ATS's SBGI, Faculty of Engineering, Miraj
Department of Computer Science and Engineering

Class :- T.E (CSE)

Batch No :- T1

Mini Project Title : -

"Automated Guided Vehicle"

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SYNOPSIS

Mini Project Title : -

"Automated Guided Vehicle"

Project Area : -

Android, Arduino Uno (Micro-controller).

Problem Statement :-

Reasons to creation AGV is to overcome the logical problem that often occurred in the workplace & to take improvement to facilities provided in the workplaces. E.g. industry, hospital, offices, etc.

Objective : -

1. Selection of jobs for handling, sequence of operation as per the type of handling system.
2. Design of various subsystems of AGV along with material selection, CAD modeling and analysis.
3. Manufacturing, selection and assembly of various components of AGV.
4. Selection of suitable technique like image processing for sorting different components in the trays or else to suit the application.
5. Interfacing of various hardware and software components, testing and validation.

Abstract :-

Automated guided vehicle is a robot that can deliver the material from the supply area to the technician automatically. The robot can be accessed wirelessly. To avoid the collision with the human workers we added the detector to detect the obstacle in its ways. Thus avoid the accident.

Concept :-

- The main concept is to move agv as per the signals given to it.
- Agv will get the signals from two sources
    - Signals from Mobile Application.
    - Signals from L393 Speed Sensor.
- Signals From Mobile Application :
    - At the first the agv gets the signals from the mobile application.
    - There are total nine jobs on which we have to perform operations.
    - To start each job's operation agv gets the separate signals from the application.
    - When it gets signals from mobile application, it moves according to the predefined path.
    - Path consists of the five stations , each station performs different operations on jobs like image processing, grinding, finishing product.
    - Navigations to path is done by calculating distance, and distance is calculated by using l393 speed sensor.
- Signals From L393 Speed Sensor :
    - L393 speed sensor gives the total numbers of tics passed through the sensor.
    - Using that tics we first calculate the distance and angle. Using the distance we move the agv to proper stations.
    - Distance and Angle is calculated using the formula :
        - Distance = Radius of wheel (in cm) * Total numbers of lines on encoder wheel.
        - Angle = (Total no. of tics) mod 360 * (90 / (no. of tics require to move in 90 degree))
    - Using distance and angle we move the agv to the correct stations.

Constraints :-

1. Material handling and storage of work in process jobs were done separately. The storage of jobs in bins on floor requires more floor space.
2. Due to manual handling, operator fatigue is high resulting in more time consumption and damage to jobs during handling.
3. In case of variety of jobs, for few jobs, having minute design variation, jobs type identification was done manually in most cases, resulting in mixing of jobs.
4. Tactile sensors should be replaced as they have lower expected life.

SYSTEM IMPLEMENTATION

- **Input Module :**

  - **Signals From Mobile Application.**
  - **Signals From L393 Speed Sensor.**

- **Process Module :-**

1. Part Identification and Recognition by suitable method.
2. AGV Design including structure, navigation and control system design. Design alternatives would be developed to optimize the cost and material of AGV yet accommodate sufficient number of parts required
3. Electrical and Electronics Components Selection like motors, sensor and controller etc.
4. Sensor Interfacing for part recognition and data acquisition.
5. Development of Android App for controlling AGV.
6. Testing and Validation through interfacing of hardware and software components

- **Output Module**

Movement Of AGV :-

The steering system used in the model is of differential type. A differential wheeled vehicle is a vehicle whose movement is based on two separately driven wheels placed on either side of the body. It can thus change its direction by varying the relative rate of rotation of its wheels and hence does not require an additional steering motion. It allows the turning center to be on the vehicle body thus the ability to rotate on the point

