



AUTOMATIC ROAD DIVIDER LEAVES CUTTING ROBOT

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Abstract— An automatic leaf cutting robot with several features has been proposed. Several related works have been studied in order to gain idea on how to build an automatic road divider leaf cutting robot. Most research are on the robot path planning using variety technique. All the technique used are mainly aim for the shortest path, consume less energy. Besides that, 2D and 3D model have been designed according to the specification required such as circuit placement and sensor placement. The structure was user friendly and economic which will achieve the objective. Throughout the test and experiment of the performance of the design it can be concluded that the system can perform cutting on field that do not have too thick and long leaves. It only suitable on short range leaves for high efficiency

Keywords— Motor, Frame, Voltage, Cutter, Pulley, Zero Turn Mechanism.

I. Introduction

The Robotics Industries Association (RIA) defines an industrial robot as: “An industrial robot is a reprogrammable, multifunctional manipulator designed to move materials, parts, tools or special devices through variable programmed motions for the performance of a variety of tasks.”

Many robots have an articulated mechanical arm onto which various devices such as a gripper, grinder, and paint sprayer, welding gun, electromagnet or pneumatic wrench can be attached. The design and operation of these devices (called "end effectors") — which take the place of the human hand— are as important as the design of the robotic arm itself. The actuators of a robot can be operated pneumatically, hydraulically, electrically, mechanically or in some combination of the four basic drives.

The first actual lawn mower (grass cutter) was discovered by Edwin Beard Budding in 1830. Budding was an engineer from England who first discovered the idea of a mower from a cylindrical machine used for cutting in a mill [7].

Corresponding to the advancing of technology, many kinds of lawn mower has been built and some are automatic. Sensor such as rain sensor, light sensor, ultrasonic sensor, and infrared sensor has widely been used nowadays to enable the lawn mower to be more intelligent and work efficiently.

II. Literature Review

This chapter studies various fields that are used for development of an automatic leaves cutting robot. Several techniques for robot routing are also presented in this chapter.

In this section we will discuss about the previous work that have done which related to this project. Much research has been done in order to find the appropriate way to optimize the use of grass cutter. Many proposed the method on how the movements of the lawn mower (grass cutter) which can give the optimum result on the path travel.

When the survey was made on the existing cutting process being used, an observation was made that the provision for cutting leaves along the road side was being done manually with the help of big scissors which was consuming a lot of time and there was risk for the labor's life and the work must be stopped due to change in weather. Our project incorporates all the features⁴ of above problem and on our part, it is an earnest effort to give a solution to the problems mentioned. Since the Automatic Leaves Cutting Robot is comparatively more efficient than lawn mower and manual cutting.

III. Experimental Setup.

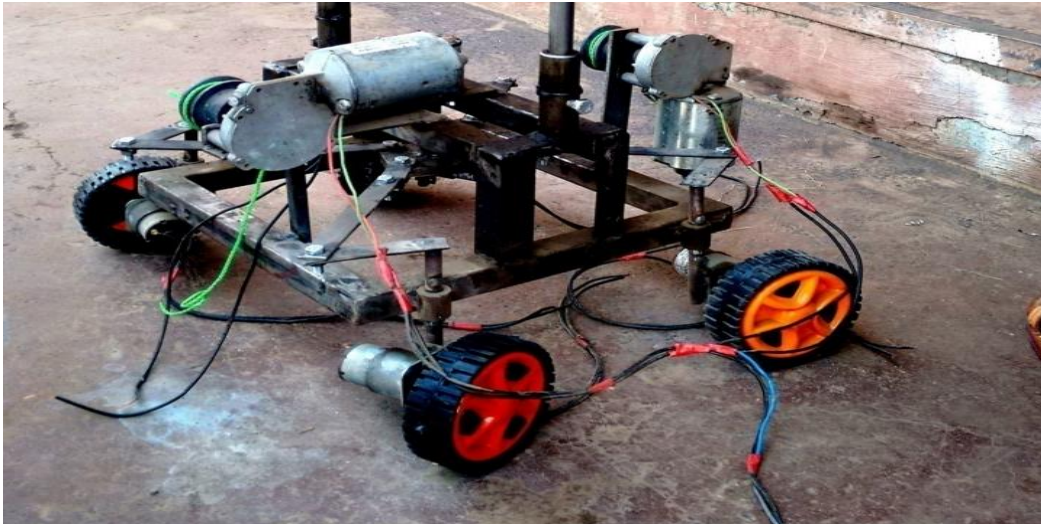


Fig.1. Implemented Lower Part

CATIA DESIGN:

The final design of the AUTOMATIC ROAD DIVIDER LEAVES CUTTING ROBOT is done on the catia software as shown in the fig. below.

