

# INVESTIGATIVE RESEARCH ON AGVs USING SENSORS

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## INTRODUCTION

The purpose of this paper is of trying to summarize how other authors have made use of an AGV with sensors. There are different sensors that the industries choose to use whether related to price, durability, effectiveness, or all of the above. After reading related articles, one MAIN question needs resolution: **Which sensor or sensors are up until now the best option for the best performance AGV?** As well as a sub-question: **With all the technology advances, what methods are becoming “obsolete”?**

## METHODOLOGY

The methodology in this paper is the investigative research. This method is based on learning and reading about what other authors have discovered throughout the years and this way summarize their findings.

## DATA EXTRACTION

25 papers were chosen for this research. They had to follow this criteria

| Criteria papers have to follow |   |
|--------------------------------|---|
| AGV                            | Has to be an AGV  |
| Language                       | The paper had to be written in English  |
| Years                          | To solve the main question last 4 year<br>To solve sub-question last 20 years   |
| Sensor                         | Need to specify what kind of sensor(s) were used  |
| Methodology                    | Talk about what algorithm or formulas were used   |
| Specify testing location       | If AGV was tested indoor, outdoor or both.  |
| Data                           | Needs to specify if data was generated or recovered. Also needs to specify if the AGV is simulated or being tested in a real-life setting. Therefore, it will be described as Tested or Simulated |

## ANSWER TO SUB-QUESTION

After reading these 25 papers regarding the method, and all the summarized data, fuzzy control by itself got less mentioned overtime and ROS gets more and more mentioned

With new advances and so many different approaches and formulas, each paper chooses either to improve a previous used method or develop their own formulas or algorithms.

## ANSWER TO MAIN QUESTION

Overall after reading those 25 papers it is noticeable that some of the authors are playing with technology also trying to make small changes that would mean better performance (speed, object avoidance, mapping, etc.). Some of the AGVs are clearly not ready to be marketable and some other AGVs show that it just a research like vehicle (monocycle AGV which provides no particular use in the industry, yet the algorithms could be used in the future).

## CONCLUSION

Usage of sensors is in rapid change and after reading these 25 papers it is clear that overtime the use of multiple sensors and technological techniques are used altogether to reach certain authors or companies' goals. The methods are in constant change and improvement and instead of using one sole method, the AGV performance improves when adding NN, data sets, algorithms, formulas, etc. Main question on the other hand needs more research to be able to conclude precisely which sensor is in fact the one that will provide better performance, if there is any.

It is suggested to keep reading more papers related to the sensors and use of AGVs that are already being used in places such as hospitals, manufacturing areas and warehouses, check the dates and find how all the papers relate to each other, if possible.