monetary organizations, and expanding shopper interest for natural food. [4] Law brings something predictable and important, on the grounds that the information themselves are not helpful, just numbers or pictures. Homesteads that choose to be innovation driven in any capacity exhibit important advantages, for example, setting aside us cash and work, expanding or diminishing creation with insignificant exertion, and delivering quality food with all the more earth well-disposed practices [5].

In any case, exploiting this on the ranch will depend not just on the appropriation of new advancements by the makers in their fields yet in addition on the size of the economy, contingent upon the capability of every specific homestead, as the quantity of benefit increments with the size of the ranch. The more prominent utilization of savvy cultivating administrations is significant not exclusively to improve the monetary exhibition of a ranch yet in addition to meet the food needs of a developing populace.

A definitive objective of this exploration paper is to show how feasible and productive practices can be utilized to support individuals while settling on choices with current information based cultivating while at the same time limiting the harm served. To assess how present day agribusiness can aid the reasonable dynamic cycle, center around information the executive's frameworks and work with variable rate devices by exploring late applications with key strides in data based horticulture and each significant advance from crop field information procurement to usage.

2.2 Related Works

New scenes of water table exhaustion, evaporating of streams and tanks, the critical requirement for appropriate utilization of water in eccentric conditions have been introduced. Temperature and dampness sensors are applied in reasonable spots for crop observing to be changed. [1] A calculation improved with minor estimations of temperature and soil dampness can be modified as a microcontroller-based entryway to control the measure of water. The framework can be fueled by a photovoltaic board and has a double correspondence connect dependent on a cell web interface that permits programming information examination and water system booking through a page. [2] Technological advances in remote sensor networks have made it conceivable to precisely utilize nursery boundaries for observing and control in agribusiness. [3] After examination in agribusiness, specialists found that horticultural yields were declining step by step. Be that as it may, the utilization of innovation in horticulture assumes a significant function in expanding efficiency just as diminishing extra labor endeavors. Some exploration endeavors have been made for the advancement of ranchers by giving frameworks that utilization innovation to increment farming yields. A far away distinguishing and control water framework structure using a coursed far off sensor network centered for variable rate water framework, control of site-unequivocal precision straight move water framework system for extending proficiency with unimportant water use, was made by Y Kim. The structure depicts in detail the arrangement and materials of variable rate water framework, distant sensor association, and nonstop in-field recognizing and control using appropriate programming. The entire structure was made using five in-field sensor stations that accumulate data and impart it to a base station using a Worldwide Situating Framework (GPS) where essential measures are taken to control water framework according to the informational index available with the system. The structure gives a promising simplicity far off course of action similarly as a regulator for exact water framework. [4] In an examination of far off sensor associations, experts assessed soil-related limits, for instance, temperature and clamminess. The sensors were set under the ground that talks with the exchange centers using ground-breaking correspondence shows that give low commitment cycles and therefore extend the life of the soil noticing structure. The structure was made using a microcontroller, all inclusive Offbeat Recipient Transmitter (UART) interface and sensor, while the action tried and upheld, sent and checked status messages for a significant long time. Foundational inadequacies are the expense and establishment of underground sensors that debilitate the radio recurrence (RF) signal. [5]

“Agricultural Robot for Automatic Ploughing and Seeding” (Amrita Sneha.A, Abirami. E, Ankita. A, Mrs. R. Praveen, Mrs. R. Srimeena).

This paper endeavors to build up a robot to consequently empower exercises, for example, furrowing, and seed flexibly. It additionally gives manual control when required and watches stickiness with the assistance of dampness sensors the fundamental part here is the AVR at Mega Microcontroller which regulates the entire cycle. At first, the robot burrows the entire field and moves towards the furrow, all the while circulating the side of the seed by side. On the field, the robot is worked in programmed mode yet outside the field is worked carefully in manual mode.

The robot framework is utilized to build up the way toward developing rural land without the utilization of human force. The reason for the paper is to build labor, diminish time, and increment efficiency.

Cultivating should be possible utilizing new innovation to accomplish high yield development. In this undertaking, we will test temperature, light, mugginess, and soil dampness. The paper here is about programmed control highlights including the most recent gadgets innovation utilizing microcontrollers and GSM telephone lines. The undertaking works naturally and accordingly decreases labor.

