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EDITOR'S PICK

## Kennesaw State professor looks to optimize drone routes

Megan Reed 11 hrs ago



**KENNESAW** — A Kennesaw State University professor is developing algorithms that could help drones in their efforts for both search and rescue missions and package delivery.

Donghyun (David) Kim, an assistant professor of computer science, said his algorithm can quickly solve coordination problems between multiple drones to determine the best route for a drone to take.

"You want to make sure (the drones) have no overlapping assignment, so coordination is very important," Kim said.

Optimizing efficiency of the drone routes is not easy — it's an "NP-hard problem," which means it would be unlikely to find the perfect solution in a reasonable amount of time, even with state-of-the-art equipment. Kim said in situations such as search-and-rescue operations, no one has time to wait for the best solution.

"In computer science, when you have a problem of a large scale ... and a lot of drones to fly around, finding the best solution is not possible. It would take forever," he said.

Kim's research, which he began in 2011, tries to find the most accurate solution in the shortest amount of time. He hopes the algorithm can serve as a guideline for companies to make their drone flights more efficient.

With companies like Amazon and UPS eyeing drone delivery as a future possibility, he is working on another algorithm that could solve some of their problems. Kim said with drone delivery, there are many factors to consider, such as how many packages need to be delivered, where they need to go and how the drone can get back to a truck after delivery is complete.

Kim's research aims to help companies find the best way to deliver a set of packages as delivery trucks and drones move simultaneously, while considering the drone's battery life. To make the deliveries more efficient, the routes of the drones should not overlap, which will save companies time and money.

Kim said years ago, his work was questioned as drones were not forecast to be as common as they are today. Now, there's a need for more drone engineers because "technology is moving," he said.

He cited Amazon as an example. The company has filed a patent for beehive-like towers that would serve as drone centers, according to media reports. Kim said he even sees people having special mailboxes for drone deliveries in the future.

"I always tell my students you're better to look at where the technology is going and go ahead," Kim said.

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Megan Reed