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"Automated Guided Vehicle System"

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ABSTRACT—

In this paper, we study the of automated guided vehicle (AGV) systems. The issues of designing and installing a system of Automated Guided Vehicles (AGVs) in a Flexible Manufacturing System (FMS) are examined in this work. The development, advantages and future trends of AGVs are briefly reviewed. Then the basic features of an AGV in an FMS environment, as well as a computerized procedure for the optimum vehicle selection, are discussed. An automated guided vehicle (AGV) is a portable robot that follows markers or wires in the floor, or uses vision, magnets, or lasers for navigation

1. Introduction

Automated guided vehicles (AGVs) are self-driven vehicles. Early types of AGVS were introduced around 1954. They are used to transport material from one location on the facility floor to another without any accompanying operator, and are widely used in material handling systems, flexible manufacturing systems, and container handling applications. With the advance of technology, more sophisticated machines are available, which considerably reduce machining and internal setup time. The aim of production planning includes along with fast production, efficient transportation of material between the workstations and in and out of storage. Flexible material handling systems are required to perform an efficient routing of material with random handling capability. The use of AGVs increases flexibility, since the flow path can easily be selected from number of alternative paths, or, can be reconfigured to accommodate new locations. The design of material handling guide path has a significant implication on the overall system performance and reliability, since it has a direct impact on the travel time, the installation cost, and the complexity of the control system software. An automated guided vehicle or automatic guided vehicle (AGV) is a mobile robot that follows markers or wires in the floor, or uses vision or lasers. They are most often used in industrial applications to move materials around a manufacturing facility or a warehouse Automated guided vehicles increase efficiency and reduce costs by helping to automate a manufacturing facility or warehouse. The AGV can tow objects behind them in trailers to which they can autonomously attach.

2. Technology

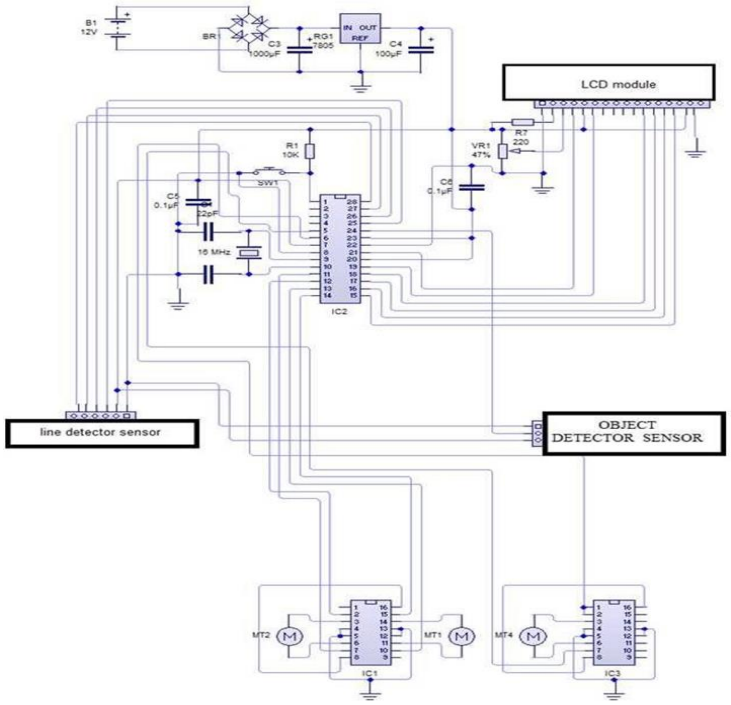

Fig -1: SENSORS POSITIONS

The positions of sensors are important factor to detect the position. The sensors for detecting the path are situated after the front wheel. But the obstruction detection sensor is placed below the chassis, and in front of the front tyre. There are four IR sensors used to detect the path. They are along a line parallel to the breadth. And side sensors are placed at an equal distances from middle sensors.

