Development of an Autonomous Wheelchair: A Progress Report

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Abstract: An autonomous wheelchair is developed with the aim of alleviating the handicap faced by those with impaired mobility. The wheelchair will seek the correct position of a patient holding a key card inside a specified room or a control environment and navigate its way to the said patient autonomously. The wheelchair will consist of two DC motors, a transmitter-receiver pair, and four proximity sensors that will be operated by a central Raspberry Pi 3, possibly in combination with an Arduino. The motors used are 24VDC 250W brushed DC motors, which will be independently controlled based on input provided by the proximity sensors and onboard receivers. Taken into account in performance testing were factors such as time taken to complete operation of initiation of Zigbee reception to arrival at within 30cm of the patient, detection of sudden changes in terrain height such as stairs, variation in sizes of the obstacles in the environment, motor rotation in collision detection, the effect of increasing the surface inclination and treading material on motor performance and traction