

Android Controlled Lawnmower

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Introduction:

Since Edwin Budding invented the world's first lawnmower in Gloucestershire, England in 1827, keeping one's lawn trimmed and tidy has been a time consuming and a laborious task for most people. This is especially true in the summertime when the weather is very hot, or when one has a physical condition, such as lumbar pain or seasonal allergies, that leaves him/her unable to mow the lawn.

In the past few years, there has been an exponential increase in the advancement of mobile device technology. Mobile devices are now used for a myriad of functions. For example, many companies have developed systems and applications for home automation systems that allow for the user to control the temperature in their home, control their lights, or activate their home security system, remotely. The next interesting step would be to develop a way to automate more laborious tasks, such as mowing one's lawn.

Motivation:

There are many situations where an individual may be unable to complete the laborious task of mowing one's lawn. Examples include people with seasonal allergies or people who suffer from some level of physical disabilities. Furthermore, some days in the summer are simply too hot for one to be safely working outdoors.

Design:

An Android controlled lawn mower was designed. The main components of the mower included an H-bridge controller, two motors, batteries, an Arduino Uno device, a WiFly Antenna module, and an Android device. The goal of the project was to design a system capable of controlling the speed and the direction of the mower through a GUI developed for the Android device. The design included both a software as well as a hardware aspect.

On the software side, the Arduino Uno, by using the WiFly Antenna Module, connects to the Android device which is set-up as an ad-hoc network. Through the GUI which was developed for the Android device, commands are sent to the Arduino board. The Android sends commands through small time intervals to refresh the Arduino on the status of the Android. This will tell the Arduino that the Android device still has its application running and that it is connected. After receiving the commands, the Arduino interprets the desired direction and the speed, and accordingly will vary the input voltages that are going into two H-Bridge controllers. These input voltages direct the current across both motors.

On the hardware side, the H-bridge controller was carefully designed using MOSFET transistors. Heat sinks were also included. The H-bridge is similar to a full-bridge inverter, except it uses pulse-width modulation inputs from the Arduino to control the current to the motor. This allows for controlling the speed of the motors. Differential steering was made possible by controlling the motors independently. Finally, a frame was built and everything was mounted on the frame.

Conclusion:

The aim of this project was to create an Android controlled lawn mower. This was accomplished through rigorous design and testing phases. Among the hurdles were the challenges of integrating hardware and software into one functioning unit. This project is an attempt to address the feasibility of creating a mechanical platform that can be automated through an Android device. In the future, the project can be enhanced with higher quality equipment and adding other functionalities such as a snowplow. Further improvements could include an application for iOS users, using a lower frequency transmitter to increase the range, and having a circuit etched onto a PCB board to improve reliability and durability of the unit.