

# Playing Pacman with Sensei-UU: A relocatable testbed with support for mobile nodes.

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## 1. DEMONSTRATION

Wireless sensor network (WSN) applications are used in many different scenarios ranging from indoor mote networks to participatory sensing applications using smartphones. As WSN systems operate in such diverse environments using different sensor node hardware, we have identified the need of a relocatable WSN testbed with support for heterogeneous node hardware. A specific application scenario we are interested in is when mobile phones are used as data mules as they pass through a WSN deployment. To evaluate such scenarios, among others, we need support for mobile nodes within the testbed.

Sensei-UU[2] is a WSN testbed designed to meet these requirements. First, it supports heterogeneous sensor hardware, e.g. mote style sensor nodes, Android phones, and Symbian S60 phones. Second, it is designed to be relocatable between sites to allow evaluation of the same sensor system in different environments. And third, it incorporates repeatable node mobility using low-price robots. Sensor nodes are carried by robots that use a marked path on the floor for navigation and localization. The approach makes it easy to relocate the testbed and reproduce the same experimental setup to evaluate applications in different target environments.

All parts of the testbed are implemented with off-the-shelf hardware to allow other researchers to duplicate the testbed, for example, the robots carrying mobile nodes are built using Lego NXT and Openmoko freerunners phones[1]. The software is also released under GPL.

To demonstrate the mobility aspect of Sensei-UU, as well as the flexibility, we have built a Pacman game. Pacman and the ghosts are mobile testbed nodes running a WSN application. A Pacman game engine controls the ghosts while a user from the audience can control Pacman using an Android testbed node. The reason to use a game to demonstrate the mobility functionality is to show that it can handle such extreme mobility patterns. To perform the demonstration we



Figure 1: Pacman, a mobile sensor node.



Figure 2: Pacman game screen with a simplified track.

need a floor space of preferably 5 times 5 meters.

## Acknowledgments

This work was carried out within the Uppsala VINN Excellence Center for Wireless Sensor Networks WISENET, partly supported by VINNOVA. We would also like to acknowledge Fredrik Hildorsson and Hjalmar Wennerström for their work to incorporate the mobile sensor host in Sensei-UU.

## 2. REFERENCES

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