

# Design, Manufacture, and Test a ROS Operated Smart Obstacle Avoidance Wheelchair

*Mohamed Fathy Abdel Rahman Badran, Mostafa Mahmoud Sabry Sadek, Amira Khaled Hasan Mohamed Elkodama, Donia Waheed Mohamed Abdelmonem Saleem, Samer Ayoub, Clark Potrous*

## Abstract

In this paper, the designing, manufacturing, and testing of a smart obstacle avoidance wheelchair will be discussed. The wheelchair is designed to be light weighted, maintainable, able to maneuver easily across obstacles along the user path with minimum commands from the user. The design payload for this smart wheelchair is 120 kg. In order to minimize the weight, the chassis is made of steel hollow pipes. The user can drive the wheelchair either using a joystick or voice commands. Ultra-Sonic sensors are used to detect obstacles along the wheelchair path. The motion and steering action of the wheelchair are controlled using the Robot Operating System (ROS). The testing of the wheelchair has shown that it is capable of avoiding obstacles and can easily reach the destination with minimum commands from the user. "Index Terms-smart wheelchair, obstacle avoidance, ROS, voice recognition, joystick

*International Journal of Mechanical Engineering and Robotics Research 2020, July*