“IOT Based Smart Agriculture” (Nikesh Gondchawar1, Prof. Dr. R. S. Kawitkar2)

In this paper a venture model of an agrarian robot portrays another situation of water table consumption, evaporating of waterways and tanks, while the erratic climate presents an earnest requirement for appropriate utilization of water. A microcontroller-based entryway can be customized to control the measure of water applied to a calculation with expanded temperature limit and soil mugginess at appropriate spots for crop checking to change the utilization of temperature and stickiness sensors. The framework might be controlled by a photovoltaic board and may have a double correspondence connect dependent on a cell Internet interface that permits programming information reviews and water system plans through a page. Mechanical advances in sensor networks have made it conceivable to precisely utilize them in observing and controlling nursery boundaries in farming. After exploration in agribusiness, the scientists found that the yield of farming is diminishing step by step. Notwithstanding, the utilization of innovation in horticulture assumes a significant part in expanding efficiency just as diminishing extra labor endeavors. Some exploration endeavors have been made for the advancement of ranchers by giving frameworks that utilization innovation to increment horticultural yields.

2.3 Scope of the Problem

Typically being a device made generally for a solitary explanation, don't take care of any issue without another person. However, the variety of homesteads that interface with data from various devices and cycles from everybody is an elective story.

Essentially dispatching insightful devices doesn't imply that ranchers don't have the foggiest idea how you manage the framework, what you instruct, and how you program to do it and it takes some difficult work and nonexistent limits to get incredible outcomes.

Flexible rural coaches give full help to a rancher however in the event that they are not proficient in this schooling and don't have a clue how to utilize this then there are questions about how to manage this venture the genuine chance is, obviously, to discover the issues you don't have. Have faith in what you have and report them to you with the assistance of AI.

2.5 Challenges

Epidemic Situation during COVID 19, completing our project was a great challenge. In epidemic situations, we cannot reach each other. After completing our project, its task was to collect test results properly.

CHAPTER 3

REQUIREMENT SPECIFICATION AND METHODOLOGY

3.1 Introduction

The research strategy is of kind philosophies or techniques used to perceive, select, process, and view information about a point. In an exploration paper, the philosophy quarter enables the investigation to in a nonexclusive encounter study an assessment's predominant realness and reliability. Here, the technique portion:

- The data collected or generated Procedure
- Analyzation

3.2 Instrument of the Project

Our home automation system uses the Arduino Uno as its Android-based microcontroller application. The critical sections of this system are:

- Raspberry Pi 4
- Arduino Uno
- LED Screen
- PH sensors
- Humidity sensor
- Temperature Sensor
- Audio amplifier board
- Male female wear
- Raspberry Pi UPS
- Arduino coding
- Python

a) Raspberry Pi4

The Raspberry Pi 4B offers quicker processor speed, interactive media execution, memory, and availability than the past age of Raspberry Pi 3B +, keeping up in reverse similarity and comparative force use. For the end-client, the Raspberry Pi 4B gives work area execution equivalent to section level x86 PC frameworks. Key highlights of this item incorporate a superior 4-digit quad-center processor, double showcase uphold in a goal up to 4K with a couple of miniature HDMI ports, equipment video deciphers up to 8 GB of RAM up to 8 GB, double/band. 5.0 GHz Wireless LAN, Bluetooth 5.0, Gigabit Ethernet, USB 3.0, and PoE capacity (by means of a different PoE HAT add-on).

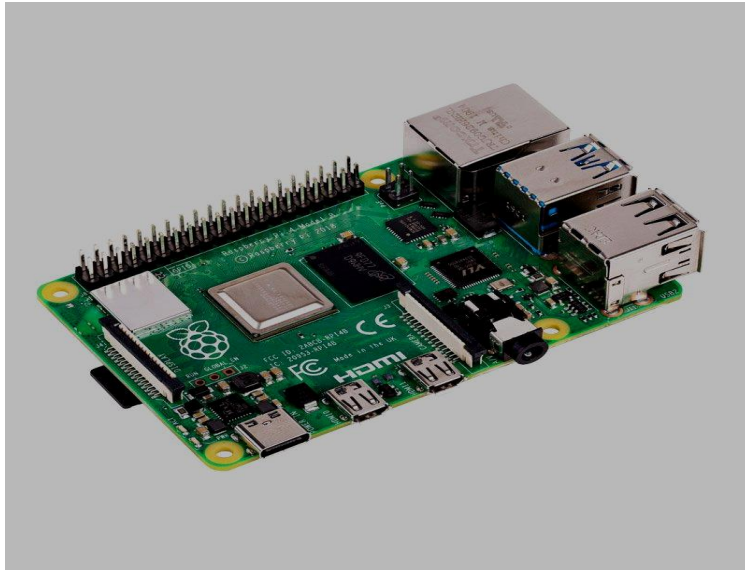


Fig 3.1 : Raspberry Pi4

b) Arduino Uno:

