Kyoto prof rolls out omnidirectional wheelchair

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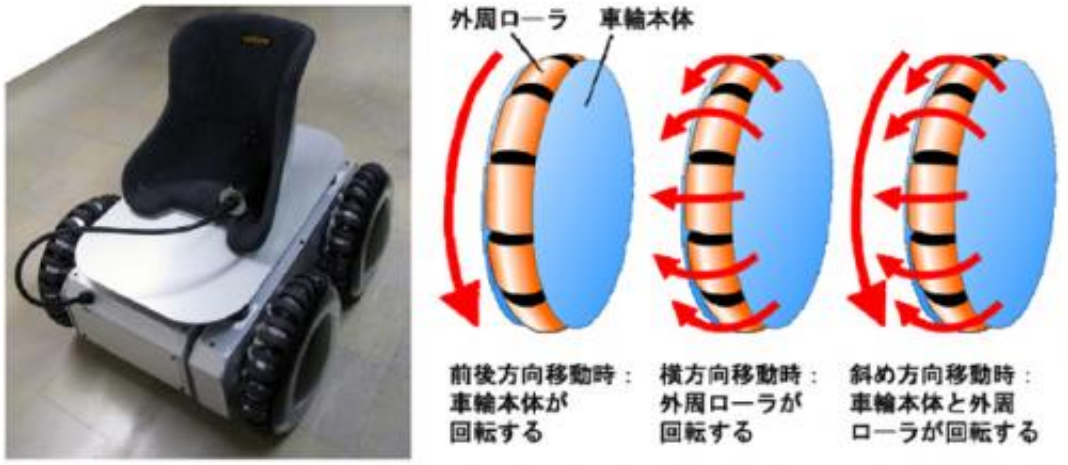

Image: Kyoto University

(PhysOrg.com) -- A mechanical engineering professor has taken the wraps off his vehicle that is designed to become a next-generation wheelchair. As its formal name suggests, this is the Personal Mobile Vehicle, or Permoveh for short. Rolling it around at his lab in Kyoto, Japan, earlier this month, the professor carried out the demo before an audience of observers and photographers. They watched him ride the device, with its clever wheel-within-wheel system, which allowed the vehicle to move in any direction. The Permoveh has four same-sized wheels with 32 rollers each. They rotate in a perpendicular direction to the rim. The rollers sit inside the main wheels, allowing the vehicle to move in more directions than just back and forth.

The driver uses a hand control that can turn the chair in the desired direction. The driver just needs to tip the lever in the direction he or she wants to move. The wheels alone move if the driver wants to go backwards or forwards. The rollers move if the driver wants to go sideways. Both wheels and rollers move if the driver wants to go diagonally.

The device is supposed to be especially handy for use in tight spaces; the intention is to help users of electric wheelchairs maneuver their movements with greater freedom than they have in the past.

What is not such good news is that the vehicle on display cost $36,300 to produce, The research lead, Masaharu Komori, an associate professor of mechanical engineering at Kyoto University, is well aware of the price shortcoming and plans to continue work on the chair to bring costs down, and make the chair lighter and more compact. The eventual target price is $12,000. Komori and team hope to commercialize the Permoveh in three to five years.

This Permoveh "rollout" comes at a time when Japan is showing much interest in bringing on improved assistive technology, from robots to motorized chairs, that can help the elderly. Among the innovations reported have been a bed that changes into an electric wheelchair and a robot that can wash hair.

Whether or not this omnidirectional vehicle can eventually be a popular wheelchair of choice (the top speed is 3.7 mph) for the elderly remains to be seen, but it is being suggested that the Permoveh wheel technology could be adapted for use in conveyor equipment in factories and warehouses.

One site notes the wheel technology is like that seen in Honda's "U3-X" which also enables the rider to move backwards, forwards, and side to

side using an omnidirectional wheel. Honda's description about how the wheel structure enables movement in all directions is that "multiple small-diameter motor-controlled wheels are connected in-line to form one large-diameter wheel. Rotating the large-diameter wheel moves the U3-X forward and backward, while rotating the small-diameter wheels moves it side-to-side. Combining these movements causes the U3-X to move diagonally."

More information: www.kyoto-u.ac.jp/ja/news_data … s6/2011/120322_1.htm (in Japanese)