

Modular bus scheduling with short-turning options



This metaInnovation introduces a modular bus system approach, addressing the modular bus scheduling problem by considering a fleet of autonomous modular units capable of skipping stops with low passenger demand to improve efficiency.



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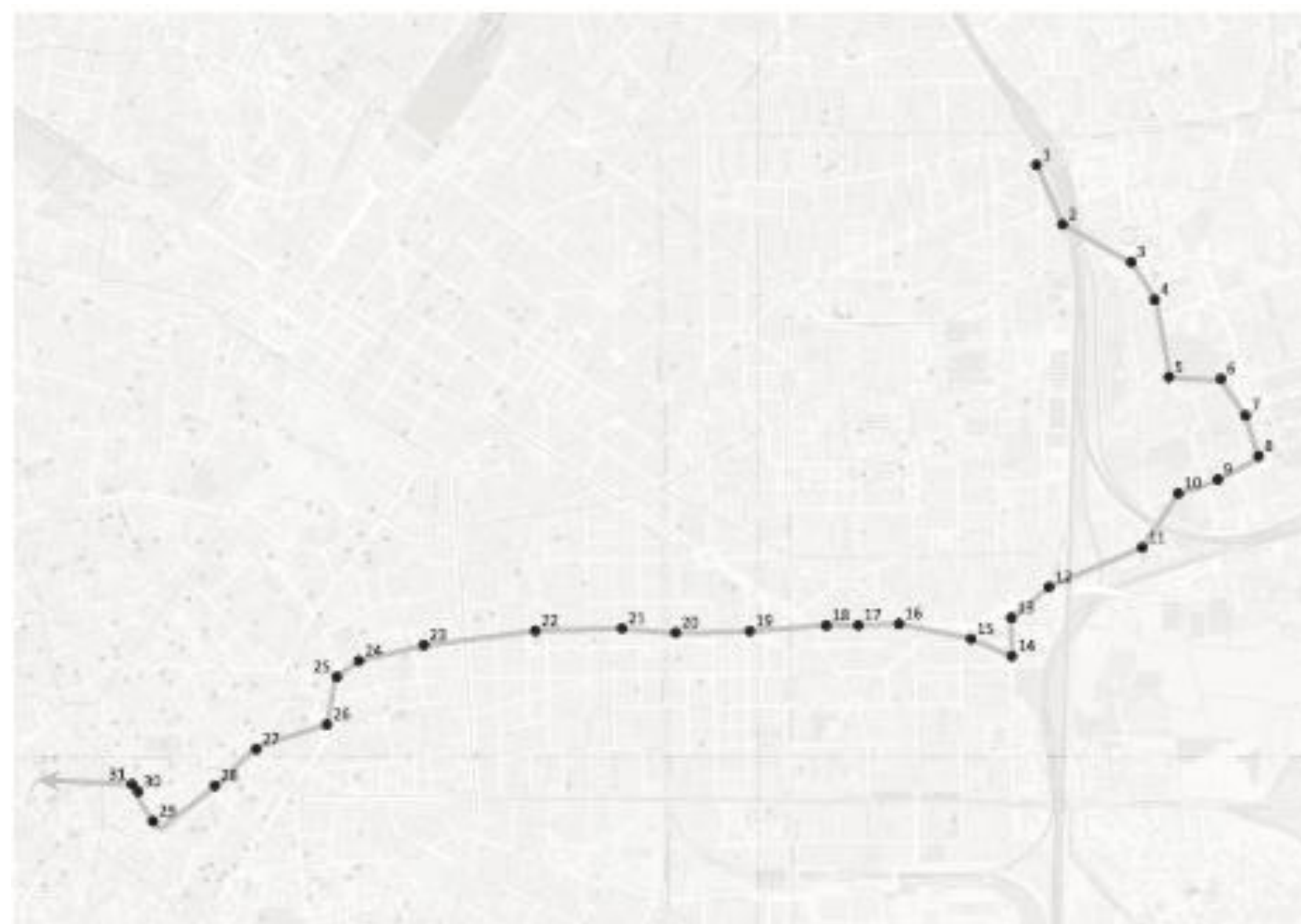


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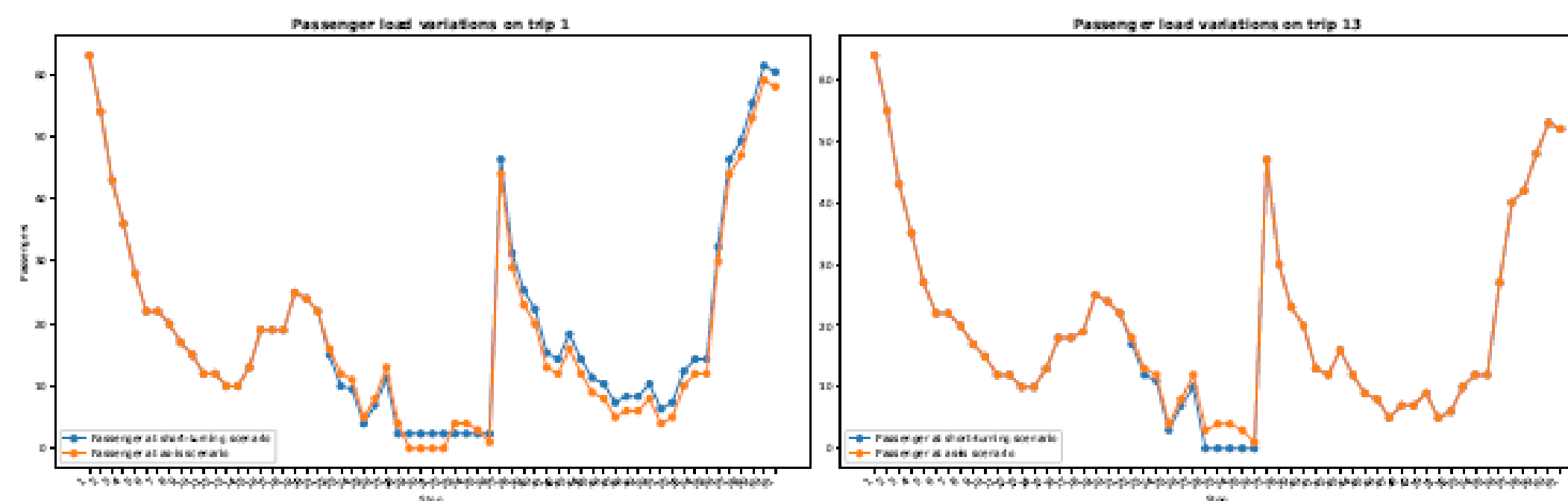
Data Requirements

- Modular bus operations and routes.
- Passenger's demand.
- Conventional bus trip schedule and routes.
- A comparative analysis of supply costs between modular and conventional bus scheduling approaches.



Decisions

- Every trip must decide on one of the 4 short-turning policies. Including not following this policy.
- Every trip must decide how many units will be used, considering the capacity issues.



Methods

- The tool uses a mixed-integer non-linear algorithm to minimize running costs while balancing reduced operational expenses against unserved demand.



Scalability

- Applicable to mid-sized urban transit networks.
- Has been tested for up to 20 bus trips and can support a larger network.
- Adaptable to different autonomous vehicle schemes.