AGV²: Automated Guided Vehicle by Vision

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Auto guided vehicles (AGV's) are widely used actually in industries for transporting of various production items. These generally use grounded cable or GPS technologies in navigation, what makes the application more expensive for installation and little flexible. The proposed solution is an AGV with navigation system that enables the transport of objects in a flexible and reconfigurable route system. The proposed system consists of a vehicle capable of moving and locating within the possible routes and finding the selected destination. For this, the robot must follow a main line, and when arriving at bifurcation, detect and read location identifiers, made with QR-codes, which will help in defining the direction to reach the destination that was requested. To control the robot, we decided to use a Raspberry Pi microcomputer, which allows the utilization of a câmera to read the identifiers. When one identifier edge is detected, the AGV stops rapidly to read the QR-code. To detect the line and keep the robot on it, we use reflective sensors with a PID controller. The system has a graphical interface that allow the definition of the routes and the movement tracking. The lines and identifiers made of adhesive material allow for easy removal and relocation, so the physical route is easily changed without the need for change in the robot program. The implemented AGV² system generated the desired flexibility for an autonomous object transport system, even with complex routes.

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