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RITA *Office of Research, Development, and Technology*

UTC Spotlight

University Transportation Centers Program

This month: Carnegie Mellon University and University of Pennsylvania | May 2012

CMU-Penn T-SET UTC Researcher Creates Smarter Parking in Pittsburgh

The Technologies for Safe and Efficient Transportation (T-SET) UTC, a partnership between Carnegie Mellon University (CMU) and the University of Pennsylvania, is working to increase both efficiency and safety in transportation using advanced intelligent transportation systems (ITS) technologies. One of T-SET's recent award-winning collaborations is the ParkPGH project—a smart parking system that uses historical parking and event data to show the availability of parking in eight parking facilities operated by private (Alco Parking) and public (Pittsburgh Parking Authority) partners within the Pittsburgh cultural district.

With support by the Benter Foundation, ParkPGH was initiated by the Pittsburgh Cultural Trust—a nonprofit arts organization established in 1984 to lead the cultural and economic development of downtown Pittsburgh primarily through the use of the arts. Growth in cultural opportunities in downtown Pittsburgh led to a strain on existing parking facilities as growing numbers of patrons traveled downtown to attend cultural and sporting events.

CMU has been collaborating with the Pittsburgh Cultural Trust and local companies and CMU spin-off Deeplocal, Inc., to deploy smart parking technologies in the downtown area. A host of information delivery methods, employed to inform drivers of parking availability, include an iPhone application, traditional and mobile website, text messaging, and an interactive voice response system.

The primary goal of ParkPGH is to reduce search time and search time variability when looking for a parking space in the Pittsburgh Cultural District and to make the District a more desirable destination for patrons by reducing the anxiety and uncertainties related to parking issues. Other goals of the project are to reduce the numbers of patrons arriving late at events, to decrease greenhouse gas emissions and congestion by creating the need for less driving to find a parking space, and to attract new patrons who were deterred previously by whether or not they would find parking.

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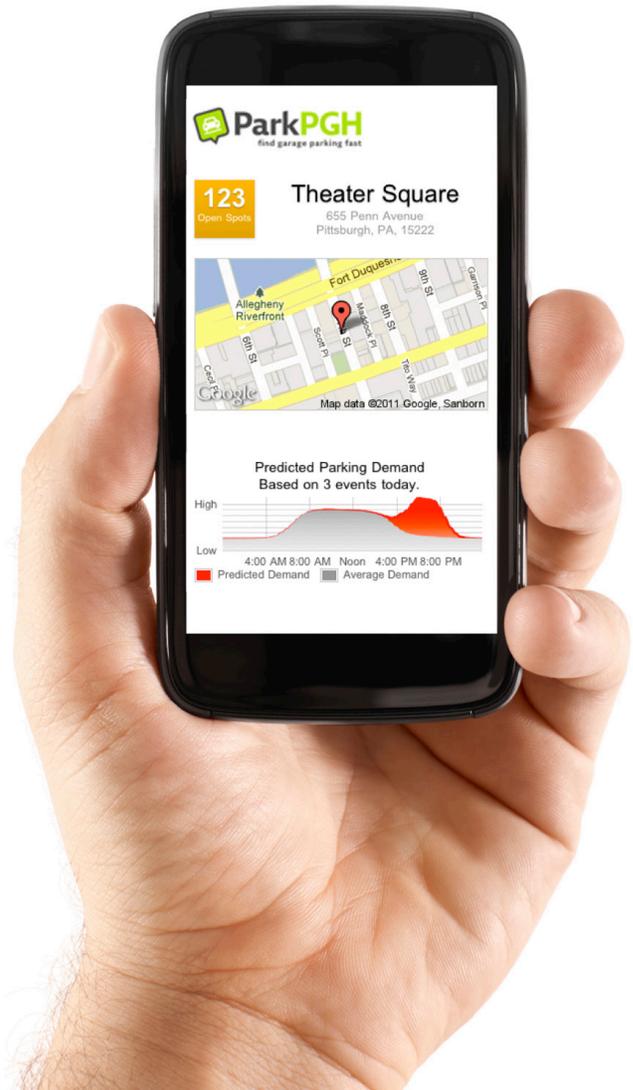
The technology used in this application is the result of a collaborative effort between CMU Assistant Professor of Operations Research and Public Policy, Robert Hampshire, funded by Traffic21 (a multi-disciplinary research initiative at CMU), the Hillman Foundation, and the CMU spin-off technology and design firm, Deeplocal, Inc. Together, Professor Hampshire and Deeplocal have developed a

parking prediction algorithm that collects real-time parking information from these public and privately held parking garages and also uses historical parking data for events occurring downtown to estimate available parking for each garage. Deeplocal handled the architecture and software development of the resulting technology, which is part of the project's goal to support local Pennsylvania technology industry.

Using this technology, drivers can download a map of the Pittsburgh Cultural District that includes the eight parking garages. Each garage is coded with traffic sign colors (green, yellow, and red) to show which have available parking spaces, which garages are almost full, and which are already full. Also listed are the existing numbers of parking spots available in each garage. Clicking on a garage reveals more information, including the facility address, map, and pricing. Popular destinations are also displayed so that visitors can locate their targeted destination and find the closest available parking. This information helps the drivers make the best decisions about where to park.

For this endeavor, the Pittsburgh Cultural Trust received a "Smart Solution Spotlight" award from the Intelligent Transportation Society of America last October. This award is presented to ITS technologies or projects that have made a real-world impact, or have demonstrated near-term potential, to improve public safety, enhance mobility, create more livable communities, strengthen economic competitiveness, or promote environmental sustainability.
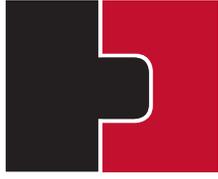
Technologies for Safe and Efficient Transportation

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ParkPGH is an example of intelligent transportation systems technology deployments that the T-SET UTC plans to continue to develop collaboratively. The future focus of CMU-Penn partnership projects will include projects that embrace safety issues, as well as efficiency, as the team applies its information technology, communication technology, embedded systems technology, and automotive systems expertise to broad transportation needs.

About This Project

The primary researcher on ParkPGH is Robert Hampshire, who is an Assistant Professor of Operations Research and Public Policy in the H. John Heinz III College, at Carnegie Mellon University www.utc.ices.cmu.edu. The director of the Technologies for Safe and Efficient Transportation (T-SET) UTC, a partnership between Carnegie Mellon University and University of Pennsylvania, is Raj Rajkumar, Ph.D. (raj@ece.cmu.edu).

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