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Performance Evaluation of Automatic Guided Vehicle System by Forklift

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ABSTRACT:The Advance AGV System is a system which is design to less the manpower and human venture. As we all know that the AGV is an Automatic Guided Vehicle which does the transportation automatically by following the existing lines which has different types of colour and widely used by many firms or industries. The AGV has some special types of integrated circuits (ICs) and power systems that run the vehicle. At last the AGV is used the bring perfection and reduce the overall time required in the work field.

KEYWORDS:IR Sensor, Ultrasonic Sensor, Microcontroller, LCD, Motor Driver.

I. INTRODUCTION

Improvements in manufacturing field allow the industries to produce the maximum number of products in short time. This has motivated a trend to reduce bulk inventory in service of short term supplies. Although this allows corporations more financial freedom, it requires warehouses to accommodate temporary, selective storage. Improved product handling and speed can be achieved with the implementation of an Automated Guided Vehicle, AGV. With the help of intelligent computers, the AGV can safely achieve higher speeds. . The AGV is highly flexible as a result of remote communication. Its ability to communicate with other autonomous vehicles provides a seamless operation. Continuous coordination between vehicles delivers money saving efficiency. A forklift is an industrial truck which is used to lift and move materials over short distances. Forklifts have become an indispensable piece of machine in manufacturing and warehousing field. Forklifts are rated for loads at a specified maximum weight and a specified forward Centre of gravity. This information is located on a nameplate provided by the manufacturer, and loads must not exceed these specifications. An important aspect of forklift operation is that it must have rear-wheel steering. While this increases manoeuvrability in tight cornering situations, it differs from a driver's traditional experience with other wheeled vehicles. While steering, as there is no caster action, it is unnecessary to apply steering force to maintain a constant rate of turn. So, we are going to combine those two machines in such a way that it will totally eliminate the manpower which is required to operate those machines. Therefore, it will allow the machine to complete the given work in shortest possible time without interference of the workers for loading and unloading of the objects. It also prevents the unnecessary accidents happened because of the fatigue of the operator.

II. RELATED WORK

MANALI POHARE, ASHOK SHINDE and PRASHANT BORKAR. [1] "Automated Guided Vehicle" The basic idea of their project was to increase the optical system of humans. The other major aim of their project was to improve the intelligent machines. They simply defined that AGV is a simple transportation machine that pick the material from one place and drop it to their respective place. Nowadays AGV became a widely used machine in industrial fields and

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open services as well as in hazardous working fields, AGVs are used in almost all the countries as well .AGV is made by keeping many advantages in the mind. They have made it in such a way that it works just like a robot as it is able to detect and reply in the given surroundings. Therefore it is considered as the AGVs are used to improve the work in almost all the fields. In this project they developed a scaled model of an AGV which follows a given path on a plane surface with the help of DC motors and wheels. A camera is provided to it for the purpose of detection of the floor surface. The path can be resolute by the user with the help of GUI application. The RF module is provided for the communication between PC and microcontroller.

PREDRAG ATANASKOVIĆ, VLADETA GAJIĆ, IVAN DADIĆ, SVETLANA NIKOLIČIĆ. [2] “SELECTION OF FORKLIFT UNIT FOR WAREHOUSE OPERATION BY APPLYING MULTI-CRITERIA ANALYSIS” This paper represents the study related to the selection of the criteria that is used to perform an ideal selection of the forklift unit for warehouse operation. The analysis is done with the target of seeing the requirements and defining relevant criteria that are important when investment decision is made for forklift finding, and based on the conducted research by put on multi-criteria study, to determine the proper parameters and their relative weights that form the input data and database for choice of the optimal handling unit.

Liai Pan, Qiulei Du and Chunshan He. [3] “Design Research on Hydraulic System of Working Device of a Forklift” According to them, as a gentle of industrial handling vehicles, forklift plays a necessary role in people's life. Nowadays, in order to meet the requests of the people, the various types of forklifts are available in the market. In this paper, on the various requirements for the forklift, the working device of the forklift is introduced. According to the calculation, the important parameters of the lifting oil cylinder are determined. The hydraulic system is designed and planned.

Prof. A.V. Gaur, Prof. Dr. M.S. Pawar. [4] “AGV Based Material Handling System: A Literature Review” This paper represents a literature view of AGV created material handling system. The various factors affecting the design and operation performance of AGV in a manufacturing unit, literature review on four major factors has undertaken in this paper. This study focuses on basic research methodologies and approaches followed by objective function and problem areas of the material handling system. The review study mostly covers articles coming from major journals related with the topic. Findings reveal that AGV based material handling system is still an open area of research.

SuthepButdee, Frederic Vignat, Anan Suebsomran, Prasad KDV Yarlagadda. [5] “ESTIMATION AND CONTROL OF AN AUTOMATED GUIDED VEHICLE” In this paper a control plan of Automated Guided Vehicle (AGV) is recommended. The vehicle movement is controlled by an inboard PLC do not need physical guide. The wheels will be used for the purpose of steering and driving. The plan is based on the following main purposes; the path stored in the Programmable Logic Controller memory and the vehicle displacement is derived from the wheel rotation measurement. The relationship between the required track and the actual place of the AGV has allowed the calculation of deviation error. A modification plan of driving speed and steering angle is applied in order to get a flat and accurate movement. Moving vehicles must know their position and orientation in order to reach the goals precisely. The techniques which are described for AGV are based on the principle of Kalman Filtering (KF) algorithm estimation. This paper also reports the problems of factory navigation and modeling with focus on keeping automatic travelling along the control path of the AGV.

III. PROBLEM DEFINITION

We visited some of the industries where the AGVs and Forklifts are being used. After observing their operations we found that the AGV requires some operators at every stage it halts for loading or unloading the objects. On the other hand whenever it carries excess of load it fails. If talking about the Forklift the major problem with it is the carelessness of the driver may lead to the major accident. As it needs human operator to drive, human errors are possible. Errors result in permanent damage of the property. The wire that carries an electric current is embedded in concrete along the predetermined path, used to carry communication cables so messages can be transmitted to AGV .The wire guidance is not suitable for the systems that are frequently changed. The wire will become brittle and break in a long time. Like a car,

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tyres and suspension affect each other. Worn tyres aggravate all kinds of problems and can make a forklift handle poorly. A damaged suspension, however, affects the entire vehicle, and can be really risky. The suspension also reacts to the load, so problems can be aggravated very quickly. This problem can be almost completely avoided with regular forklift servicing.

IV. CONCLUSION

The aim of this is to give complete design information about the forklift AGV. Also the machine has to be simple in design and construction such that it could aid easy maintenance. Forklift AGV is automatic as well as it can be operated manually also and thus it is important to have an optimum usage of effort.

Accordingly system will be designed. The conceptualized machine should have ability to follow the line as it is commanded and place the weight or load at particular place where it is required. The project is of fabrication where all the factors are considered like: Cost factor, Safety factor & Time factor.

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