Vision Based Guiding System for AGV Using Robot Operating Systems

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An automated guided vehicle or automatic guided vehicle (AGV) is a mobile robot that is most often used in industrial applications to move materials or goods around a manufacturing facility, warehouse or stores. This research is based on making a vision based guiding system for AGV instead of follow markers, wires in the floor or magnets. For this task here used *"rviz"* and *"Gazebo"* visualizing interfaces in ROS (Robotic Operating Systems). In this guiding system, the initial map was generated of the working environment manually. Then, in this mapped environment AGV can navigate autonomously avoiding obstacles. To obtains a 3d and 2d map of the navigating environment, AGV used *ROS RTAB map* (real-time appearance based mapping) packages. Video cloud of the environment was obtained by Xbox Kinect 360. For communicating with Kinect video cloud, *ROS freenect-opennii* package was used. The AGV model was designed by *URDF* (unified robot designing format). This model is designed to its real dimensions through URDF. For first map generation, AGV moved manually in the working environment. Manual Navigation of the AGV achieved by *ROS keyboard_teleop* packages. These navigation commands pass to motors of AGV through Arduino board. For communication between Arduino and ROS, *"rosserial"* packages were used. This system can identify obstacle through video cloud with a small delay. The laptop was used as ROS working environment and also to monitor and mark the destination point of AGV. It is possible to use wandboard, Raspberry Pi board instead of laptop and HMI (Human Machine Interface) instead of the laptop monitor. AGV can identify its current position through ROS localization packages and use wheel encoders to obtain traveled distance accurately, while navigation to the given destination.

Key Words: AGV, ROS (Robotic Operating Systems), RTAB Map