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Localized Control of AGV Guidance Mechanism for Small-Scale Industries Using Modularized Instruction Cards

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ABSTRACT –

An automated guided vehicle (AGV), that follows along marked long lines or wires on the floor, or uses radio waves, vision cameras, magnets, or lasers for navigation. They are most often used in industrial applications to transport heavy materials around a large industrial building, such as a factory or warehouse. After receiving the cargo handling instructions, according to the pre-drawn operation map, the current coordinates and the forward direction of AGV, the central controller carries out route analysis, chooses the best driving route, automatically intelligently controls the AGV trolley's driving, turning and steering on the road, arrives at the accurate parking position of loading cargo, and loads the cargo. Then AGV starts to "run" to the target unloading point, stops after arriving at the exact location and completes the unloading, and reports its position and status to the control computer. Then AGV starts to run to the standby area until it receives new instructions and then does the next task.

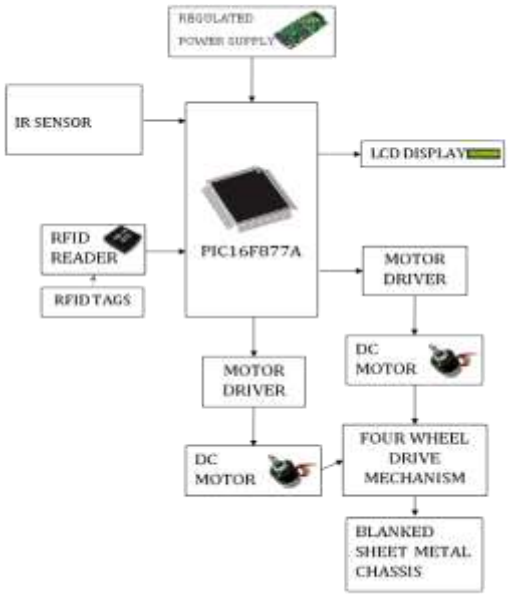
Keywords : **AGV, RFID, central controller, cargo.**

I. INTRODUCTION

Earlier the transportation of the carriers were in fixed structures. The manual handling needs the worker to push or pull the trailer that carrying the product. However pushing or pulling the trolley with a load manually may cause effects to the workers such as low back disorders.

To make it easy, the load carriers that travel along the floor is travelled without an onboard operator or driver. Their movement is directed by a combination of software and sensor-based guidance systems.

II. LITERATURE SURVEY



Before this AGV mechanism, the carriers in industries were handled by humans, which had a lots of man power. In this case, the concentration on handling of the products will be less, due to which products may get damaged.Also, there will be a lots of confusion in transporting the raw materials and also transporting finished goods.

In order to improve the transportation of goods inside an industry, AGV is used. It follows the pre designed instructions and perform according to the tasks assigned to them.

These Automated Guided Vehicle are instructed using RFIDs.

The paper proposes a systematic literature review to investigate the research field from the controller design perspective. Its protocol and procedures are presented in detail. Four main research topics were addressed: the control strategies used in the AGV position control problem, how the literature presents the AGV operating requirement of position accuracy, how the literature validate the proposed controller and present their results regarding the system's position accuracy, and the technological tendencies the proposed solutions reveals. Besides, within the topics, other points were investigated, such as the AGV application area, the considered mathematical model, the sensors and guidance system used, and the maximum payload of the vehicle and operation under different load conditions. The data synthesis shows the predominant control strategies applied to the problem and the interaction among distinct control theory areas, indicating a notable interaction of Intelligent Control techniques to the other strategies.

III. PROPOSED METHOD

A novel method is presented in this paper to address the need for improved pressure ulcer prevention with appropriate sensors of lower cost and more accuracy.

The aim of this method is to assist the caregiver in implementing an effective pressure ulcer prevention procedure by repositioning the mattress automatically in accordance with braden's value.

Repositioning details are incorporated in LCD display so that manual noting is not necessary. The various subsystems in the proposed method and the functionality of each of these subsystems is detailed in the following sections.

A. Block Diagram

The block diagram consists of a PIC microcontroller,RFID reader, IR sensor, DC motor, motor driver.

B.PIC16F877A

The PIC microcontroller PIC16f877A is one of the most renowned microcontrollers in the industry. This microcontroller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many PIC microcontroller projects.

PIC16F877A also have much application in digital electronic circuits.

