Industrial Engineering Department
Friday Seminar Series

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L2D2

Drones in logistics: Optimal routing and scheduling of flying robots for small parcel delivery

Unmanned aerial vehicles (UAVs) were once exclusively available for military purposes, where their capabilities have evolved from providing over-the-hill surveillance to launching laser-guided weapons from a remote trailer on the other side of the globe. Today, you can purchase a smartphone-controlled "drone" from your local mall. As technological advances have made these flying robots more capable and less expensive, the commercial sector is exploring ways to leverage the unique capabilities afforded by (semi-) autonomous aircraft. One such application is the use of UAVs for small parcel delivery, as popularized by Amazon's Prime Air drones. This talk will briefly explore the state-of-the-art in UAV technologies, but will primarily focus on the operational challenges and opportunities associated with incorporating UAVs into logistics systems. Motivated by Amazon's proposed delivery-by-drone, the "flying sidekick traveling salesman problem" is introduced, which seeks to coordinate a traditional delivery truck with a UAV for last-mile parcel delivery. The talk will conclude with an overview of ongoing projects in the Optimator Lab at the University at Buffalo, where UAV routing and scheduling algorithms are being tested in high-fidelity simulators.

Biography: Chase Murray is an assistant professor of Industrial & Systems Engineering at the University at Buffalo, the State University of New York. He is fascinated by vehicles that operate autonomously. Murray's research involves the application of operations research techniques to solve problems encountered by industry and the military. In particular, he is interested in leveraging the capabilities of autonomous vehicles for logistics and surveillance, including routing and scheduling of UAVs and coordinating truck platoons. His research has been supported by the National Science Foundation, Office of Naval Research, DARPA, Air Force Research Labs, and the Federal Highway Administration. Murray received B.S. and M.E. degrees in Industrial Engineering from Texas A&M University. This was followed by a five-year stint in the semiconductor industry, where he worked for Intel and Dallas Semiconductor. His Ph.D. is in Industrial & Systems Engineering from the University at Buffalo. Prior to returning to Buffalo, Murray was an assistant professor at Auburn University. He occasionally maintains his Web presence at http://chasemurray.com.