DESIGN AND PROTOTYPE PRODUCTION OF ROBOT LAWN MOWER

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Abstract

A lawn mower is a machine utilizing one or more revolving blades to cut a grass surface to an even height. A robotic lawn mower is designed to operate either entirely on its own, or less commonly by an operator by remote control.

Robotic lawn mowers are increasingly sophisticated, are self-docking and some contain rain sensors if necessary, nearly eliminating human interaction. Robotic lawn mowers represented the second largest category of domestic robots used by the end of 2005.

Solar power is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV), indirectly using concentrated solar power, or a combination. Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam.

Introduction

In this project, since the solar system will be used, the scythe motor must be selected electrically. The electric scythe motor must have a certain rpm and a certain power. Minimum values of these power and rpm should be calculated according to the project. Since the electric scythe motor will operate at a very high speed, a protector box must be designed to protect for safety reasons. This protector box should be placed on in front of vehicles. DC Motors are needed to move the moving part.
In this project, a microprocessor is required for the car to be move right-left, forward backward.

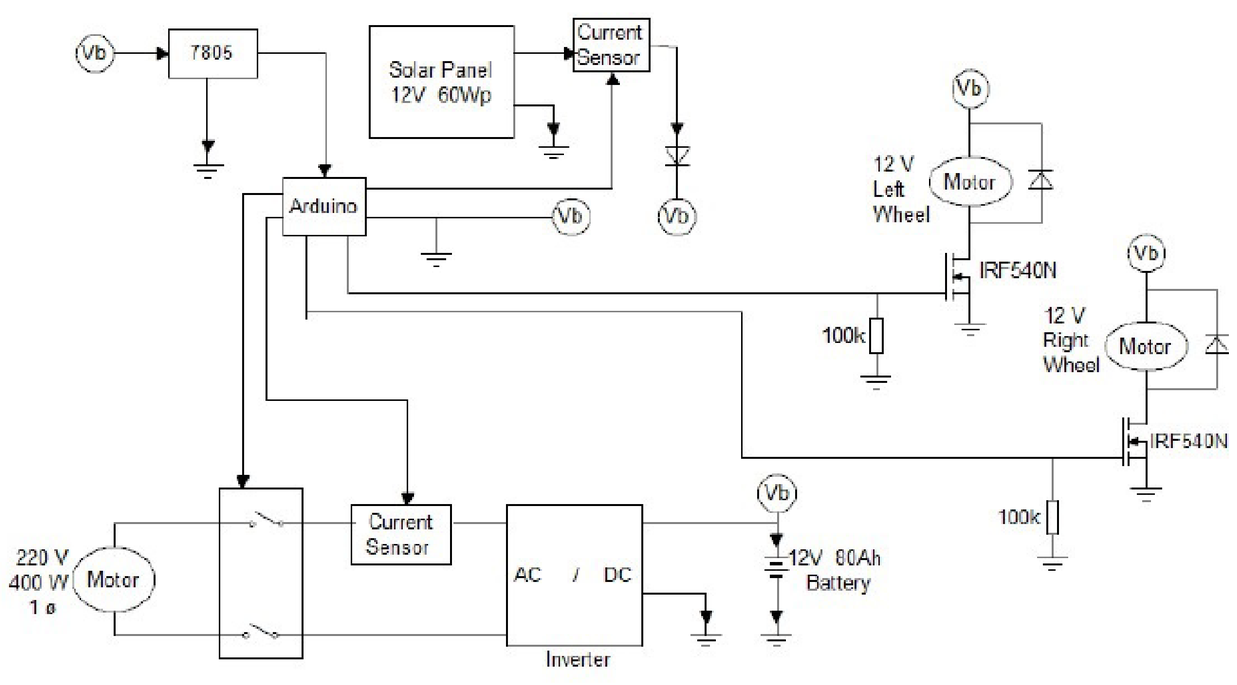

Figure 1 – Block Diagram

Implementation

In first prototype, lawn mower was designed a by using a battery operated car. However, the first attempt was failed because the battery operated car has only one gearmotor that was insufficient.

In second prototype, a new lawn mower was designed from the beginning. A 12V 80 Ah battery and two DC gearmotors was used. The speed of the lawn mower was controlled by using PWM via Arduino. By giving different duty cycle to the motors, The direction was controlled with joystick. The scythe motor operates with 220 V AC voltage. The scythe motor is worked by converting the 12 V DC voltage from the battery to 220 V AC voltage through the inverter. The battery can be charged with the help of the solar panel. The robot is mowing 1 hour with a charge of 20 hours.The speed of the robot can be adjusted as desired and it set 1.37 km/h at 80% duty cycle.

Figure 2 – Lawn Mower

Conclusion

In this project, we aimed to cutting grass while moving the vehicle, it has achieved the desired level at the end of the term. The lawn mower provide its own energy by using the solar panel. The speed of the robot can be adjusted as desired.

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