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Smart Self Driven Fully Automatic Tool Using IOT Technology.

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ABSTRACT:

Solar power has served as the principal life-sustaining power since the beginning of time for lifestyles on earth. The converted power from solar energy moved into operation. Drying clothes and curing agricultural products and keeping food require immediate assessment of solar energy, etc. Today we continue to use the energy that originates from this source. From fuel-wood, petroleum, paraffin, hydroelectricity even our food originates obliquely from sun. The amount of solar strength exceeds all known limits. The power generation from solar energy exceeds all human power requirements, electricity demands. The recent trend presents various grass cutter devices with exceptional dimensions. The grass cutter device gained popularity within public areas such as parks and gardens however its manual operation the manual development process for that machine requires skilled technicians and produces monotonous work. The Smart self-driven fully automatic multipurpose tool emerged from our proposal which uses technology different IOT technology. The device has the capability of processing different grass configurations the machine features scalable grass cutting capability for floor cleansing tasks as well. The grass cutting robot system allows users to directly move it to specific locations in the lawn. The user can control the device location from anywhere to cut the grass in the designated garden section.

Keywords: IOT, DC, PIC, IR, IC

1. Introduction:

Recent years have not brought any changes to product development within the lawn mower market. The availability of electric motors alongside small so systems encouraged us to create innovative floor cleaners along with lawn mowers while human beings now lose time from performing tasks that should be automated. House fires along with human casualties may occur when households utilize explosive materials regularly. The harder-to-manage properties of the engine were improved by the simpler operation of electric motors which inspired us to develop products that conserve human resources. The operation of conventional gasoline-powered grass cutters leads to the emission of damaging chemicals that pollute the air. Solar grass cutters employ renewable power sources which help decrease air pollution from emissions while offering cleaner fresh air to the environment. Solar grass cutters produce less noise than conventional gas-powered models thus reducing the amount of noise disturbance in urban neighborhoods. The minimal noise output of these units makes them appropriate for use in urban areas with loudness restriction rules. Users need less manual effort since solar grass cutters operate automatically. Therefore they prove highly advantageous for massive grass areas and agricultural territories which make standard maintenance methods physically demanding and duration-heavy. Users benefit from automated grass cutting since they reduce their work efforts. Internet of things (IoT) indicates devices which integrate sensors along with processing capability and software and additional technologies that create data exchanges with other systems through internet and network-based connections. Internet of things encompasses electronics, communication, and computer science engineering. The term "Internet of things" stands invalid because devices do not require public internet connectivity to function since any connected network with individual device addressing meets the criteria.

2. Literature Survey:

The table below provides a comparative analysis of research papers focused on Smart Self Driven Fully Automatic Tool Using IOT Technology. It highlights the authors, titles, publication years, along with the advantages (pros) and limitations (cons) of the proposed methods and technologies in each study. This comparison aims to offer insights into the advancements and challenges in the domain of automated answer grading systems using artificial intelligence, natural language processing (NLP).

Table 1 – Comparative Analysis of Research

Sr. No.	AUTHOR	TITLE	YEAR	PROS	CONS
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[1]	Asha N, Monica J S, Saraswathi R, Rahul R, Ravikiran	Smart Grass Cutter	2017	Dual power (solar & battery); obstacle detection; wireless control via Android; live video streaming	Limited to small areas; manual control may be required
[2]	Jayant Thadani, Manoj S. Bharre, Vijay R. Awchar	Automatic Grass Cutter Using Solar Tracking System	2017	Solar-powered with tracking; mobile app control; external charging option	Requires external charging in cloudy conditions
[3]	Neha, Syeda Asra	Automated Grass Cutter Robot Based on IoT	2018	Combines manual and automatic modes; weather and soil monitoring; Wi-Fi control	Limited to small areas; manual control may be required
[4]	Ibrahim B, Siva Brahmaiah V, Sharma P	Design of Smart Autonomous Remote Monitored Solar Powered Lawnmower Robot	2020	Solar-powered; IoT-based monitoring; obstacle detection; remote control	Limited to small areas; manual control may be required
[5]	Tayyab Tahir, Adnan Khalid, Jehangir Arshad, Seada Hussien	Implementation of an IoT-Based Solar-Powered Smart Lawn Mower	2022	Solar-powered; IoT-based motion control; remote operation via Android app; energy-efficient	Limited to solar availability; requires stable internet connection
[6]	Shubham M. Benade et al.	Design and Implementation of a Solar-Powered Grass Cutter using IoT	2019	Dual control modes; obstacle avoidance; solar-powered; IoT integration	Limited to small areas; manual control may be required

