Wireless Rope: Experiment in Social Proximity Sensing with Bluetooth

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DOWNLOAD Wireless Rope J2ME: http://wrp.auriga.wearlab.de/dl

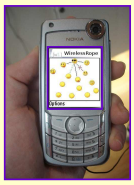
CONNECTION MAP on WEB: http://wrp.auriga.wearlab.de

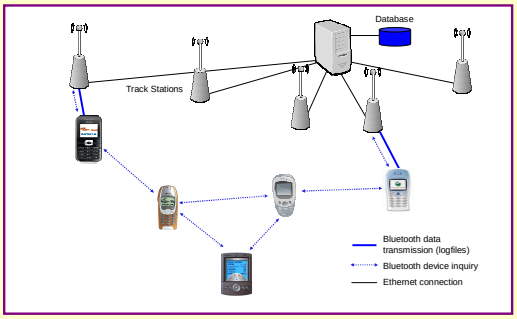
INTERACTIVE DEMO

Wireless Rope aims to study large scale Bluetooth scanning for proximity detection with consumer devices and its effects on group dynamics during the conference. Participants can download a program for Java enabled phones, which collects information of surrounding devices by Bluetooth. Users can interact through a GUI with members of an existing group or form a new group. All connection information will be collected by tracking devices and a connection map of all participants can be obtained via the web. Wireless Rope is an interactive project enabling tribes to stay together while they act together or individually. Especially when exploring crowded places, companions can easily get lost, and considerable effort is needed to keep everybody together. Like a real rope tying together mountaineers, the Wireless Rope gives the urban group immediate feedback (tactile or audio) when a member gets lost or approaches. Thus everybody can fully engage in the interaction with the environment, and cognitive resources for keeping track of the group are freed.

EXPERIMENT SETUP

The demo will run over the whole time of the conference, from the first day thru the last. Participants can download Wireless Rope at the demo web site or at the demo stand. More involvement will increase he scale of this experiments. It consists of four main components.





COMPONENTS

➢ Java Bluetooth Phone with Wireless Rope

Wireless Rope collects information of surrounding Bluetooth capable devices by periodic device inquiries and visualizes the results on the display of the phone. Log data are kept within the device until the information can be automatically transmitted to a tracking device. The program does not involve any additional costs, e.g. for going online. The only requirements on the phones are that it can execute Java programs, that it has built-in Bluetooth support, and that Bluetooth is accessible through Java, i.e. it needs the JSR-82 API.

➢ Bluetooth Devices without Wireless Rope

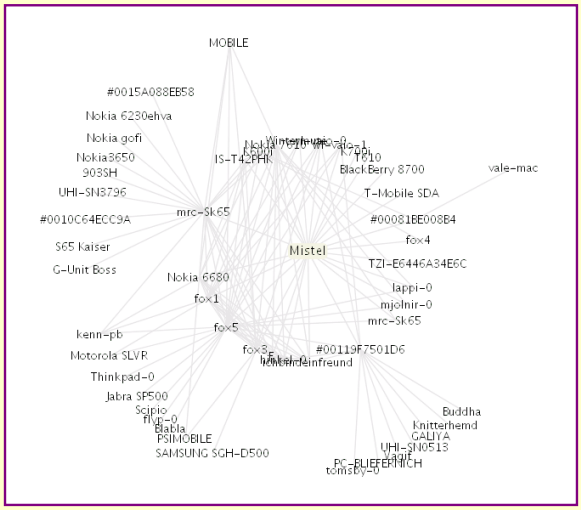
All Bluetooth devices running in visible mode (respond to inquiries) automatically become part of the experiment as passive participants. Wireless Rope users are notified of their existence and collect the sightings. A large part of conference attendees is expected to have a Bluetooth device at their disposal.

➢ Track Stations

Five Track Stations are installed at highly frequented locations (e.g. the main conference room, breakout area), consisting of small embedded Linux computers. The Track Stations automatically record the passing-by of users. Periodically, these devices collect log data from the mobile phones and store them in a database.

➢ Connection Map over the Web

The information collected by the Track Stations is visualized in on a website. The data can be explored in two different views: A radial graph view and a force simulation is available. Any participant (active or passive) can determine his location within this map by querying for his Bluetooth name or address.



Connection Map

PROXIMITY ANALYSIS

Proximity detection is a basic technology and crucial factor in the concept, and its detection is about determining whether two objects are close to each other. It may also involve the measurement of the exact distance. Bluetooth can do proximity detection, usually it can determine whether two devices are within 10m (up to 100m, depending on the class) of range. Depending on the implementation it can also measure the strength of the signal, from which a distance can be approximated. Thus, Bluetooth is an apparent choice for realizing proximity detection on consumer devices. Sightings are grouped into one of the four categories:

- **Stranger:** All new sightings are classified as strangers.
- **Familiar Stranger**: Strangers which are sighted repeatedly are automatically advanced to familiar strangers.
- **Watch:** If the user is interested in being notified of the leaving or approaching of a (familiar) stranger, he can put the person on his watch-list (unidirectional link).

FUTURE WORK

We plan to evaluate the logged information afterwards to analyse the connection patterns, group formation and evolution, and social patterns including an evaluation of the usefulness of Bluetooth for this kind of proximity detection. The result from this experiment may provide the aid which highlights relations between objects, people, situations within the given space, a scientific conference environment. This could be extended to map urban inhabitants. Our future fabric of digital and wireless computing will influence, disrupt, expand and be integrated into the social patterns within our public urban landscape.