

Automated Guided Vehicle Commuter System

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Abstract:-- Everyday commute, to and from one place to another, within an institution, or transport of materialistic components with respect to the same over longer distances, that will result in the fatigue of humans can drop the efficiency of productivity in the organization. Use of aiding sources to ease the burden of the reducing fatigue and helping achieve the required levels of morale in a company are crucial, though this may seem very small as a reason to affect productivity, human phycological factors play a major role in the welfare and overall effectiveness within an institution. Applying newer, cleaner technologies including Solar energy have attracted significant attention of researchers all over the world, solar energy is, abundant, widespread, and renewable.

Key Words: Automated Guidance, Sensors, Solar Panel, Line Follower System.

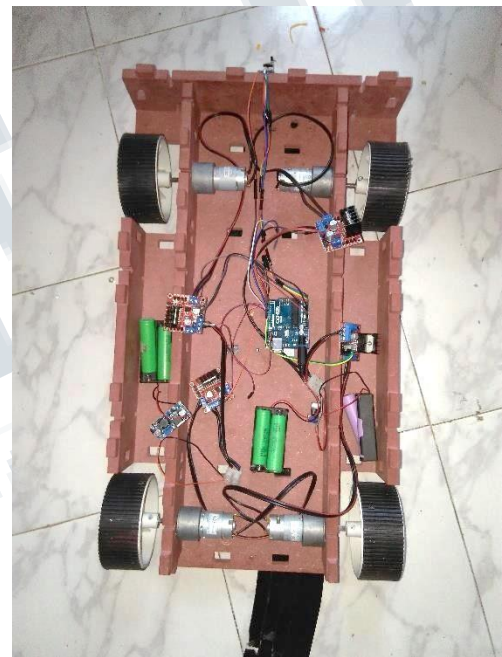
1. INTRODUCTION

Situations and areas where human commutation over long distances, could and will create stress, leading to fatigue and clumsiness in their performance at either their place of work, or study.

This slack in performance has a negative effect on safety, efficiency, quality, and overall institutional output.

These expenses are reduced with the introduction of an Automated Guided Vehicle, (AGV).

A driverless, intelligent cart uses an optical path to quickly and safely traverse a predetermined path TO and FROM determined set points. Its capabilities are enhanced by the ability to send and receive tasks through IR and SONAR (Auditory) data communication.



Model of proposed multi-purpose solar powered AGV

2. OBJECTIVES OF THE PROJECT

The main aim for our project has been to develop a multi-purpose solar powered machine, that helps people to go from point "A" to point "B", within an institute or organization, and as our design is modular, it can also be used to carry goods if necessary. We have designed this machine to be automated, to an extent that it follows a specified path, and does necessary corrections onboard if found to be deviating from the path specified. In this machine we have used a solar panel to capture and convert solar energy into electrical energy which in turn is used to charge a 12V battery, to power auxiliary electrical equipment, and provide necessary power to DC motors as well. This power is then transmitted

to all wheels independently. The speed is maintained constant using geared arrangement.

Consequently, in this project an attempt is made to make the electric and mechanical systems share their powers in an efficient way.

3. METHODOLOGY OF THE PROJECT

The system we are looking forward to implement involves the use of an already existing vehicle used for commuting from one point to another. However, the changes to be made include making the said vehicle driverless, and completely automated.

The fulfilment of making the vehicle driverless involves using an open source programming platform, here Arduino; which connects to a number of electromechanical components and sensors, by being employed as a micro-computer system.

Technically, the use of IR sensors as the primary means of guiding the vehicle on a determined path, utilizes the line follower system, which either in made of a reflective paint, or strip, that reflects the emitted light back to the receiver of the sensors, making sure that the vehicle doesn't veer off into uncharted / non-determined territory, and keeps the vehicle on track which is pre-determined.

The Ultrasonic Sensors, being the secondary guiding mechanism, comes into play in the object collision avoidance system, where any obstructions in the path of the AGV is detected, and by creating requiring algorithms through programming code, stops the vehicle in its path as a matter of safety to the passengers on board, and to the physical damages that can be incurred to the vehicle itself.

The innovative aspect of the entire project, is the application of recharging the vehicle through means of a renewable source of energy, the utilization of Solar Power

Panels, helps us in charging / powering up the vehicle by a free and clean energy source.

The entirety of the vehicle, which includes the micro-computer system, the electric driving mechanism, the sensors, and / or any other electric / electromechanical components, will be powered by means of these solar panels that store the energy in a battery, for application, even when there is minimal to no sunlight available.

The use of charge controllers, help, as the name suggests, control the charging aspect of the vehicle whose input is from the solar panel.

An auxiliary / secondary power source can also be utilized with can either be another renewable source mode, or through the three-phase power outlet found and used for domestic purposes.

4. SPECIFICATIONS OF EQUIPMENT USED

SOLAR PANEL:

OUTPUT	17.1 VOLT
SIZE	34.5cm X 21.5cm X 1.8cm
POWER	5 WATT



DC GEARED MOTOR:

SPEED	100 RPM
OPERATIVE VOLTAGE	12 VOLT



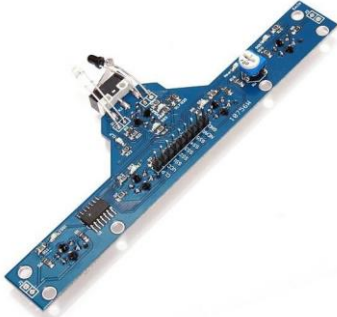
BATTERY:

RECHARGABLE	
OUTPUT	12 VOLT



SENSORS:

INFRARED SENSORS

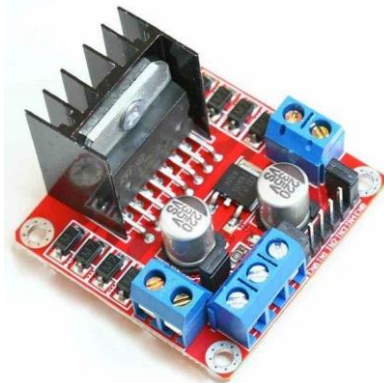


ULTRASONIC SENSORS



MOTOR DRIVERS:

L298 MOTOR DRIVERS



BUCK CONVERTERS:

DC TO DC CONVERTERS



5. SCOPE FOR FUTURE WORK

The future is very vast and unpredictable, with the advancements of technology at the high pace it is in right now, however, it is only a matter of time before all our mechanical oriented machines are made into automated machines, to improve the existing efficiency of work that is put in, to the work that can be extracted. The effectiveness of how this is possible is again a boon through automation, as it does not involve fatigue and tiredness as us humans are prone to, after a long day's work. The consistency of operations is another area of improvement that can be observed through automation, as no limitations like fatigue are put up, equal performance, in results are obtained without diminishing the quality as well.

CONCLUSION

This is an ambitious senior design project, but one that is exciting and most of all challenging, the report presented is meant to be easily extendable, adaptable and modifiable in the future years based on the application criteria, and modes of use of the AGV. At the time of this publication, the bare minimum of the design phase of the project is completed, parts and equipment will have to be ordered based of the funding provided, and the following months will be dedicated to testing, analysis, assembly, programming and final development of the project.

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