

Orientation and Guidance within Doors

Marianna Sipos

John von Neumann Faculty of Informatics, Budapest Tech
sipos.marianna@nik.bmf.hu

Abstract: There is a research in Budapest Tech, John von Neumann Faculty of Informatics about the orientation and guidance within doors. The main parts of the research are: make connections and keep connections with different devices, orientation within doors, help for handicapped and disabled people in orientation, information storage and pass and security decisions.

Keywords: orientation, wireless, communication, IrDA, bluetooth, roaming, handicapped, thin- and thick- client, security

1 Introduction

There is a research in Budapest Tech, John von Neumann Faculty of Informatics about the orientation and guidance within doors. The research is divided into five parts. This parts are: 1. How to make connections and keep connections with different devices. 2. Orientation within doors and within buildings. 3. Help for handicapped and disabled people in orientation. 4. Information storage and pass 5. Security decisions.

This parts are functionally well divided on the one hand, but all parts are working on the full system on the other hand. So all the teams are working dependent, but with the full system. The security decisions team work has the most tightly contact to the other teams. Their decisions influence most the work of other teams. The Information storage and pass needs mainly software development knowledge, the other parts need not only software development knowledge, but also a broad review about the available devices and technical knowledge to gear them.

Students can participate in the research as research assistants and can publish their results as student research work or as dissertation. They work on a small section of the chosen part.

The next heading are about the different parts deeper.

2 How to Make Connections with Different Devices

People, who are step into the building have different communicators. Mainly different mobile phones but year by year more PDA-s (Personal digital assistant: pocket PC-s, palmtops). Simple phones and smart phones provide also different level of communication. We want to offer information the highest bidder way, so that we have to explore all possibility.

First of all we have to see the different kinds of wireless communication. “In modern usage, the term refers to communication without cables or cords, chiefly using radio frequency and infrared waves. Common uses include the various communications defined by the IrDA and the wireless networking of computers.”¹

2.1 IrDA

The Infrared Data Association is a standard for communication between devices (such as computers, PDAs and mobile phones) over short distances using infrared signals. [1] The biggest problem is for the devices to communicate via IrDA they must have a direct line of sight. It is not useful when people who are using the communications channel are moving. A wall or another man or everything not transparent matter also blocks the IrDA communication.

2.2 Bluetooth

Bluetooth is an industrial specification for wireless personal area networks (PANs). “The system is named after a Danish king Harald Blåtand (Harold Bluetooth in English), King of Denmark and Norway from 935 and 936 respectively, to 940 known for his unification of previously warring tribes from Denmark, Norway and Sweden. Bluetooth likewise was intended to unify different technologies like computers and mobile phones”².

Bluetooth connection is composed up to 8 active devices in a master-slave relationship (up to 255 devices can be connected in 'parked' mode). typically has a range of 10 meters, although ranges of up to 400 meters can be reached with new devices under ideal circumstances. The reached distance is enough within doors, but the 8 active devices can be short supply. At the beginning and in some places can be a useful technology.

Bluetooth provides a way to connect and exchange information between devices via a secure, low-cost, globally available short range radio frequency. [2]

¹ Wikipedia the free Encyclopedia, Wireless <http://en.wikipedia.org/wiki/Wireless>

² Wikipedia the free Encyclopedia, Bluetooth <http://en.wikipedia.org/wiki/Bluetooth>

2.3 Wireless LAN

WLAN or wireless LAN is a wireless local area network that uses radio waves to give a network connection to all users in the surrounding area. Areas may range from a single room to an entire campus. The backbone network usually uses cables, with one or more wireless access points connecting the wireless users to the wired network. [3] Originally WLAN hardware was so expensive that it was only used as an alternative to cabled LAN in places where cabling was difficult or impossible. WLAN components are now cheap enough to be used in the home. [4]

WiFi (Wireless Fidelity), is a set of product compatibility standards for WLAN based on the IEEE 802.11 specifications. [5] New standards beyond the 802.11 specifications, such as 802.16(WiMAX), are currently in the works and offer many enhancements, anywhere from longer range to greater transfer speeds.