3. Block diagram & Flow chart of proposed system:

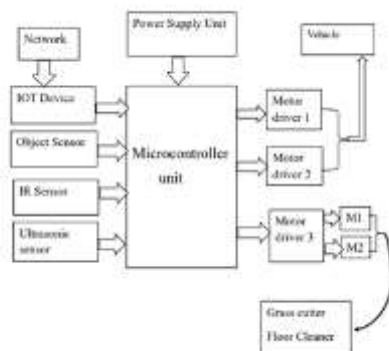


Fig. a) shows block diagram of proposed system

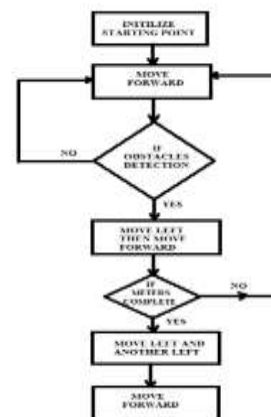


fig. b) shows flow chart of proposed system

4. Proposed Methodology:

The project design uses autonomous solar devices as the backbone to build an IoT-integrated floor cleaning robot which maintains remote control operation. The system runs on primary power from solar energy that enables us to reduce both fossil fuels usage and decreases environmental contamination. Batteries will store electricity generated by solar panels from sunlight so the system operates continuously for cost-efficient sustainable operation. The automated robot system operates with built-in ultrasonic sensors that help it detect and avoid obstacles while free-moving across any type of grass area. Users can control the tool using a mobile Android application through Bluetooth wireless control for distant monitoring and operation management. The programmed system will execute grass cutting operations in established patterns together with floor cleaning functions that create efficiency while eliminating the requirement of manual employees.

5. Modules and Their Functionalities:

Module 1: Solar Power Module

The system module functions essentially as it enables complete power using clean solar-generated energy to drive the entire power system. The system operates without power grids by making possible constant operation in remote sites while simultaneously decreasing pollution in the environment and reducing dependency on fossil fuel power. This module plays a key role in sustaining the whole system.

Module 2: IoT Integration and Remote Control Module

The tool features distance-based control through an Android application that enables users to operate it from any point. Real-time adjustments and status updates through this feature automate the tool while giving users more convenience.

Module 3: Obstacle Detection and Avoidance Module (Ultrasonic Sensors)

Strict navigation autonomy occurs because this module detects obstacles including stones together with animals and fences. Its detection capability protects the tool from damaging its environment to permit unhindered operation.

Module 4: Microcontroller and Processing Module

The system's brain role is handled by the microcontroller that processes sensor data for motor control activities. Through this module the system controls all operations including navigation and obstacle avoidance and grass cutting. The core module stands as both the main factor that affects tool performance and the key element that determines system functionality.

6. Objective:

1. The Create a smart solar-powered lawnmower which employs renewable energy to decrease fuel usage together with labor needs in grass cutting operations.
2. The project creates a solar-powered automated grass cutting machine for golf club grounds as well as cricket facilities and municipal parks.
3. Using IoT technology enables remote control of the lawnmower while minimizing human operators and allowing one user to manage operations automatically.
4. The lawnmower gets its power supply from a PV system that also keeps the battery fully charged for operation both day and night.
5. A system of infrared sensors detects obstacles in addition to preventing accidents thus helping the lawnmower avoid stones and animals while it operates.
6. The solar-powered lawnmower requires connection to a microcontroller for managing motor direction alongside obstacle avoidance operations.
7. The lawnmower should stop cutting operations automatically after detecting obstacles through its safety function before resuming working after the obstacle clears.

7. Conclusion:

An autonomous tool with IoT capability operates as an intelligent system for self-driven operations. The combination of technology shows the immense potential that exists through implementing renewable energy with smart technology in landscaping. This mechanism runs efficiently through its capability to collect and use solar power, which diminishes fuel consumption and reduces environmental impact. The solar power system delivers both affordable operations and environment-friendly sustainability. Users now have access to remote monitoring through IoT integration, which offers them control capabilities for managing the tool. Smartphone and web-based applications enable users to operate the cutter system. The solar grass cutter empowered by IoT technology has proven itself as a vital advancement. Smart landscaping has advanced through the development of this practical device to maintain green spaces effectively, sustainably, and efficiently.

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