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Automatic Grass Cutting Robot

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ABSTRACT: In traditional system of grass cutter Internal-Combustion engines is used which uses fossilenergies to run and thus causes environment pollution. This Internal-Combustion engine also requires man power to handle. This problem can be solved by using IoT based grass cutter. Which totally based on IoT and in Enabled with wireless control through bluetooth technology allowing users to operate it remotely.

KEYWORDS: ESP32 Micro-controller, DCmotors, Ultrasonic Sensor, Arduino IdeGrass Cutting Blade.

I. INTRODUCTION

In today's fast-moving world, if a grass cutter is being moved by human effort or using fossil fuels is an outdated method. Even today people use manually operated grass cutters for maintaining athletic fields, industrial fields, and school yards, hotels,public places, etc. Recent years there have beenvarious innovations such as electric lawn mowers, tractor lawn mowersthat use petrol and diesel. Traditional designof lawn mowers have motored powered engines which required regular maintenance such as engine oil and greasing. Manually operating device requires more human efforts and more timeis required for accomplishing the work. While trimming the grass, they create a lot of noise and air pollution. In the cold and harsh environment, the fuel powered motors tend to freeze and do not start. The proposed grass cutter is environment friendly, it keeps the environment clean andhealthy. Non-skilled person also can handleit easily and it detects the obstacle and changes the directions or stop functioning as per instruction given. Therefore, equipment can be protected from damage and reduces risk on human. It is eco- friendly and it protects the environment from the air pollution.

II. RELATED WORK

Edwin Beard Budding [1] the idea of the field mover after seeing a machine in an original cloth shop which used a slice cylinder mounted on a bench to trim cloth to make a smooth finish after weaving. Budding realized that an analogous conception would enable the slice of lawn if the medium could be mounted in a wheeled frame to make the blades rotate close to the field's face. P.Bulski,S.D.Yu and E.D Davidge [2] identified the sound createdby the machine is making noise pollution. While cutting grass on the lawn or ground, he studies the sounds created by the machine and shows how to eliminate them.I recommend that electric lawn mowers be implemented because of the air pollution that is caused by petrol engines. Ms. Lanka Priyanka and Mr. J.Nagaraju [3] have used fabricated grass cutting machine with tempered blades are attached to this grass cutter. It is manually operated and automatic operated. The materials generally used GI distance, motor, wheel, Al distance, switch, line, square pipe and separating material. Manish D et al. [4] have created a manually operated grass cutter with spiral roller blades because spiral blades improve cutting effectiveness. A reelcutter is a component on a grasscutter that is used to alter the height. This grass cutteris used to cut grass uniformly and can cut many varieties of grass. Kartik R. Khodke et al. [5] have purposed a technique is to move the grass cutting in different directions using an automatic device. This device is composed of linear blades that do not change with climatic conditions, which is what makes this work unique. Paala [6] Android-controlled lawn mower Enabled with bluetooth and Wi-Fi connection. here bluetooth and Wi-Fi are utilized to regulate the motor's direction however, there is no obstacle recognition, so if an object suddenly appears, the motor will not be able to stop at its location. Nikhil Gupta et al. [7] have developed as an IoT- based solar grass cutter. The IoT application, demonstrated how to utilize IoT technology to control the grass cutter with the help of an Android phone, is the main topic of this work. To link the Android phone to the controller, bluetooth was used. Ayesha Sultana et al. [8] have developed a Gesture Controlled Smart IoT based Grass Cutting Vehicle. The main aim of this study is hand gesture controlof the machine. It costs more to build the machine because it uses both an Arduino and a Raspberry Pi controller. The technique is little difficult to comprehend. The force of motion is connected to the solar panel and Influenced by a

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battery. The project grewexpensive, and the system is complicate. Snehal Popat Jagdale, and Prof. PritiRajput [9] have proposed a grass cutter operated by an android. With thehelp of Bluetooth, this system connects to an Android phone. The direction of movement of this system is displayed on a 16 by 2 LCD (Liquid Crystal Display) screen. It also displays the grass cutter's ON and OFF status. This system uses lead acid battery. Adersh Ramesh et al. [10] have designed a controlling circuit, the comparator is Influenced by the Schmitt-trigger. It uses a wireless sensor-based wireless frequency management system stays submerged. Whenthe grass has been cut, water is sprayed overthe trimmed area.The color green is detected with a color sensor. Thus, the lawn mower may operate in either one of two ways: manually or automatically.

III. PROBLEM STATEMENT

The current system mainly relies on garden mowering are not eco-friendly mover, Internal-Combustion are used lot of petrol and diesel and produces lot of air pollutions, this Internal-Combustion are causes heavy noise pollution. Small cylinder lawn mower that need to simply push on with muscle force are not able for large gardens and to maintain garden, sports tracks needed of Man power to keep cleaning the lawn. This Work focuses on key issues:

1. No man power: no needed of man power for push lawn mower and it has high risk of getting injured.

2. No air pollution: using internal-Combustion that causes lot of air pollutions and use lot of petrol and diesel.

IV. METHODOLOGY

Methodology of this work tells that this system involves ESP32 Micro controller that controlled though the mobile bluetooth. The system that ensures that does not move unless that ESP32 Micro controller connects with mobile bluetooth. When the mover starts to moves forword direction ultra sonic sensor turns on and starts detecting any object are in range of 10cm.if any object is detected in range lower than 10cm mover turns right and move forword.