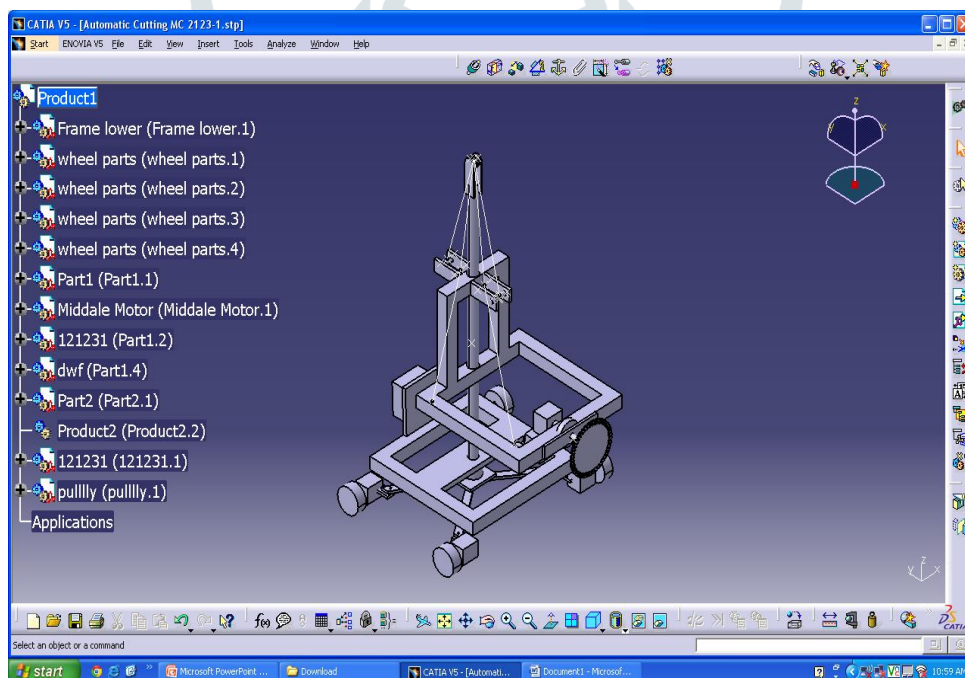


Fig.2 Final Design

IV. Methodology

Following Will Be The Flow Of The Project:

1. Problem statement.
2. Research and Interview.
3. Literature Review.
4. Model Design in Auto Cad.
5. Fabrication.
6. Implementation of the process.
7. Testing and Modification.
8. Result and Analysis.
9. Final product.

V. Future Scope.

Cutting Of Road Divider Leaves.

1. Cutting of garden leaves.
2. Cutting of footpath leaves.

This automatic leaves cutting robot will meet the challenge of environmental production and low cost of operation since there is no cost for fueling. automatic leaves cutting robot has been developed for the use of residences and establishments. The machines capacity is adequate for its purpose. The machine as proved to be a possible replacement for manual cutting.

From the critical review of the related literature, advantages of each system are studied with their respective design constraints, cost, and limitations. Therefore, a strategized system is proposed to develop a successful automated leaves cutting systems, in which the proposed could be implemented commercially with minimal production and operating cost. Thus, the leaves of a very spacious field can be cut easily in reciprocating motion without having human to operate manually. On the other hand, since the robot is unmanned, then, whether sunny or rainy day will not affect the cutting operation and the robot can be continuously operated almost at any weather conditions

VI. Conclusion.

An automatic leaf cutting robot with several features has been proposed. Several related works have been studied in order to gain idea on how to build an automatic road divider leaf cutting robot. Most research are on the robot path planning using variety technique. All the technique used are mainly aim for the shortest path, consume less energy. Besides that, 2D and 3D model have been designed according to the specification required such as circuit placement and sensor placement. The structure was user friendly and economic which will achieve the objective. Throughout the test and experiment of the performance of the design it can be concluded that the system can perform cutting on field that do not have too thick and long leaves. It only suitable on short range leaves for high efficiency.

VII. REFERENCES

- [1] "Smart Lawn Mower for Grass Trimming": Volume 3 Issue 3, March 2014.
- [2] "Design and Development of a Solar Powered Lawn Mower": International Journal of Scientific & Engineering Research, Volume 5, Issue 6, June-2014.
- [3] Cohen, M.W., Siro tin, I. and Rave, E. Lawn Mowing System for Known Areas, International Conference on Computational Intelligence for Modelling Control and Automation, CIMCA, 2008, 539 – 544.
- [4] Zhang, Q., Wu, D., Reid, J.F., and Benson, E.R. "Model Recognition and Validation for an Off-road Vehicle Electro hydraulic Steering Controller" Mechatronics. 12, 2002 845-858.
- [5] Stoll, A. and Wurzbach, H.D. "Guidance of a Forage Harvester with GPS." Precision Agriculture. 2: 2001, 281-291.
- [6] Batavia, P.H., Roth, S.A., and Sanjiv Singh. "Autonomous Coverage Operations in Semi-structured Outdoor Environments." Unpublished Research, Robotics Institute Carnegie Mellon University, 2002.
- [7] International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 4, Special Issue6, May 2015
- [8] Pan sire, D.G. "Self-propelled Self-guiding Lawn Mower." U.S. Patent 4, 1980, 180,964.
- [9] Reid, J.F., Zhang. Q., Noguchi, N., and Dickson, M. "Agricultural Automatic Guidance Research in North America." Computers and Electronics in Agriculture. Vol. 25, 2000, pp. 155-167.

Reference Books:

1. Design of Machine Elements by Prof. V.B.Bhandari.
2. P.S.B. Design Data Book.
3. Theory of Machines by Thomas Beven.
4. Theory of Machines by J.E.Shigley.
5. Theory of Machines by P.L.Ballaney.
6. Machine design - Khurmi Gupta.