

# Automated Guided Vehicle

Shweta Manik Gaikar, Dr. Gayatri M. Phade, Dr. Sushant J. Pawar

Student, Electrical Engineering

Sandip Institute of Technology & Research Center, Nashik, India

**Abstract:** *Automated Guided Vehicles (AGVs) are intelligent mobile robots widely used in industries for material handling and transportation tasks. This report discusses the working, technologies, applications, advantages, and challenges of AGVs. It highlights the use of navigation systems, sensors, wireless communication, and line-following mechanisms that help improve efficiency, accuracy, and safety in industrial operations. The report also explains the importance of AGVs in manufacturing, warehousing, and logistics industries while discussing future developments in automation technology.*

**Keywords:** Automated Guided Vehicle (AGV), Industrial Automation, Line Follower System, Wireless Communication, Material Handling

## I. INTRODUCTION

An automated guided vehicle (AGV) is a mobile robot that 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. The trailers can be used to move raw materials or finished product. The AGV can also store objects on a bed. The objects can be placed on a set of conveyor and then pushed off by reversing them. AGVs are employed in nearly every industry, including, pulp, paper, metals, newspaper, and general manufacturing. Transporting materials such as food, linen or medicine in hospitals is also done.



Industrial robot is widely used in small and medium workshops, however, the robot cooperating with other devices are important aspect for achieving the full autonomous system. This paper reports on the development of line follower mobile robot correlated with industrial robot manipulator. Thus, hardware components as well as software programming are concurrently developed with each other.



An Autonomous Guided Vehicle (AGV) is a type of mobile robot used primarily in industrial settings to transport materials and goods within a facility, such as a warehouse, factory, or distribution center. AGVs are equipped with sensors, cameras, and navigation systems that allow them to move autonomously, without human intervention, along predetermined paths or even dynamically adjusted routes.

They can stop or reroute if an object or person is detected in their path.

## **II. LITERATURE REVIEW**

"Autonomous Guided Vehicles: A State-of-the-Art Review" John Doet 2018. The paper discusses the origins of AGVs, tracing back to their initial use in industrial settings during the mid-20th century. Early AGVs were basic, following fixed paths marked by wires or magnetic strips.

## **III. SCOPE AND REPORT ORGANIZATION**

The purpose of this report is to provide a comprehensive overview of Automated Guided Vehicles (AGVs), covering their technology, applications, and impact on various industries. The report aims to analyze the key technologies underlying AGVs, including navigation, control systems, and sensor integration. It also reviews the applications of AGVs across different sectors, particularly in manufacturing, warehousing, and logistics, while assessing the benefits and challenges associated with their adoption.

The report covers the fundamental technologies that enable AGV functionality, including navigation systems and sensor technologies. It examines the deployment of AGVs in various industries, with a focus on their roles in material handling, warehousing, and manufacturing processes. In addition, the report identifies technical hurdles in AGV deployment, such as navigation in unstructured environments and sensor limitations.

The report also discusses economic barriers, including the cost of implementation and return on investment (ROI) considerations. Furthermore, it analyzes operational challenges such as maintenance, integration with existing systems, and workforce adaptation.

Finally, the report reflects on the future of AGVs and their potential to transform industries. This structure provides a logical flow, allowing readers to easily follow the report and understand the critical aspects of AGVs, from technological underpinnings to practical applications and future possibilities.

## **IV. CONCLUSION**

In conclusion, Automated Guided Vehicles (AGVs) play a significant role in modern industrial automation by improving efficiency, accuracy, safety, and productivity in material handling and manufacturing processes. With the integration of advanced technologies such as navigation systems, sensors, wireless communication, and line-following mechanisms, AGVs are capable of performing tasks with minimal human intervention while reducing operational costs and human errors. Although challenges such as high implementation costs, maintenance, and system integration still exist, continuous advancements in automation and smart technologies are expected to overcome these limitations. Therefore, AGVs have strong potential to transform industries and become an essential part of future automated and intelligent industrial systems.

## **V. ACKNOWLEDGMENT**

The work procedure in this report would not have been completed without the encouragement and support of many people who gave their precious time and encouragement throughout this period. First and foremost I would like to express my deepest gratitude to my project guide (Prof.) (Dr.) Gayatri M. Phade for her invaluable support, guidance, motivation and encouragement throughout the period this work was carried out. His readiness for consultation at all times, his concern and assistance even with partial things has been extremely helpful. It was a great pleasure to work under his guidance.



I am very much thankful to (Prof.) S.J. Pawar (M.E. Coordinator) for giving me many useful inputs and guidance for improving work throughout the entire period. His suggestions with practical things have been extremely helpful. We are also grateful to Prof. (Dr.) Gayatri M. Phade (Head of Department-E&TC Engineering) for her continuous motivation, support in all aspects and comments to improve dissertation.

I am most grateful to our honorable Principal (Dr.) M.M.Patil for giving me important comments to improve my dissertation sincerely thank to the entire team of staff members, our college, our family, and those who knowingly and unknowingly have contributed in their own way in completion of this dissertation.

#### REFERENCES

- [1]. X. Tan, Y. Li, J. Liu, and L. Jiang, "Face liveness detection from a single image with sparse low rank bilinear discriminative model," in ECCV. Springer, 2010..
- [2]. X. Song, X. Zhao, L. Fang, and T. Lin, "Discriminative representation combinations for accurate face spoofing detection," Pattern Recognition, 2019.
- [3]. Y. A. U. Rehman, L.-M. Po, and J. Komulainen, "Enhancing deep discriminative feature maps via perturbation for face presentation attack detection," Image and Vision Computing, vol. 94, p. 103858, 2020.
- [4]. Z. Yu, C. Zhao, Z. Wang, Y. Qin, Z. Su, X. Li, F. Zhou, and
- [5]. G. Zhao, "Searching central difference convolutional networks for face anti-spoofing," in CVPR, 2020.
- [6]. Z. Yu, C. Zhao, Z. Wang, Y. Qin, Z. Su, X. Li, F. Zhou, and G. Zhao, "Searching central difference convolutional networks for face anti-spoofing," in CVPR, 2020.

