

SPAM – Smart Power Assisted Module (ie. smart wheelchair)

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The SPAM is a motorized wheelchair with sensors that detect obstacles and software that modifies the path of the wheelchair to avoid obstacles.

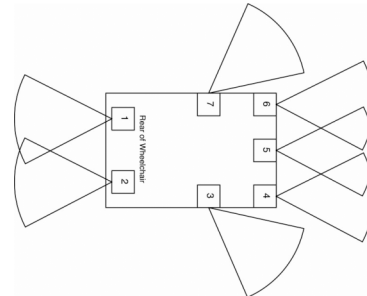


The wheelchair will be used for people with both a visual and mobility impairment that makes it difficult or even impossible for them to walk independently by using a cane, guide dog or other traditional methods of transportation for the visually impaired. Mostly the SPAM will be used for the elderly.

It is an important innovation because it is the first commercially available wheelchair that can alter the speed and direction of the wheelchair instead of using warning signals to tell the wheelchair operator that an obstacle is in the way. It also has better sensor coverage than other wheelchairs and does not restrict the wheelchair to software defined paths. It does this by allowing the user to choose when and where the wheelchair will move.

The SPAM uses sensors to wheel velocity, torque on the wheels and other things as well as to locate obstacles relative to the location of the chair. These sensors include infrared range finders, sonar sensors and bump sensors. The software of the wheelchair then corrects the path of the wheelchair by maneuvering the wheelchair around the obstacle and then returning it to its original path. The software shares the control of the wheelchair with its operator by allowing the operator to choose when and where the wheelchair ultimately moves while the SPAM

modifies the speed based on how close obstacles are.



The SPAM is compatible with multiple brands of wheelchairs and doesn't require any modifications to the underlying power wheelchair. Unfortunately, the SPAM still does not offer the same maneuverability as manual wheelchairs. It is also not as light as manual wheelchairs and thus is more difficult to transport in a car. In addition, if multiple obstacles are detected at once, the SPAM sometimes will not move in any direction.

Right now, the microprocessor used in the wheelchair hubs is being replaced with a new (programmable) microprocessor. This will allow the SPAM to provide much smoother and more controlled motion of the wheelchair. New enclosures have also been designed for the sensors that provide increased mounting flexibility and the number of these modules has also been increased. The project has been completed but is still seeking further funding.

Sources

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