The Arduino Uno is a microcontroller board that depends on ATmega 328P. It is a crude, moderate, open-source prototyping stage developing for devices, programming. It has 14 mechanized info/yield pins (of which 6 can be utilized as PWM yields), a typical information source, 1 MHz. Release regenerator, a USB affiliation, a power jack, and a reset button. This can help the microcontroller. We either need to interface it to a PC utilizing a USB connection or power it with an AC-to-DC connector. The Arduino circuit goes about as an interface between the product part and the task gear part.



Fig 3.2 : Arduino Uno

c) LED Display



Fig 3.3: LED Monitor

d) PH Sensor

To gauge pH esteems in cycle applications, we give various plans, for example, sans glass ISFET sensors. Advanced pH estimation is directed utilizing retained innovation that empowers tactile wellbeing safe diagnostics.

Our sensors have a wide scope of blast assurance, diverse sensor lengths, and a wide scope of associations. They are reasonable for a huge determination of scratch fittings, for example, sensate and clay just as inline, move through, and inundation fittings.



Fig 3.4: PH Sensor

e) Humidity Sensor

A humidity sensor is a gadget that distinguishes and recognizes water fume. T Connectivity (TE) creates a full reach and progressively delicate sensor items that measure relative dampness (RH). In light of our noticeable capacitive innovation, these stickiness sensors consolidate relative moistness (RH) and temperature (T) estimations to give exact estimations of dew point and amazing dampness.

