ATOM: Asset Tracking and Operation Management

Goal

The goal of the project is to track and manage all mobile assets in the enterprise like IT companies, Hospitals and factories etc.

Project Description

Radio Frequency Identification (RFID) technology has matured over the last few years and can be used to track equipment. Active and passive RFID tags can help solve the equipment location challenge. Software applications are being written to use the information provided by RFID technology to solve asset tracking and management problems.

In this project we will cooperate with SAP Company to develop an in-depth understanding of the asset tracking challenges faced by different types of customers. (For time limitation and privacy issues in hospital we might just work on IT company for now.) We would like to prepare prototypes of solutions appropriate to their needs and get their feedback for the prototypes. We also would like to prepare a change management strategy for our customers based on our research.

Needs

- Workers in factories and IT company's offices misplace tools, laptop computers and companies write off such 'misplaced' equipment worth millions of dollars every year.
- Hospitals, factories and offices use a wide variety of equipment that travels within their facilities.
- Nurses in hospitals spend several hours a day looking for IV pumps, wheelchairs and the like, precious time that could have been spent saving lives. They also hoard equipment so that they don't have to go looking for it when they need it.

Potential Users

- IT Company
- Hospital

- Factories
- Other enterprise whose equipment that is 'recalled' or needs urgent maintenance is hard to locate.

Research questions and challenges

IT Companies, Hospitals and factories are challenging environments for deploying new applications. RFID technology has significant limitations including signal interference in environments with metal and liquid presence, and high cost.

The two big challenges, however, are usability and change management.

Usability

- Why tracking is so important in IT companies?
- What are the benefits RFID can bring for IT Companies?
- How will people look for equipment now? Will they call a phone number? Will they walk up to a computer to look up the information?
- What kind of RFID reader does our customer preferred? Stationary equipment or mobile devices?

Change management

- What are the items that hard to find when needed?
- What would company do to the new inventory items?
- How does the company manage their assets now? Hardware, software or some other methods?
- Typically, how do people rent equipment from the company? What they need to do to get it?
- By using RFID will they stop hoarding equipment?
- Do people want their equipment to be tracked?

This Quarter's Deliverable

- Notes and reports of user observation the interview
- Lo-fi prototype (at least two one stationary and one mobile)
- Hi-fi prototype
- User testing

References

[1] K. V. S. Rao, "An overview of backscattered radio frequency identification system (RFID)," 1999 Asia Pacific Microwave Conference Digest, Singapore, Vol. 3, pp. 746-749, 30 Nov. 1999.

[2] J. R. Tuttle, "Traditional and emerging technologies and applications in the radio frequency identification (RFID) industry," 1997 Radio Frequency Integrated Circuits Symposium Digest, Denver, U.S.A., pp. 5-8, Jun. 1997.

[3] M. Kossel, H. Bebedickter, and W. Baechtold, "An active tagging system using circular polarization modulation," 1999 IEEE MTT-S Digest, Anaheim, U.S.A., Vol. 4, pp. 1595-1598, Jun. 1999.

[4] Hitoshi Hayashi†, Toshimitsu Tsubaki, Tomoaki Ogawa, and Masashi Shimizu, "Asset Tracking System Using Long-life Active RFID Tags" NTT Technical Review., Vol. 1 No. 9, pp 19-26, Dec. 2003

Weekly Schedule

April 15 – 22

- Finalize Proposal
- First round user study: survey and interview at SAP IT department
- Data collection and analysis
- Technology study of RFID tracking

April 22 – 29

- Review last week's work and results
- Second round user study: ethnography study at SAP IT department
- Note collection and analysis
- Design brainstorming

April 29 - May 6

- Review last week's work and results
- Third round user study: diary study and interview at SAP IT department
- Note collection, data collection and analysis
- Design brainstorming

May 6 - 13

- Decide prototype design ideas
- Lo-fi prototype: paper sketch and story board how they system would work
- Try to build two Lo-fi prototypes, one stationary, and one mobile
- User testing of Lo-fi prototype (questionnaire, interview)
- Data collection and analysis

May 13 – 20

- Discussion about improvements
- Hi-fi prototype: still not decided how to implement
- User testing of Hi-fi prototype if possible

May 20 – 27

- User testing of Hi-fi prototype (observation, questionnaire, interview)
- Data collection and analysis
- Discussing further improvements

May 27 – June 3

- Paper draft
- Paper revise
- Presentation and report