We can use MDA (Microconnect Distributed Antennae) or MANET (mobile ad-hoc network) or other maybe mixed solutions. We can use wireless mesh network to give continuous connections between nodes.[6]

We have to take into account that wireless devices can interfere with other open access points on the same or a neighboring channel.

3 Orientation within Doors and within Buildings

Another problem is to solve how to switch between a variety of radio systems. It is like roaming system of cellular telephones. When the range of the network is enough in one building the use in the whole campus needs this technics.

On the other hand to give useful information for the users we need to know their actual position. If we use low range networks we can easily give the information where the user is, but we need to solve the switch problem. With high range system we do not have the roaming problem, but we have to fix the user position.

4 Help for Handicapped and Disabled People in Orientation

The system can be very usable for handicapped people. We can improve the system with particular informations like: where are the elevators, where are the washrooms for disabled people, where are the routes for wheel-chairs or where can be heard better the lecturer.

There are already devices and softwares which help sightless people in orientation. We have to take attention in our system to assist handicapped people. With research we can enhance this supply.

5 Information Storage and Pass

The system is about how to give guidance people within doors. We have to collect the kinds of information the delineation of the building, the description of the offices. The logical system of the retrieval.

We have to plan which part of the software is on client device which is running on the server. What kind of architecture will we use. If a small part runs on the client (thin client) more devices can use but it will cause a higher network trade. The use of a thick client will limit the usable user devices.

How to pass information from the database servers to the user device. What kind of programming language and development tool will use the team. What kind of user interfaces will the application use to give the information for the user.

6 Security Decisions

The aim of the program is to give information from the building, so that is a public access system. But we have to protect our informations from the undesirable attacks, against hackers, against burglars and other intruders. We have to plan the authentication and authorisation process and other protection technics to protect our data. [7] So we prevent unauthorized persons from having access to official information.

Our system is a wireless system. The WPA (Wi-Fi Protected Access) is a system to secure wireless (Wi-Fi) networks. Researchers have found a number of weaknesses in WEP (Wired Equivalent Privacy), which was the previous security system of wireless networks. WPA was created to patch the security of the WEP.

We have to make security decisions in the network architecture. We define our security policy, which is a generic document that outlines rules for computer network access, determines how policies are enforced and lays out some of the basic architecture of the company security environment.

Conclusions

The research is about orientation and guidance within doors and buildings. The getting up is about to define the functionally well divided parts and its responsibility. The reserch includes the plan of system architecture with the

communication channels, the software architecture and the security system. The research have to solve the problem of fixing the position of users and the switch between a variety of radio systems. There is a research area about giving higher service for handicapped people.

References

- [1] Wikipedia the free Encyclopedia, <http://en.wikipedia.org>
- [2] Wei-Meng Lee: Bluetooth File Transfer with Windows XP, 09/18/2003
<http://www.oreillynet.com/pub/a/wireless/2003/09/18/winxpunwired.html>
- [3] Rob Flickenger: Building Wireless Community Networks, O'Reilly, 2003
- [4] Tomas Krag: Wireless Networks as a Low-Cost, Decentralized Alternative for the Developing World, Emerging Technology Conference, San Diego, CA, february 9-12, 2004,
http://conferences.oreillynet.com/cs/et2004/view/e_sess/4697
- [5] Matthew Gast: 802.11 Wireless Networks: The Definitive Guide, O'Reilly, 2005
- [6] Tomas Krag, Sebastian B-ettlich: Wireless Mesh Networking, 01/22/2004,
<http://www.oreillynet.com/pub/a/wireless/2004/01/22/wirelessmesh.html>
- [7] Michael Howard, David LeBlanc: Writing Secure Code, Microsoft Press, 2002