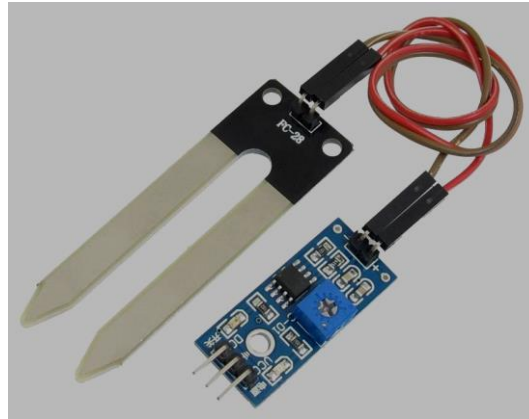


Fig 3.5 Humidity Sensor

3.3 Circuit Diagram

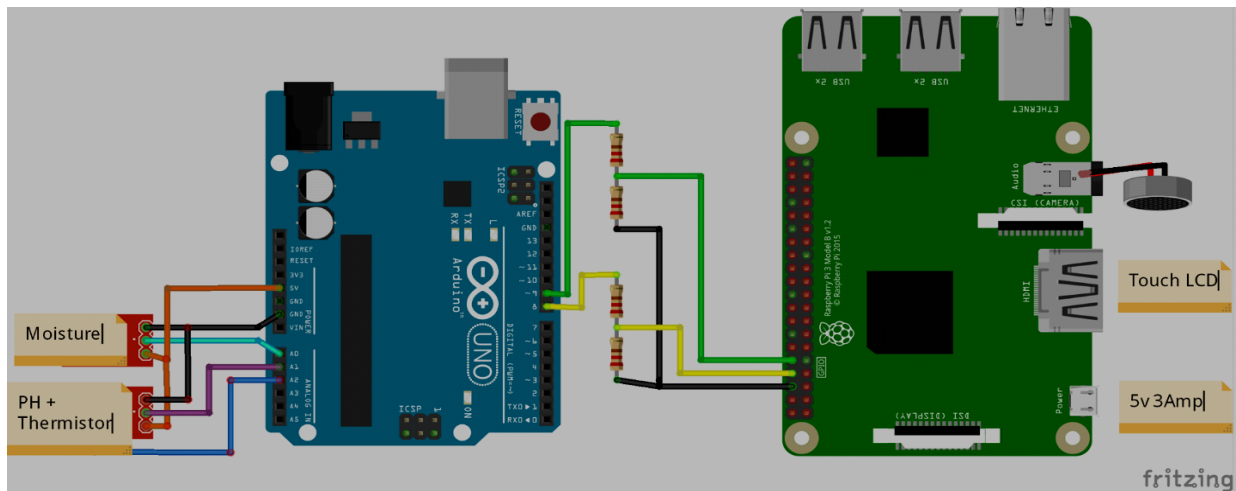


Fig 3.6: Circuit Diagram of the project

3.4 Flowchart Diagram

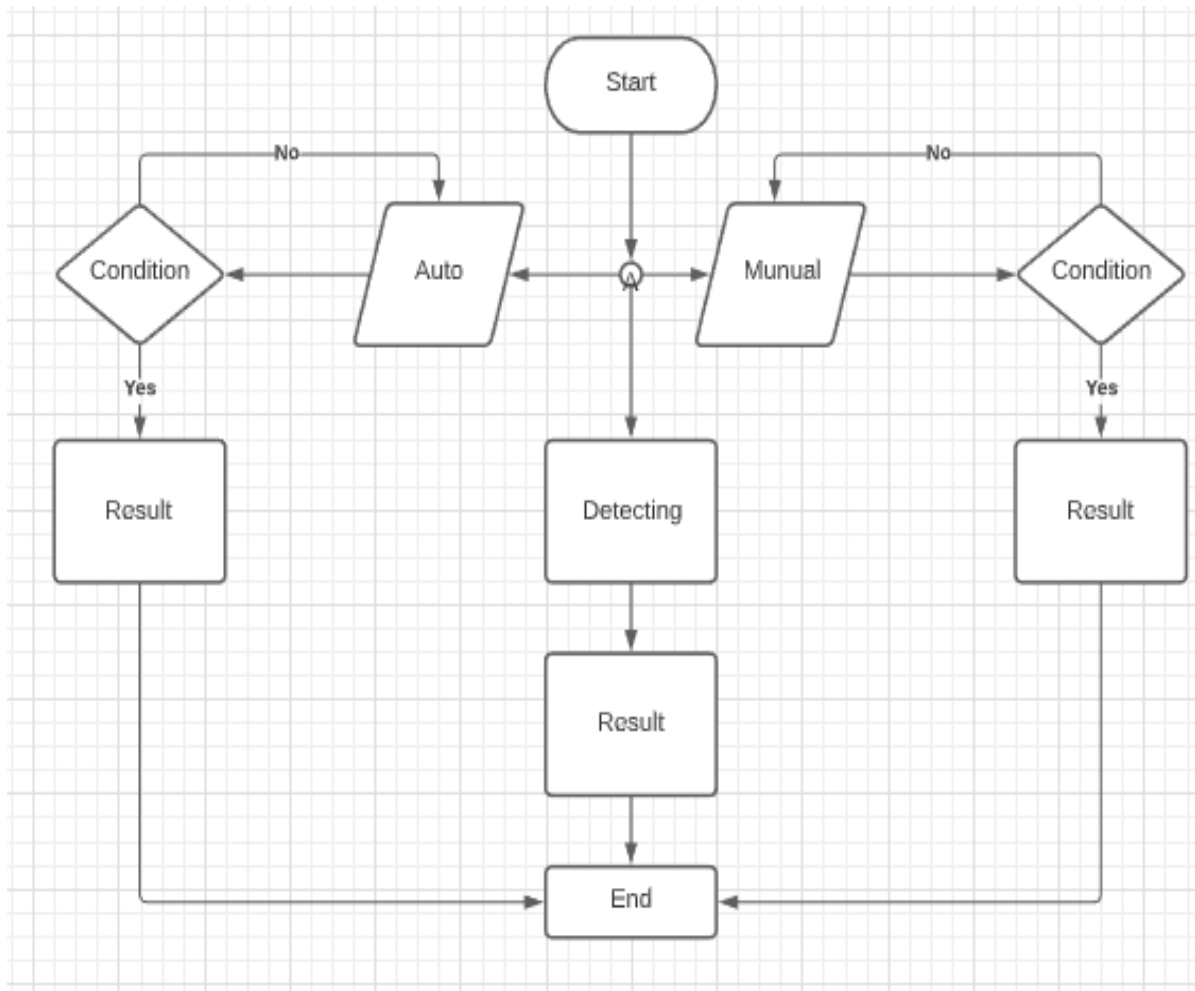


Fig 3.7: Flowchart Diagram of the project

CHAPTER 4

IMPLEMENTATION RESULT & DISCUSSION

4.1 Proposed System

In this paper, we propose a system that is a completely different robot trainer for farmers. Its farmers can carry it anywhere and it is more efficient to produce any product based on any weather that can give a satisfactory result. Through this project, farmers are able to measure soil and soil moisture, measure weather temperature, and measure the pH of the soil. It can detect grain diseases and farmers can also get valuable advice for this disease. With these facilities, farmers will be able to produce profitable crops using our project. We will use a pH sensor to measure the temperature. . The complete operation of an automation system is performed in two ways:

