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MSc. Project Proposal
Title: On-demand ride-sharing for smart public transportation

Brief description: Intelligent Transportation Systems are foreseen to be able to provide efficient transportation on-demand to anybody, anywhere, anytime. In particular, automated taxi ride-sharing can be achieved by: (a) computing shortest paths given the streets graph of the city, (b) computing possible trips that can be shared between riders and vehicles and (c) optimally assigning trips to vehicles via an Integer Linear Program. We have applied this algorithm to analyze the ride sharing opportunities in New York City.
Your role will be to: (a) find available public data of taxi and bus trips in The Netherlands, (b) develop an algorithm for routing of vehicles and assignment of passengers to vehicles, which accounts for different transportation modes such as taxis and buses, and (c) which accounts for the congestion created in the routing process.

Related video from past work: https://www.youtube.com/watch?v=xHWrRci0H54

Collaboration: This project will be in collaboration with the Transport and Planning Department (Dr. G. Correia).

References:
[1] J. Alonso-Mora, S. Samaranayake, A. Wallar, E. Frazzoli, and D. Rus, "On-demand high-capacity ride-sharing via dynamic trip-vehicle assignment," *Proc Natl Acad Sci USA*, vol. 114, no. 3, pp. 462–467, Jan. 2017.
[2] Martinez, L.M., Correia, G.H.A., Viegas, J.M., 2014. An agent-based simulation model to assess the impacts of introducing a shared-taxi system: an application to Lisbon (Portugal). Journal of Advanced Transportation 49, 475–495. doi:10.1002/atr.1283

Desired qualities:
- Motivated and independent
- Good problem solving skills
- Experience in constrained optimization and/or operations research
- Experience in C++ programming

To apply please send me an email with:
- Why are you interested in this project? What would you like to achieve?
- What is your experience relevant to this project? This could be past projects, past courses; theoretical knowledge or practical experience, related to constrained optimization, planning and/or robotics.
- When would you like to start and which courses will you have left by then?
- Is your motivation to do algorithmic work or applied research?
- Your transcript of record with past courses.
- Available day/times to meet within one/two weeks.

You may also propose your own project.