



Walk and Roll Bot

Dale Rogers and the Walk and Roll Foundation

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PROJECT OVERVIEW

The purpose of this project was to design and build a motorized, omnidirectional wheelchair that was capable of taking the user from a sitting to a standing position.

The constraints of the project included:

- Having a small footprint to allow easy mobility.
- Support riders from 5'2" to 5'10" and less than 200 lbs.
- Be omnidirectional, capable of at least 16 unique vectors.

The objectives of the project included:

- Comfortably raise and support riders in a standing position.
- Affordable and lightweight.
- Aesthetically pleasing.
- Safe and easy to use.

PROJECT OUTLOOK

The Walk and Roll Bot will allow paraplegics to have a sense of normalcy. Paraplegics will now be able to maneuver easily in tight areas as well as stand themselves up. The sleek design along with a low price will make the wheelchair popular.



OMNIWHEELS

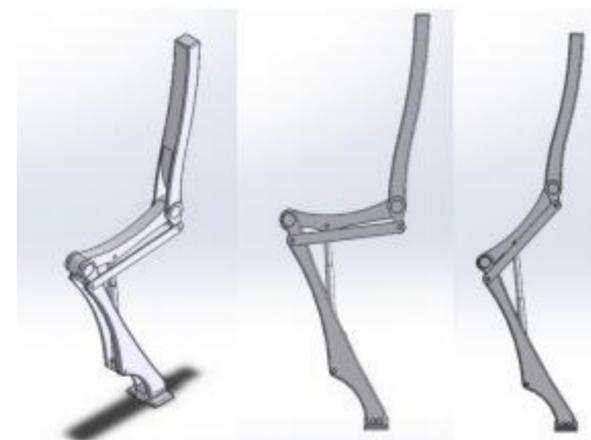
The omniwheel design allows for movement in all directions along with 360° rotational (in-place) capability. The three wheel design allows us to keep a small footprint and overall cost down.

The brain of the wheelchair is an Arduino Mega. This controls three Pololu Motor Drivers which run the three 24 volt brushed DC Motors. A 4-axis joystick is used to control the wheelchair.



MODULAR DESIGN

The wheelchair was designed to be modular. It can break into three separate parts to allow for easy transportation. These modular parts include the base and electronics, the seat linkage, and the batteries. All modular pieces weigh less than 50 lbs each.



STANDING MOTION

The standing motion is done with the use of an electric linear actuator. The actuator is placed under the seat and by the push of a button, it will raise the user to a fully standing position.

The linkage was done using a parallel link design. This utilizes a single structural member that is made up of two parallel aluminum plates.

The advantage of this design is the simplicity of the parts. Making the overall wheelchair more lightweight and easier to disassemble.

