

Firefighters' positioning system may be used to monitor walking difficulty for elderly

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A positioning system adapted for use in fire rescue operations will soon be tested on senior citizens in Sweden as a way to spot signs of early stage Parkinson's disease and other mobility problems.

Inside the heel of a boot, advanced sensors designed at KTH Royal Institute of Technology in Stockholm make it possible for emergency operations commanders to follow smoke divers' exact movements in any building—even 25 metres below ground. The system, which includes an accelerometer and gyroscope, plus a processor, can withstand shock and high temperatures and remains operational where GPS positioning systems fail.

The module is available under an Open Source License and is now marketed by GT Silicon in Kanpur, India.

"And in addition to saving lives in emergencies, it can also be used to help senior citizens maintain their mobility and independence for as long as possible," says Peter Händel, Professor of Signal Processing at KTH.

In September, the researchers will work with a group of senior citizens to test a new version of system, which is designed to collect additional data that produces a detailed picture of foot movements. These special insoles could be placed in ordinary shoes, to gather data about a person's steps, Händel says.

"Doctors could see how forces are distributed in the foot, and detect



problems such as early-stage Parkinson's," he says. "This kind of information could also allow caregivers to predict when people should start using mobility aids—before further problems arise."

The small sensor in the shoe carefully measures the movement of the foot and directional changes, whether the user walks, runs, jumps or crawls. So, there are more potential uses for the technology. For example, behavioral research could take advantage of the data on people's movements.

Sports is another area where positioning technology can be useful. Athletes can measure their own movements and analyse whether these can be optimised to improve performance or to reduce damage.

More information: Open shoe project: <u>www.openshoe.org</u>

SAATH project: <u>www.saathproject.in</u>

Module available at: <u>www.inertialelements.com/</u>

Provided by KTH Royal Institute of Technology

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