LAROB for Warehouse Applications

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Abstract :

Laser Guided Vehicle is robot that can deliver the materials from the supply area to the destination. This is faster and more efficient .The robot can be access wirelessly.ie. a technician can directly order the robot to deliver the components rather than order it via a human operator (over phone, computer, etc. who has to program the robot or ask a delivery person to make the deliver). To avoid collision with human workers, safety sensor has been added which causes the robot to stop as long as there is no obstacle in its way, thus avoiding accidents.

Keywords: Raspberry pi 3,Python, Lidar, GY-87 MPU 9265, 7 Inch touch screen, Safety Sensor.

I. INTRODUCTION

One of the major challenges in industries is the internal logistics; the problem arises when the right product doesn't reach right destination at right time, in order to overcome these we make use of the advance material handling technologies such as AGV's.AGVs increase efficiency and reduce costs by helping to automate manufacturing facilities or warehouse.AGVs can carry loads behind them in trailers. The trailers can be used to move raw material or finish product. The AGVs can also store objects on bed. Some AGVs used fork lifts to lift objects for storage. AGVs are employed in nearly every industries, including, paper, metals, newspapers and general manufacturing.To build an AGV that can replace the manual handling and able to being the fragmentary products to a particular location based on laser pattern recognition systems. Laser guided vehicles (LGVs) is a flexible automated guided vehicle (AGV). LGVs are a more flexible solution than older forms of AGVs that follows markers or wires in the floor or where navigation is based on following a magnet crumb trail. LGVs can move through a facility on multiple paths and the paths can change as needed. The proposed work explains how a LGV implementation would take and the steps involved. Each vehicle has one of these rotating laser sensors that interact with targets mounted along the path. The laser sensors receive the reflected signals and use that data to triangulate the vehicle's position.

In addition in the LGV the concept of the wireless infrastructure is also done. Because of wireless communication it is easy to be in constant connection with LGV software. Reliable wireless coverage also is needed if the vehicle is doing automated barcode scans or is integrated to a warehouse management system. This is particularly advisable if an LGV is navigating not just based on XY coordinates but needs Z coordinates to be able to accurately place pallets in slots in a rack, or on top of each other, or on top of a conveyor. In locations where this kind accuracy is needed, the number of targets needed are been increases. In a big warehouse, where there might be as many as 2000 locations where pallets could be placed, this kind of survey could take long time.

The payback from any form of AGV comes in the form of labor savings that result from less time wasted in traveling across a facility. Warehouses and factories in the wealthy Western world are finding it increasingly difficult to hire workers. That is the primary reason the AGV companies are so busy. Laser guided vehicles may be getting less publicity than autonomous mobile robots because it is an older technology.

II. OBJECTIVES & PURPOSE OF PROJECT:

To build an AGV that can replace the manual handling and able to being the fragmentary products to a particular location based on laser pattern recognition systems.

The main purpose of LAROB is to reduce the man work for porting or delivering the raw or finished materials from one place to other.

LAROB guide itself to reach to destination without human interference so this saves the time, manpower in the industries or warehouse

LAROB gives the longer vehicle lifecycle with the smooth and controlled movement.

This Lowers energy consumption. Possible to operate warehouse with lights-out and at high or low temperature.

III.REFERENCE :

1) A Low cost land wheeled autonomous mini-robot for indoor surveillance
Juan G. Parada-Salado, Luis E. Ortega-Garcia, Luis F. Ayala-Ramirez, 1Francisco J. Pérez Pinal, *Senior Member IEEE*, Carlos A. Herrera-Ramirez, José A. Padilla-Medina
This paper presents design and construction of a land wheeled autonomous mini-robot (LWAMR) in-door surveillance. The LWAMR can be autonomous by using a position, speed and distance sensor. In addition, it is capable to send images and video in real time by using a spy cam, which is controlled by a servomechanism. Details of design, control algorithm, communication, and human machine interface are given. HMI was implemented in Lab VIEW and it is used for monitoring remotely the LWAMR health and surveillance. Communication between the HMI and the LWAMR system was carried out by means of RF transceiver. Results shows effective implementation of this kind LWAMR system. Advantages of presented LWAMR: low cost, versatility, modularity, robustness and remote (or not) operation by using a
mobile device HMI.

2) **LAROB: Laser-Guided Underwater Mobile Robot for Reactor Vessel Inspection Jae- Hee Kim, Jae-Cheol Lee, and You-Rack Choi**
There are several cylindrical vessels in the nuclear power plant such as the reactor vessel and pressurize. The vessels usually constructed by welding large rolled plates or nozzle pipes together. To ensure integrity of vessel, their welds should be periodically inspected using sensors such as ultrasonic transducers or visual cameras. To inspect these welds effectively, we developed an underwater mobile robot, which is guided by a laser pointer. To reduce the inspection time and the schedule during code inspections the robotic system was devised compared to the conventional inspection machine with a large structure. The system mainly consists of underwater mobile robot, a laser positioning unit, and a main control station. The underwater mobile robot guided by laser positioning unit with a precise resolution of0.05◦. The mobile robot moves on reactor vessel wall with the four magnetic wheels. This paper presents the design and underwater mobile robot. The laser guidance control of mobile robot is also described along with experimental results. The system was integrated with main control station, and tested in reactor vessel of a Korean nuclear power plant .After many improvements in its design and engineering, the system is expected to dramatically reduce the critical path of the reactor vessel inspection, if the system is used practically.

3)Localization of a Mobile Robot Using a Laser Range Finder in a Glass-Walled Environment
Jiwoong Kim and Woojin Chung, *Member, IEEE*
A laser range finder is most reliable and commonly used sensors It is challenging problem to employ LRF-based localization schemes in environments surrounded by transparent or reflective object such as glass walls or mirrors. Because the LRF is an optical sensor, range measurements are affected by various phenomena at the glass wall, such as diffuse reflection, specula reflection, and penetration. Hence, LRF measurements are erroneous in environments surrounded by the glass walls. This paper proposes the new strategy for localization using the LRF in glass-walled indoor environment. We designed novel scan matching algorithm under the consideration of all candidate distances that can be measured in the direction of the glass wall which is based on reflective characteristics of laser beam. The proposed method can significantly improve the local tracking performance of a mobile robot in glass-walled environments.

4) **Design Implementation of High-Performance Line Following Robot**
Milan Shah, *L.D.College of Engineering*; Viraj Rawal, *Vishwakarma Government Engineering College*; and Jay Dalwadi, *L.D.College of Engineering*

Nowadays, in hospitals, in medical centers, in farming, in the military, on factory floors, in each and every field application of robotics is increasing day by day. Line following robot is one of the widely used robots. Basically, line following robot is an autonomous mobile system which follows the line which has a different color from the background. So the performance of these line following robots heavily depends upon its efficiency in differentiating the line from the background. Many robotic events based on the line following robot are organized at college as well as industry level all across the world. In this paper, we have described various problems we faced while designing the line following system for the robot for ROBOCON 2016 (International robotics event), how we overcome them and how we designed the most optimized, efficient and high performance line following system.

IV. CONCLUSION :

In this paper, about the automatic guided vehicle i.e. laser guided vehicle used in warehouse application for supplying the goods from one place to other without any manual interference.