

ABSTRACT

The growing demand for automation in warehouse and industrial settings has made Automated Guided Vehicles (AGVs) an essential part of many operations. While these vehicles are designed to work independently, their performance still depends on one crucial factor: battery management. When an AGV suddenly stops due to low battery, it can disrupt the entire workflow. This project aims to solve that issue by creating a system that allows AGVs to monitor their own battery levels and return to the charging station automatically—without needing help from human operators.

The system is built with the idea of simplicity and autonomy in mind. Instead of relying on fixed schedules or manual monitoring, the AGV can decide when it's time to charge, go to the charging station on its own, and resume work afterward. The process runs quietly in the background, triggered by the vehicle's condition and location, and helps reduce unnecessary interruptions during the day. The overall design prioritizes practicality and ease of use, making the system suitable for dynamic and high-paced environments.

From the testing process, it was clear that this approach could significantly improve how AGVs operate on a daily basis. The vehicles could work continuously, stop only when needed, and return to full operation after a short break. By giving AGVs the ability to manage themselves, this system reduces downtime, increases efficiency, and brings warehouse automation one step closer to being truly independent.

Keywords: Autonomous Charging, AGV, Battery Monitoring, IoT, Industrial Automation, Battery Management