The width of the white line is little more than the distance between two sensors. All the four sensors were give different movements during different combination. The combination means closing of IR sensors. According to it the working of the driving motors change. Initially the AGV is placed above the line, in such a way that the two middle sensor comes above the white line. During the straight path the middle sensors close, the two motors run in forward direction with equal speed. Thus the vehicle moves in the straight line. When two of the left side close left motor stops and right works. Then the AGV takes a left turn depending upon the curvature. And when two right side sensors close,right side motor stops and the left works. Thus the AGV takes a right turn.

The design of path is very important for an AGV. The magnetic sensors are placed below the driving motors. Two magnets are used to detect the loading and unloading station. There is a particular distance between those sensors and the lift. The loading stand should be placed about at that distance from the magnet. Lifting up sensor is placed below the right motor. So one of the magnet is placed in the right side of the path. Lifting stand is placed about a distance from that magnet. The magnets are placed in such a way that any one of its poles comes to top. Only then the magnetic switch works.

MQTT Broker on Edge Device

The MQTT protocol provides a lightweight method of carrying out messaging using a publish/subscribe model. This makes it suitable for Internet of Things messaging such as with low power sensors or mobile devices such as phones, embedded computers or microcontrollers

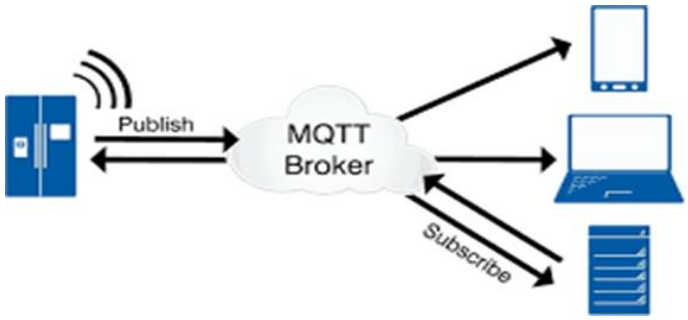

Fig - 2: MQTT Broker

The AGV is an autonomous mobile robot, consists of the onboard computer and other components that can carry materials from one location to another. The AGV will receive the Source and definition from edge device by MQTT protocol. Each AGV will subscribe to the MQTT broker at edge device, as MQTT client to receive delivery details.

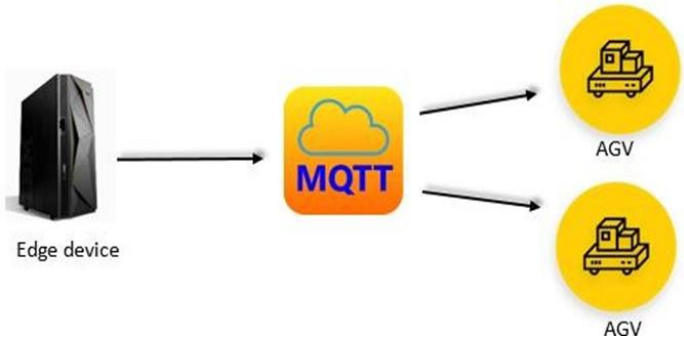

Fig - 3: MQTT connection between AGVs and Edge device

3. Advantages

- Automated Guided Vehicles (AGV), popularly known as battery-powered driverless vehicles.
- AGVs are becoming an integral part of automated manufacturing systems.
- They are with programming capabilities for destination, path location, and positioning.

4. Applications

1. Raw material storage
2. Finished goods storage
3. Assembly operations
4. Flexible manufacturing systems
5. Manufacturing operations

Conclusion

Here we focused on material handling system in AGV along with its factors. By the reviewing this we found a need of area of research on material handling in AGV based material handling. We are designing an AGV to Reduced human efforts with great efficiency and in order to reduce floor installation cost and for obtaining higher efficiency we are using Natural Navigation. For good aesthetics and design, accuracy in speed, proper path following we will work on AGV Drive System and for traffic management issues we will work on communication between two automated guided vehicle.

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