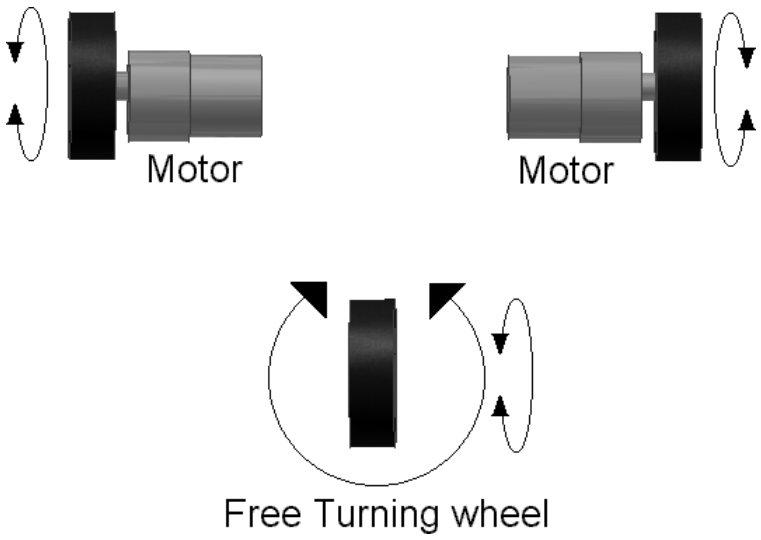

Fig 3.1: Differential Steering

If both wheels rotate at the same speed and in the same direction, the robot will move in a straight line.

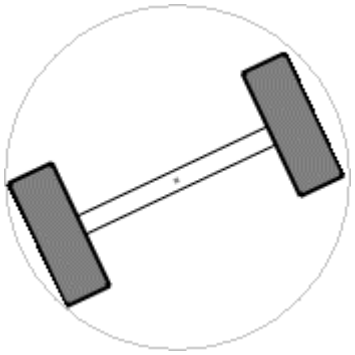

Fig: 3.2Spinning by differential steering

If the wheels rotate at equal speed, but in opposite directions, both wheels will traverse a circular path around a point centered half way between the two wheels. Therefore the robot will pivot, or spin in place. (Figure 3.2)

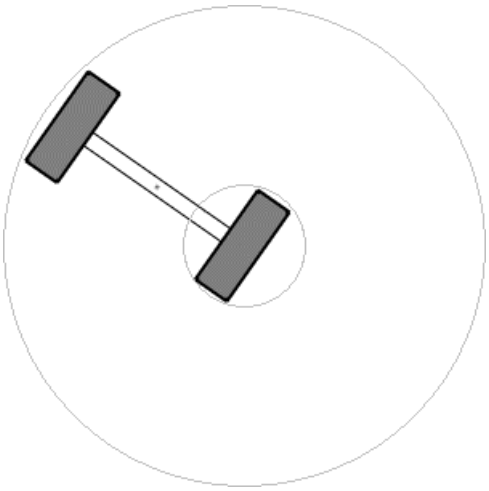

Fig 3.3 Small radius turning

If one of the wheels is stopped, while the other continues to rotate, the robot will pivot around a point centered approximately at the mid-point of the stopped wheel.

Fig: 3.4 Large radius turning

If one wheel rotates faster than the other, the robot will follow a curved path, turning inward toward the slower wheel.

- **Technical Requirements**:-
  - The minimum requirement for our project are
  - **Hardware Requirements-**
    - Esp8266 wifi module, Arduino Uno,l393 speed sensor,
    - Motor, Battery, Motor Driver.
  - **Computer –**
    - Processor- PIV with 1.90Ghz & above
    - Keyboard, Mouse, Monitor.
    - RAM - 256MB & above
    - HDD - 20GB & above
  - **Software Requirements-**
    - Android studio, Arduino IDE
  - **Study Of-**
    - Arduino programming.
    - Android studio programming.

Conclusion :-

The AVG is productivity increases feature in a factory. During the manufacturing of this AGV we had found many of intelligence that can be given to it. The main function, transportation of goods from one station to station .main prototypes of this AGV is

1) Speed of delivery.
2) Flexibility of path.
3) Adaptive to changes in factory layouts.

References: -

Website-

1. https://www.surecontrols.com/industrial-automation
2. https://en.wikipedia.org/wiki/Automated_guided_vehicle
3. www.researchgate.net

Books-

1. **ManaliPohare, Ashok Shinde and PrashantBorkar, "Automated Guided Vehicle".**
2. **Daniel Antal, TamásSzabó, "Controlling and modeling of an automated guided vehicle".**

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