

Optimizing Routes and Resources for Trucking Companies

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Georgia Tech researchers are helping Duluth, Ga.-based Saia optimize its routes. They are currently developing real-time dynamic plans to reduce costs and the time required for freight in the system to arrive at destinations. (Photo courtesy of Saia)

(PhysOrg.com) -- As competition increases and shippers raise their expectations for service, trucking companies must optimize their routes and use of drivers, vehicles and facilities.

Researchers in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech are developing models to help optimize driver and equipment scheduling, shipment planning, load consolidation and routing for two carriers - Saia and YRC Worldwide. The companies operate as less-than-truckload carriers, which means they collect freight from various shippers and consolidate that freight to fill trailers for travel to common destinations.

“Tens of thousands of shipments have to be picked up and then dropped off hundreds or thousands of miles away, and we’re studying how all of that freight can best be consolidated and sent through the company’s network of hundreds of facilities to minimize cost and improve service,” says Martin Savelsbergh, Schneider Professor in the School of Industrial and Systems Engineering.

Many less-than-truckload carriers operate with a fixed consolidation and routing plan that they typically repeat every day. But Savelsbergh, along with associate professor Alan Erera, and graduate students, developed a different tactical plan for each day of the week for Duluth, Ga.-based Saia.

“Our results have shown that there is the potential for 5 to 10 percent reductions in line haul costs, which equates to savings of \$10 million to \$20 million dollars per year, simply by executing a different plan each weekday,” says Erera.

Taking it one step further, the researchers are developing real-time dynamic plans for Saia based on freight information collected each day. While the goals of dynamic planning are to reduce the time required for freight in the system to arrive at destinations and to cut costs, the models developed also consider the future operational cost impact of decisions made today.

For YRC Worldwide, which operates both the Yellow Freight and Roadway carriers, the researchers initially focused their efforts on driver management issues. They developed a computer program that could plan a week’s worth of driver schedules in a matter of minutes, while considering driver constraints and costs.

“Our software can be used to tell companies how many drivers they should have, where the drivers should reside and how they should be

dispatched,” notes Erera.

The researchers have also recommended ways to manage YRC’s equipment to minimize the tractor and trailer resources required by the company to effectively serve its customer demands. Results indicate that fleet sizes may be reduced by 10-15 percent if resources are moved geographically to where they are needed most at any given time.

“The optimization techniques we’ve developed are applicable for any less-than-truckload carrier and are going to become increasingly necessary in the future to maximize profit and service based on the fixed resources available,” explains Savelsbergh.

Provided by Georgia Institute of Technology

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