

Test project uses AI system to improve transit accessibility in Chattanooga

June 21 2024



Credit: Unsplash/CC0 Public Domain

Vanderbilt researchers have developed an innovative software system incorporating artificial intelligence that aims to improve the efficiency of public transportation for individuals with special needs.

The [research](#), led by Abhishek Dubey, associate professor of computer science and electrical and computer engineering, will be [presented in a paper](#) at the [International Joint Conference on Artificial Intelligence \(IJCAI\)](#) in August.

In the paper, Dubey and his team discuss their work with the Chattanooga Area Regional Transportation Authority (ARTA) that started in 2020 to improve the operation of its paratransit service, a critical component of traditional transit services that offers door-to-door assistance for people who face challenges using standard transit routes. Pick-up and drop-off times for those individuals must also be adhered to under federal regulations.

However, like other [transit systems](#) across the country, ARTA has struggled operationally because of decreasing ridership and increasing operational costs. To improve efficiency, the team developed a set of data-driven optimization modules that incorporates AI to handle online booking, day-ahead scheduling, and real-time requests received by ARTA's paratransit fleet for routes in the Chattanooga region. Recently, the team has also started running tests with a microtransit version of the system that will be open for general public.

Results from a test of the SmartTransit system that Dubey and his team developed showed significantly fewer detour miles and a higher percentage of trips with more than one passenger, thus reducing the total number of miles the vehicles must drive, researchers said. Another area of improvement was in the generation of manifests, a sequence of pick-ups and drop-offs assigned to each vehicle.

"The ARTA operators revealed that the algorithm closely resembled the manifests generated by hand, and even more crucial, the algorithm took a minute to generate the manifests, whereas ARTA operators took two weeks to generate the manifests by hand," said Dubey, senior

research scientist at the Institute for Software Integrated Systems (ISIS).

"To the best of our knowledge, this work presents one of the first examples of using [open-source](#) algorithmic approaches for paratransit optimization."

Co-author David Rogers, a research engineer with ISIS, said the system prioritizes the needs of dispatchers, drivers, and riders.

"We maintain continuous communication with CARTA personnel to ensure our solutions are both practical and beneficial for all stakeholders," said Rogers.

The system is continuing to be tested, but Philip Pugliese, CARTA's general manager of planning and grants, said its results are promising.

"The project has identified some key opportunities to improve service," said Pugliese. "We look forward to continued development and implementation."

More information: Deploying Mobility-On-Demand for All by Optimizing Paratransit Services, scopelab.ai/files/paviaIJCAI24AISG.pdf

Provided by Vanderbilt University

Citation: Test project uses AI system to improve transit accessibility in Chattanooga (2024, June 21) retrieved 26 June 2024 from <https://techxplore.com/news/2024-06-ai-transit-accessibility-chattanooga.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.