Optimization of integrated passenger-freight transport for an modular autonomous vehicle systems

Problem description

The purpose of this thesis is to leverage the capacity-adjustment capabilities of modular autonomous buses, allowing for flexible capacity reallocation during transit. By utilizing this flexibility, the aim is to efficiently serve passengers while also using any available capacity for cargo transport, maximizing resource utilization. This study uses advanced modular buses developed by Next company for concept validation, exploring how this emerging technology can enhance the efficiency of current public transportation systems.

Assignment

The project will involve the following steps:

- Build an optimization model to represent the integrated passenger and cargo transport system using modular autonomous vehicles
- Develop either an exact or heuristic algorithm to solve the optimization problem, determining the optimal utilization of modular bus capacity for both passenger and freight services
- Apply the model and solution algorithm to a real-world scenario using data from Next company's modular vehicles to validate the concept and demonstrate potential efficiency improvements

Candidate

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

Research group

Sustainable Urban Multimodal mobility (**SUM**)

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This project can be conducted at TU Delft.