Fig.2 PIC16F877A

C. Infrared Sensor

A device which can detect motion by receiving infrared radiation. Infrared radiation is an electromagnetic wave with wavelength of 700nm to 1 mm. It is emitted by objects with temperature above 0 Kelvin. Furthermore intensity and wavelength of infrared radiation depends on the temperature of the object.

The infrared sensors are the sensors that detect/measure infrared radiation or change in the radiation from outer source or inbuilt source. Also sensors that use the property of infrared radiations to detect the changes in surrounding are termed as infrared sensors.

Fig 3. Infrared Sensor

D. RFID TAGS

RFID tags are a type of tracking system that uses smart barcodes in order to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology. These radio waves transmit data from the tag to a reader, which then transmits the information to an RFID computer program. RFID tags are frequently used for merchandise, but they can also be used to track vehicles, pets, and even patients with Alzheimer's disease. An RFID tag may also be called an RFID chip.

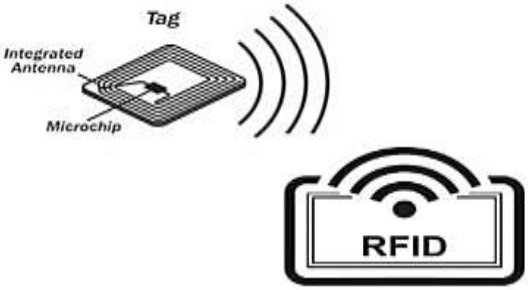


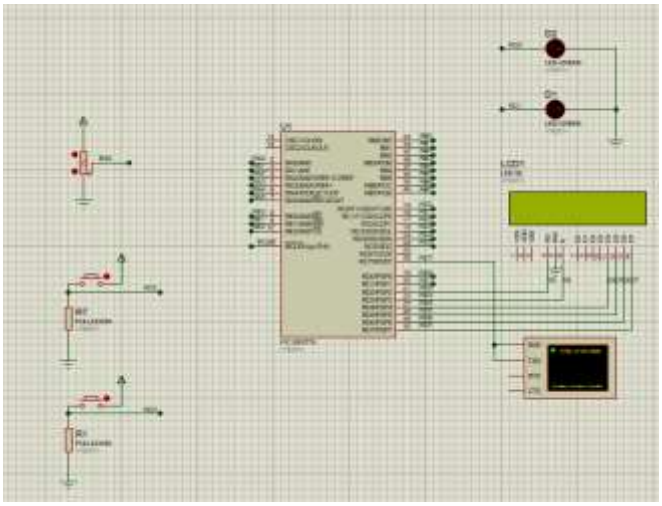
Fig.4 RFID tag

IV.WORKING

Computer-controlled and wheel-based, automatic guided vehicles (AGV) are load carriers that travel along the floor of a facility without an onboard operator or driver. Their movement is directed by a combination of software and sensor-based guidance systems. Whenever the Automated guided vehicle starts and moves along the track, if it finds any obstacle while moving, the IR sensor senses the object and informs to the reader and that information is displayed in the LCD as obstacle found, then after the clearance of the obstacle the vehicle again starts moving towards the target. In between reaching the targets, there will be some of the navigation signs like move left, move right, turn, stop etc. These signs are attained by the RFID reader. RFID readers are placed in the way of target, so that the AGV follows the information throughout the movement. Once the AGV reaches the target, it automatically stops and waits for the other load. This is how AGV vehicles are controlled using RFIDs.

V. RESULTS AND DISCUSSION

- The most obvious cost saving that comes from implementing automated guided vehicles is a reduction in labor costs because you are either replacing an existing employee or foregoing a new hire.
- By replacing personnel with AGVs, you remove this growth in labor expenses. In fact, instead of getting more expensive, AGV use becomes more profitable with each year that passes: Once a machine has operated long enough to recoup the initial investment, any additional proceeds that its use brings in is pure profit (excluding the cost of maintenance, repair, and energy consumption).



CONCLUSION

In this we have been developed an easy monitoring Automated Guided vehicle using RFID tags. Due to this project we cancontrol a transformer inside the control room the equipment will be safe and there will be no damage to the products in the cargo and also manual power can be reduced. AGVs reduce labor costs in your operation in many ways: By replacing a human worker with an AGV, a company pays a single expense for the equipment—the initial investment—versus ongoing costs that would come with a new hire such as healthcare coverage, payroll taxes, salary increases, vacation time.

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