- Automatic Mode
- Manual Mode

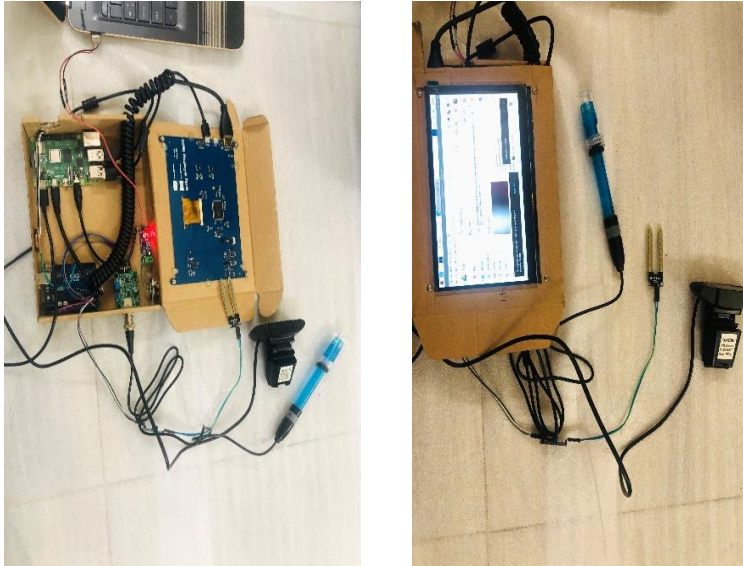
In automatic mode, we don't need to change the temperature, PH & Humidity levels which are estimated by the temperature sensor. Our project's temperature sensor automatically detects that's level and Accessible it shows the expected result for harvesting crops. The communication cycle will work by realizing the gadget address and will work by directly utilizing the knowledge position to provide more cycles.

In manual mode, we can change the temperature, pH, and humidity levels used by our project which may be displayed on the display. After the selection levels, farmers will be able to know about their expected harvest.

Not at all, using our project farmers will be able to know and learn about the method of harvesting any crop like- tomato, potato, rice, etc. and for our farmers, we have developed our project we have used our mother tongue Bangla language to create the user-friendly project.

4.2 Result & Discussion:

After complete our project we run it for testing. But at present during pandemic situation COVID-19 we cannot go out for implementation our project that's why we collect some soil and crops for demo test and its work amazing. It detect everything properly and also its work perfectly.



This figure shows that the trial arrangement incorporates a versatile robot with a focal worker, temperature sensor, stickiness sensor, camera, and different sensors. All sensors are effectively interfaced with the microcontroller and the microcontroller is interfaced with Raspberry Pi and the camera is associated with Raspberry Pi. Test outcomes show that the robot can be controlled by User interface using R-Pi orders forward to the microcontroller and the microcontroller yields to a showcase. Even the farmer who is not able to understand this project in English can easily understand this project manual in Bangladesh based Bengali language and the user can easily work in the field through his backpack For testing soil, temperature, etc.

As appeared in the figure above, there are temperature sensors, stickiness sensors, and so forth associated with the microcontroller board. The sensors input the regulator and in like manner the microcontroller controls the gadgets in auto mode and communicates the estimation of the sensors to R-Pi and R-Pi advances it to the client's showcase. Test outcomes have worked effectively with this undertaking.

CHAPTER 5

FUTURE WOK AND CONCLUSION

5.1 Future Work:

In the present assignment, only a few gadgets can overcome this dilemma and at the same time increase the control barriers of each other's machines. Our project only detects disease, detects temperature and humidity. And the information was limited. For future work, we update the database and include our project Insect Detector, we can use wireless sensors, cure diseases, and add voice control systems. Finally, develop an application for our project.

5.2 Conclusion:

The three center sensors and microcontrollers were effectively interfaced with Raspberry Pi and correspondence was executed between different hubs. All perceptions and experiments demonstrate that the initiative uses remotely controlled robots, bright water system structures, and an intelligent distribution center administration structure individually for field practice, water system problems, and capacity-related problems. Can absolutely help to do. Apart from this, the project also has the facility to easily use the project in Bengali for the farmers who are ignorant of English.

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