Real time dispatch optimization for urban food delivery riders

Problem description

The aim of this thesis is to optimize bike-lane network operations with a focus on profitability, safety, and service quality. The proposed model identifies safe and profitable routes for each origin-destination pair, integrating rider and customer preferences to determine optimal paths that strike a balance between safety, efficiency, and service levels. Additionally, a dynamic dispatching solution will be designed to efficiently allocate resources in real time. This approach will be applied to the instant food delivery service of Just Eat Takeaway in Amsterdam, aiming to enhance both operational efficiency and customer satisfaction. Ultimately, the thesis outputs will enable delivery providers to offer cost-efficient services while considering the wellbeing of riders.

Assignment

The project will involve the following steps:
- Develop a dynamic dispatching model for bike-lane-based deliveries, integrating real-time data and behavioral factors
- Introduce a real-time dispatching algorithm to optimize rider allocation within the instant food delivery system
- Apply the proposed approach to a real-world case study to evaluate cost-efficiency and enhance the wellbeing of riders

Candidate

- Should have: coding skills in Python, knowledge of optimization and heuristics methods.
- Good to have: behavioural modelling, reinforcement learning.

Research group

Sustainable Urban Multimodal mobility (**SUM**)
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This project can be conducted at TU Delft.