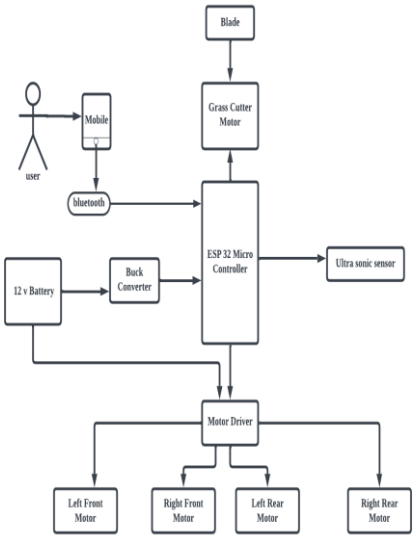

Fig.1: Model diagram

Fig.1 that describes about this work and connection of the components that's connected with each other's and work flow of the model. Ultra sonic sensor are takes input by sending and receiving singles to the objects if any objects are detected then motors in front and rear are change directions.

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i. COMPONENTS

The following fig.2 ESP 32 is a low-cost, low-power Microcontroller with anintegrated Wi-Fi and Bluetooth.

Fig. 2: ESP32 Micro controller

Fig.3 is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal

Fig. 3: Ultra-Sonic Sensor

Fig.4 have motor driver L298D It is a twin full-bridge controller with a high voltages and high power. intended to drive inductive loads such and take common TTL logic levels relays.

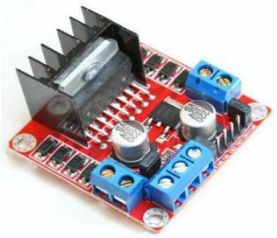

Fig. 4: Motor Driver L298D

Fig.5 A DC electrical motor that transforms direct current electrical energy into mechanical**.** The most common varieties depend upon the forces that produce generated magnetic fields as the outcome of current passing in the coil.

Fig. 5: DC Motors

Fig.6 is simply an electromechanical switch in the sense that an electrical signal causes a mechanical contact to flip betweenON and OFF states.

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Fig. 6: Relay

Fig.7 is DC- DC power converter that convert high voltage to low voltage.

Fig. 7: Buck Converter

ii. **FLOW CHART**

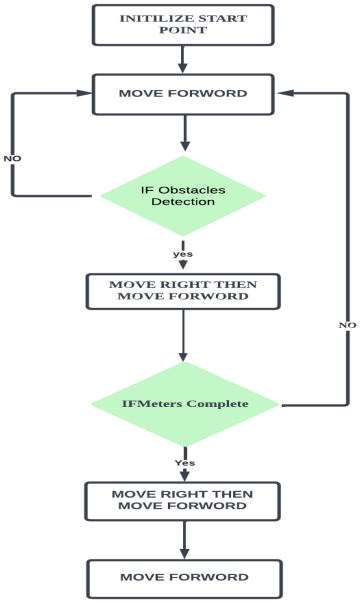

Fig .8: Flow Chart

Fig.8 that describes about the work flow. Whenever a model is moving forward If there occur any issues, are within 10 cm, turn right and continue forward. If meters are finished, take a right and continue further.

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V. RESULTS

Fig.9: Forword direction

Above Fig. 9 Pressing the Forword button causes the lawn mower to travel towards the Forword path.

Fig.10: Backword Direction

Above Fig.10 When the Backword button is hit, the lawn mower moves in the Backword direction.

Fig.11: Obstacles Are Identified

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In Fig.11 When any Obstacles are identified within arange of 10 cm, change direction.

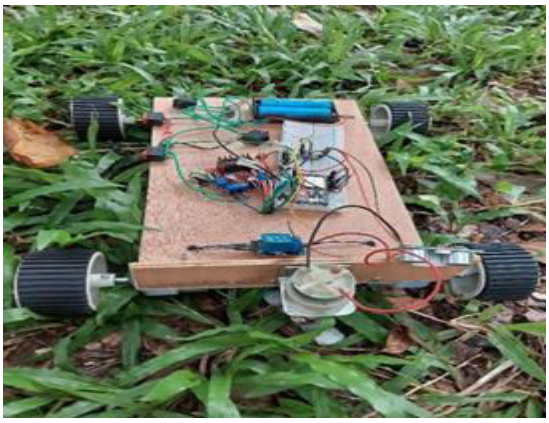

Fig.12: The process of cutting blade begin

In Fig.12 The blade starts to turn and slice the grass once its blade button is pushed.

VI. CONCLUSION

The usage of automatic mover to cut grass automatically in gardens. There are several lawn mowering machines on the market, but there is no solutions for air and noise pollution. In addition to being user-friendly and environmentally friendly, this technology provides solutions for pollution-free environments. It additionally identifies obstacles by ultrasonic sensors. This technology is affordable and makes landscapes simple to manage. IoT-based automatic grass cutting robot systems provides a number of benefits, including greater performance, improved production and efficiency, better safety and security, as well as expense savings.

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