Plan for implenmentation of wireless sensor network in DERI building

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1 Description of work

In this work, we aim to implement a wireless network sensor(WNS) for a smart office and we use DERI building as an object to do the experiments. The WNS consists of physical sensor nodes to collect enviromental data, actuator nodes for automatic controlling such as light switching, door locking ... etc. Each node should able to communicate with thier base station via wireless technologies such as wifi, zigbee..ect. A Central Unit is used as a sensitive data storage, data analyser to predict the status of the room and to issue command to the actuator nodes. Users are able to communicate with the system via application built and installed on thier mobile devices. In the next sections we discuss about realistic scenario, available technology, system design, and evaluation result.

2 Scenarios

2.1 Looking for parking place

When a Derian drives his car to IDA Bussiness Park's gate, the first thing he does is to look for a parking place. When his phone has connected to DERI wifi, a parking map shows with avaiable slot for him.The application is also able to record his usual spot and remind him if it is avaiable.

2.2 Guide the visitor

A visistor is comming intoDERI building, he open his cell phone and connect to the DERI network. A mobile application will atomatically install to his cell phone and asking what he want to do. If the visitor wants to meet some one in DERI, the system will notificate his host to arrange the place for the meeting then guide him to his meeting.
If the visitor is comming to a meeting is hosted by DERI. The system will show him a list of meeting are or going to take place. He is able to pick the meeting then application will guide him to the conference room booked for this meeting.

2.3 Notifications

System will issue diiferent notifications to remind people about the working enviroment in the room if it might affect thier health or concentration.

2.4   Discussions

More scenarios have to be depicted.

3   Equipment

3.1   Sensor nodes

Name	Controller	Tranceiver	RAM	Storage	Programmable	Remarks
Sunspot	ARM 920T	802.15.4	512K	4MB flash	Java	Squawk Java ME Virtual Machine
Mica2	Atemega 128L	Chipcon 868/916 MHz	4k	128k Flash	No?	TinyOS, SOS, Manti-sOS support
Tmote-Sky, Tmote-invent	MSP430	250 kbit/s 2.4 GHz IEEE 802.15.4 Chipcon Wireless Transceiver	10k	48k Flash	No?	Contiki, TinyOS, SOS, Manti-sOS Support
RFID tags						

3.2   Gateway sensor nodes

Name	Controller	Tranceiver	RAM	Storage	Interface

4   Setup

4.1   Sensor node distribution

Sensor nodes are placed around the room to collect the data. The distribution of the sensor nodes depend on the scheme of the room.
In one room will place 1-2 base station which are directly connected to the Central Control Unit (Coordinate). This coordinate takes the reponsibility to communicate to moblie divice to answer the data query or listen to the request then issue the notifications for users or commands to the actuator nodes.

4.2   System Design

Some pictures

5   Background Knowledge

Networking will be immplemented in JAVA base on JAVA JNI and PECES
BASE - A Micro brokerbased is required as basic knowledge to implement the work.

6   Test Field

6.1   Testing with data collection

6.2   Testring with system decision

6.3   Testing with notification and command