

## **Development a Self-Driving Golf Cart Using Kinect Sensor and Robot Operating System (ROS)**

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An automated guided vehicle (AGV), in general, follows markings or wires on the floor or uses vision or laser sensors for its navigation. AGVs have been applied for flexible manufacturing systems, storage systems, delivery systems and in many similar situations in the industry mainly to move materials around a manufacturing facility or a warehouse. They are programmable mobile vehicles. AGVs are advantageous over conventional material transportation methods because of their repeatability and economic savings because of the absence of labor. The aim of this paper is to develop an automated golf cart for human transportation. To date, in Sri Lanka, there is no self-driving system for human transportation. Hence, by introducing an electrical self-driving solution for the Sri Lankan transportation system, environmental impacts and exhaust emissions can be reduced which are generated by fossil fuel consumption. The price of petrol is increasing due to shortage in supplying crude oil. If there is an electric self-driving system, the shortage of fuel can be overcome. This AGV system can be used in large factories, hotels, gardens and parks for human transportation. This self-driving technology may create new industries and job opportunities for thousands of employees in Sri Lanka. Paper presents an autonomous navigation AGV system based on a Robot Operating System (ROS) for indoor and outdoor navigation tasks. This system uses a Kinect sensor for map building of its environment. First, the system was developed and simulated using the ROS platform. Then, this self-navigation system was applied to a real golf cart by updating its control and drive system to match with the new self-navigation system. In this update, the Ackerman steering system and the braking system of the golf cart was automated to work in parallel with the new controller. This innovative system can carry up to four persons at a time. Experimental trials showed the ability of the AGV to move loads and people to their target locations.

**Keywords:** AGV; ROS; Kinect Sensor; Ackerman Steering System; Automated Navigation