By Ioana Patringenaru   Nov 14, 2019

Graduate student David Paz and Scott Driscoll, logistics supervisor of student mail and safety driver, on a mail run at Sixth College.
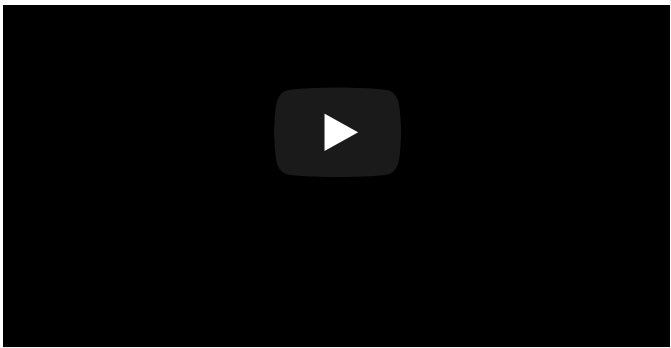
Self-Driving Mail Delivery Begins on Campus

Harry Potter had his magical owl, Hedwig, to bring him mail. UC San Diego has driverless cars.

If you've seen carts that look like they're driving themselves on the road around Warren and Sixth College this quarter, you have not been imagining things. Two self-driving vehicles have been delivering mail to the two colleges since September.

The project is a collaboration between the Contextual Robotics Institute and Integrated Procure-to-Pay Solutions here at the University

of California San Diego. It's all part of a broader effort to use the campus as a living laboratory for new technologies.
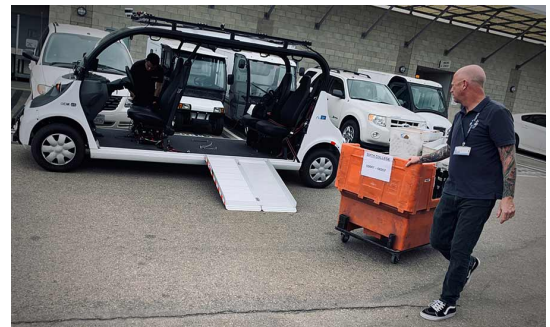
"We're trying to understand how we can use vehicles to do "last mile" logistics: that is, when autonomous vehicles get off the freeway and onto crowded streets that they have to share with other vehicles and pedestrians," said Henrik Christensen, director of the Contextual Robotics Institute at UC San Diego and the lead researcher on the project. The campus is like a small city, Christensen added, with about 65,000 students, faculty and staff coming together every day with vehicles, bikes and pedestrians sharing the same space.

The carts are equipped with some off-the-shelf technology, such as cameras and various sensors. But the algorithms that enable the vehicles to actually share the road with cars and people were developed by UC San Diego researchers.

"When we get up to an intersection, it will read what other vehicles are at this intersection, whose turn it is and it will use this to drive," Christensen said. "It drives just like a regular driver through traffic, except it's all done by a computer."

Christensen and his team chose mail delivery as the first phase of the project because it's exactly the kind of repetitive task that robots excel at. Eventually, the self-driving carts will make 13 different stops at drop points on campus, where employees come to pick up mail and distribute it to specific departments.

Logistics supervisor Driscoll loads the mail delivery cart while Paz checks the on board computer.

Long-term plans include operating self-driving carts to ferry people from the new trolley stations that will open on campus in 2021 to medical facilities on the east side of the UC San Diego campus. Christensen also envisions early testing taking visitors from the Birch Aquarium parking lot to the aquarium's entrance.

Scott Driscoll, logistics supervisor of student mail, has been acting as a safety driver for mail delivery vehicles.

"It is a little like being on an amusement park ride, where you're learning to trust," he said. "There is no track, except for the computer and the programming."

As safety driver, Driscoll sits behind the wheel but only intervenes when the vehicle encounters an unexpected situation—for example a construction truck partially obstructing the road. The cart is programmed to stop when confronted with unexpected obstacles so that Driscoll can intervene with the self-driving program to put the vehicle back on the right track.

Computer science graduate student David Paz checks code during a mail delivery run.

While Driscoll keeps an eye on the road, computer science graduate student David Paz keeps an eye on the algorithms running the self-driving cart. He makes sure there aren't any bugs and collects data from all the rides.

Paz has been the lead on implementation of the algorithms on the cart. "It is surprising how quickly campus changes with all the construction going on, but the vehicle has been adapting robustly to all the changes," he said.

Paz takes the self-driving cart from the Pangea parking structure to the UC San Diego Mail Center every weekday morning. He and Driscoll then load it up with the day's letters and packages. They let the computer take over for them as they deliver the mail to Warren and Sixth Colleges. Finally, they come back to the mail center and then Paz takes the vehicle back to Pangea. The route takes about an hour.

In the past month, Christensen's team has learned a fair bit, including some surprising findings.

"One of the things we've learned is that in most traffic situations people don't necessarily follow the law to the letter," Christensen said. "At stops, we actually stop for three seconds as the law requires. And people sometimes get really frustrated."

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