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ABSTRACT

Wireless control multipurpose agriculture robot

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Now days the system will manually work in the agriculture land, so the manpower, energy and money also increased. So proposed system an automatic grass cutter, seeding and water supply with several features has been proposed. Several related works has been studied in order to gain idea on how to build an automatic grass cutter. Most research is on the robot path planning using variety technique. We also used the solar based energy for storing in to the battery to use more functions for do agriculture activity.

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I. INTRODUCTION

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 cutting grass, water supply, seeding, etc. based on automated robot using IoT.

Bangladesh is an agricultural country blessed with a lot of fertile land having three cropping seasons. It means we can use our land throughout the year for the purpose of cultivation which covers a major part of our GDP as well as one of our basic needs, food which is one of the most primary concerns for the people worldwide. Undoubtedly there is no substitution of food and better farming process is the only way to increase the production of food. In order to produce sufficient amount of food we must have to find some ways to make agriculture easier, time saving and digital. Once, more than sixty percent of our total occupied people were directly and indirectly involved in farming. As time passes by, we can now see a completely different scenario. Nowadays, in our country people are more centralized towards towns because farming is not an easy task and farmers don't get enough earnings through farming. Recent statistics shows us that the growth rate of farmers in Bangladesh has slowed down over last decade and causing the fall in rice production growth. Here we have come up with an idea where farming can be considered as less complicated task. People can easily monitor cultivation process from time to time even when they are not available in the field. We are living in the modern era where everything is getting digitized and farming is not exceptional among them but here we are proposing something very exceptional which can farm itself and can give all kinds of information which is very essential for a farmer. It is not just a machine or robot, it itself is a farmer.

1.1 Objective

Our main objective of this project is to overcome the manual efforts and time reduce on the agriculture fields, this project is work on automation technique based on the IoT concept with help of ESP8266 controller.

Here we multiple operations implemented with the help of aggrirobot like, cutting, pumping and seeding. Some other objectives below,

- Connecting the cutter, pump, seeding mechanism on the robot.
- Connecting the surveillance Robot to the Arduino controller.

II. LITERATURE SURVEY

Design and Implementation of Autonomous Grass cutter Robot Controller, This paper basically focuses on designing an automated grass cutter controller which can use to mower the grass at lawns and playground. It used the concept of sense-act whereby it does not fully depend on the workspace surrounding. The automated grass cutter has the feature of detecting the grass. Besides that it has GPS system which allocated the path for the robot movement. Other than that, some sensor such as sonar sensor which use to detect obstacles, encoder to calculate the distance the grass cutter travel together with the GPS system. [1]

Design and Implementation of a Control Algorithm for an autonomous lawn mower, This paper discuss on the way of implementing GPS system for automated grass cutter path flow. Besides that it also stated there they used PID controller to increase the performance of the motor speed which can provide better flow. Besides that, their project also included encoder to calculate distance but their encode was made by magnetic and hall sensor which placed around the wheel and it calculate the number of magnetic field strength while moving which will convert the number of magnet to distance travelled. The grass cutter performance is being watch throughout the whole working process at the base station using wireless transmission. [2]

Modified Grass cutter Search Pattern for Areas Comprised of Weighted Regions, This paper discuses on the way the grass cutter move while it work. It used weightage spot or region to determine the correct way of path. With this technique, the grass cutter can find the most important place to cut the grass depending on the amount of weight comprised in order to cover the maximum area and also to minimize the time usage. The region with the most weight will be allocated first followed by the second weight and so on. This is some sort of guided path system whereby it move according to the weight given. With this technique, is able to achieve a good result on area coverage. [3]

Design and Modeling a Prototype of a Robotic Lawn Mower, This paper discuss on how to develop a robotic grass cutter with several functions. It objective is to build a grass cutter that do not go out of workspace, do not leave any uncut area, able to avoid collision and the most important that is the robot must be cheap and affordable to everyone. Basically it used PIC microcontroller to perform the grass cutter working process or to run the lawn mower. [4]

Survey of Robotic Lawn Mowers, This paper discusses different types of Robotic Lawn Mowers present in the market at present. It discusses different companies and their products and compares them with others.[5]

III. BLOCK DIAGRAM

The robot is placed in the farm and is switched on through ardiuno controller and IoT its direction controlled by android application. This starts the rotation of cutter to remove grass and thus starts seeding which is done simultaneously as the robot moves forward with water supply using water pump. The system focused on the design, development and the fabrication of the multipurpose agricultural robot. The multipurpose agricultural Robot is used to controlled through Wi -Fi module with low budget. The block diagram of the system is shown in block diagram.



3.1 Component List:

Controller:

It is a circuit board of credit card size. It consists of both a microcontroller which is the physical programmable circuit board and a software, or IDE (Integrated Development Environment). It keeps running on PC and is utilized to compose and transfer program code on a PC.



Fig 2. Ardiuno

DC Motor

DC motor is a device that converts electrical form into mechanical form of energy. There are many kind of DC motor such as DC motor, separately excited DC motor and self-excited DC motor. DC motor was powered by DC current. There are various voltage input for DC motor are 3V, 5V, 12V, and 24V. There are advantages for DC motor which are the DC motor perform better than AC motor, and DC motor provide excellent of controlling the speed.

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Fig 3. DC Motor

ESP8266:

ESP-12E WiFi module is developed by Ai-thinker Team. core processor ESP8266 in smaller sizes of the module encapsulates Tensilica L106 integrates industry-leading ultra low power 32-bit MCU micro, with the 16-bit short mode, Clock speed support 80 MHz, 160 MHz, supports the RTOS, integrated Wi-Fi MAC/BB/RF/PA/LNA, on-board antenna. The module supports standard IEEE802.11 b/g/n agreement, complete TCP/IP protocol stack. Users can use the add modules to an existing device networking, or building a separate network controller. ESP8266 is high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.



Fig 4. Wi-fi Module ESP8266

Cutter:

This will be used for the primary function of the mower i.e. to cut the grass. Depending on the design, more than one cutter can be used in synchronization as well. Also cutters with different shape or number of blades can be used for the purpose of getting the required cutting speed.

Battery:

It will provide the energy for the working of the robot. The battery of a two wheelers will be able to provide enough power to drive the robot for its working or independent multiple batteries can be used for better performance.

Wheels:

These will be required for the cause of the motion of the body of the robot. The choice of the wheels largely depends on the shape and size of the grass. It will also depend on the required ground clearance of the robot. As treads of the tires can contribute significantly to the performance of the mower, great caution is needed during the decision to choose the particular tires.

IV. RESULT





Fig 5. Hardware setup

V. CONCLUSION

In this work IoT controlled robot, named, Agri-robot has been designed, builted and demonstrated to carry out

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seeding, cutting and water supply in an agriculture field. The agrirobot will assist the farmers in increasing crop yielded and protect them from harmful activity.

VI. FUTURE SCOPE

In future, we have the plan to overcome the limitations and add some new features to our project so that the general people of our country can get the benefit of happy farming. Some of the extensions that we would like to add in future are discussed briefly below.

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