Sharing the research on car-sharing

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Share and share alike is a concept we all learn as youngsters. Of course, when it comes to something as personal – and expensive – as a car, sharing's not so easy. Due to rising fuel costs hitting hard, increased concerns about the environment and overcrowded cities, car-sharing services like Communauto are becoming a popular way to get around. Can they be more popular still?

Researchers from the Concordia Institute of Information Systems Engineering can answer this question with a resounding "yes." They have piloted a computer model that can help determine how a car-sharing service can grow, maximize customer satisfaction and be profitable.

"Given car-sharing's goal of reducing congestion and carbon emissions, our work represents a potential boost to environmental sustainability," explains Anjali Awasthi. The assistant professor in the Faculty of Engineering and Computer Science came to Concordia in 2008 after spending many years researching car-sharing services in Europe.

"I wanted to apply the lessons I'd learned overseas to the Montreal region," recalls Awasthi, who was quick to enlist the help of her master's student, Ahmed Al Fassi. They turned to local car-sharing company, Communauto. Founded in 1994, the Montreal-based organization is the oldest of its kind in North America. The company is now poised to make tracks in Europe with its recent acquisition of French car-sharing company, Mobizen. The new expansion could mean up to 4,000 new Communauto cars on the streets of Paris, making this Concordia study particularly timely.

Awasthi and Al Fassi assessed which areas had the greatest growth potential in Montreal, based on factors like population density and customers' proximity to existing stations. They focused on data from Communauto for one particular area – the borough of Verdun. They then simulated the response to various growth scenarios to measure the potential impact on the level of activity at each station, the level of activity among the service's members, and the availability of cars to meet customer demand.

The researchers' model can test hundreds of different scenarios and evaluate their respective performances. It can help predict the best strategy for car-sharing growth in any given location, be it increasing the number of vehicles at one station, merging stations, or opening a new station entirely.

For Communauto, the scholarly research was a great boost. "The expertise and input of Professor Awasthi and Ahmed Al Fassi allowed us to improve the analysis necessary to determine our growth strategy," says Communauto's director of development and public relations, Marco Viviani. "This was the first step that we hope will lead to a long-term collaboration, which will be particularly helpful as we grow into new markets overseas."

Awasthi is now collaborating on another study with Communauto, funded by the Natural Sciences and Engineering Research Council. This time her focus has switched from the stations to the car fleet itself, and she'll be identifying possible ways to deploy vehicles more efficiently.

More information: The paper authored by Awasthi and Al Fassi was one of three selected as finalists in a competition run by the Canadian Operational Research Society. It was also published this year in the international journal *Expert Systems with Applications*.

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