

# Tracking pedestrians indoors using their smart phones

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The next generation of smart phone could combine the data from its gyroscopes with a built-in compass to allow you to track your movements when indoors even without GPS. Such a system could be useful for shopping mall managers, factory bosses for worker safety and security and office workers hoping to manage the flow of people through buildings. It could also be used to enable location based services and to help users navigate to specific meeting points or shops.

Research described in the *International Journal of Innovative Computing and Applications* by Shahid Ayub of Lancaster University and colleagues there and at HW Communications, suggests that the embedded inertial sensors in many smart phones have added the facility to be used for localisation and tracking applications. The primary benefit of using smart phones is that no additional infrastructure would need to be installed for monitoring personnel movements in a wide variety of situations not least staff, equipment and inventory movements in warehouse facilities, [shopping malls](#) and factories. In contrast, other technology being proposed would require new equipment such as RFID technologies.

However, smart phones do not yet have the ability to pinpoint their location without recourse to the [GPS system](#), which is not accessible indoors and has the added disadvantage of using up battery power very quickly even if it could be used. Inertial navigation only provides the necessary information relative to a specified starting point the team says. This is useful for anyone with a non-GPS smart phone who wishes to

track the route they take when walking or jogging if they specify their starting point. The team suggests that pedestrians indoors could be positioned using a combination of the smart phone [accelerometer](#) and an built-in digital compass, something that will become available in future [smart phones](#).

They have now investigated the potential of three different smart phone placement modes: idle, hand held and listening, which could be used with pedestrian dead reckoning (PDR) techniques to allow users to record the path they follow or for various kinds of workplace or other monitoring requirements.

"The technique could be used in underground tube stations, airports , train stations where there is no infrastructure installed for tracking or navigation," Ayub explains, "It can also be used for location-based service applications. In big shopping malls it becomes easier to navigate to a target shop or meeting place, while in large offices and across industry it could be used to track employees and control movements of workers in restricted areas."

**More information:** "Indoor pedestrian displacement estimation using Smart phone inertial sensors" in *Int. J. Innovative Computing and Applications*, 2012, 4, 35-42

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