ParkSens – a Parking Space Locator System

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FAQ

What it is: ParkSens is a state-of-the-art parking space locator system.

The Future is Now! Vehicles in the future will be equipped with GPS and Internet connectivity. The ParkSens system will allow a driver to locate, and optionally reserve parking spaces at meters or in garages equipped with the technology.

Benefits:

Personal benefits:
• Save time, reduce frustration and stress of driving in crowded urban areas

Commercial benefits:
• Revenue growth and cost savings by maintaining accurate inventory availability, allowing garages to maximize occupancy and without creating in-garage congestion.
• New business opportunities for parking services via alternative billing schemes such as (a) time-based billing, (b) space reservation and pre-payment to provide tiered service classes and increased revenue.

Global benefits:
• ParkSens is expected to yield fuel savings and reduced greenhouse gas emissions as drivers will spend less time driving around looking or waiting for parking spots

How it works:
1. A wireless "mote"[1] at each parking spot tracks occupancy. When a vehicle enters the spot, the ParkSens mote communicates, through a wireless mesh of like motes to a base station that relays occupancy data to the ParkSens server.
2. A driver initiates a search for a parking space from an in-dash console, or any other web browser. The query is sent to the ParkSens server which matches the desired search location (e.g., near Fenway Park) with parking inventory.
3. The response is returned to the driver console, where it is displayed as available locations on a map.
4. Optionally, turn-by-turn driving directions lead the driver to the available spot.

Who developed ParkSens?
• ParkSens was developed by Travis DeMent, Andy Eisen, Charles Riter, Jon Thornton; students in the Electrical and Computer Engineering program at Boston University as part of a Senior Design Project.
• The project was sponsored by Prof. Thomas Little of Boston University based on a concept described in the paper by P. Basu and T.D.C. Little, "Wireless Ad Hoc Discovery of Parking Spaces,'' *MobiSys 2004 Workshop on Applications of Mobile Embedded Systems,* Boston MA, June 2004,
http://hulk.bu.edu/pubs/papers/2004/TR-01-08-2004.pdf

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[1] MicaDot mote from Crossbow Technology, Inc

The major components of ParkSens are
- A vehicle sensing system designed by the team using a magnetometer from Honeywell to sense occupancy
- A wireless "mote" for reading the magnetometer and transmitting the occupancy data. We use the MicaDot mote from Crossbow Technology.
- A mesh network formed using protocols in the TinyOS suite (developed at UC Berkeley)
- A gateway that bridges the mesh network with the Internet
- A computer server that captures data from each mote in the mesh network
- A Web Services software architecture developed by the team that links a web interface with the Google Map API to respond to geo-coordinates originating from a query.
- An administrative interface for managing the system

What will each unit cost?
- Early business models indicate that product pricing will be "value" driven, rather than cost driven, due to justification and benefits.
- The cost to manufacture mote-occupancy sensors in is expected to be less than $40 per unit and is a function of volume

What is the future of ParkSens?
- The ParkSens system is a fully functional system comprised of more than 10 working occupancy sensors
- The team is exploring options for scale up in public and private parking service applications
- See www.parksens.com for more information on the evolving product

Are there any other projects like ParkSens going on?
- ParkSens is one example of many ongoing initiatives in the area of Sensor Networking at Boston University. See:
  - Projects in the MCL http://hulk.bu.edu/projects/projects.html
  - CISE at Boston University http://www.bu.edu/systems/
  - The Sensor Network Consortium http://www.bu.edu/snc