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Development of an Algorithm for Ridesharing in an Autonomous Mobility-on-Demand System

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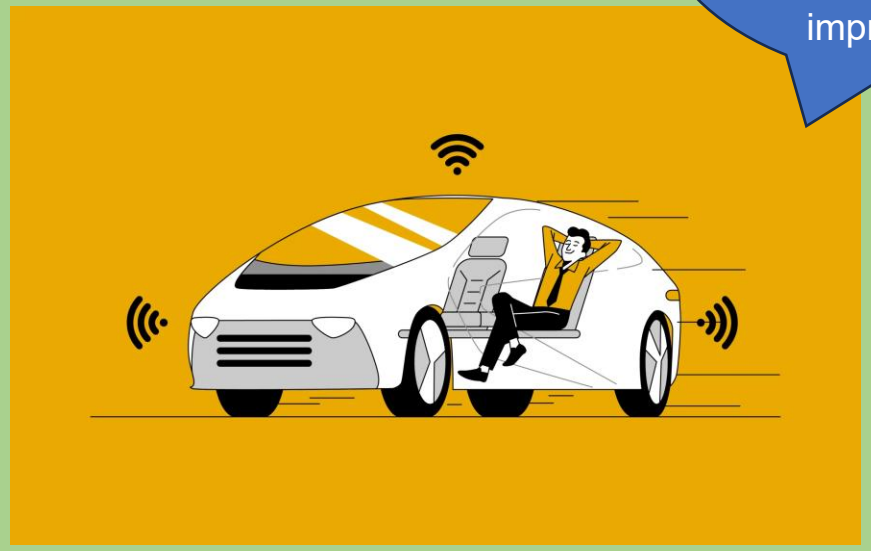
AVs demonstrate significant potential for crash prevention, travel time reduction, and fuel efficiency improvement!



Ridesharing using AVs can maximize this potential!

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System under study

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Selected geographical boundaries

Mobility-on-Demand (MoD) service using Autonomous pods

MoD- Booking a service of choice as and when the demand arises

Ridesharing is an arrangement in which people with similar itineraries and time schedules utilize spare seats in a vehicle and share the travel cost (Furuhata et al., 2013)

Static
Pre-arranged trips

Dynamic
Real-time matching of riders with vehicles already in the network (Shen, Huang & Zhao, 2016)

1. Furuhata, M., Dessouky, M., Ordóñez, F., Brunet, M.-E., Wang, X., & Koenig, S. (2013). Ridesharing: The state-of-the-art and future directions. *Transportation Research Part B: Methodological*, *57*, 28–46. https://doi.org/10.1016/j.trb.2013.08.012
2. Shen, B., Huang, Y., & Zhao, Y. (2016). Dynamic Ridesharing. *Association for Computing Machinery- SIGSPATIAL Special*, *7*(3), 3–10.

Algorithm for Ridesharing

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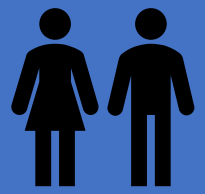
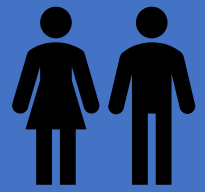
Framework- The mechanism by which changes get updated in the system
E.g., When a new request arises in the system



Request generation

D1

Searching and Matching…..



D2

P2

Execution of trips

P1

Applications of the work

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Accurate determination of the required fleet and vehicle (number of seats) sizes

Optimizes fleet operations when employed in combination with other fleet management algorithms such as vehicle rebalancing

The algorithm simplifies-

a) Inclusion of new constraints
b) Adjusting parameters when the scale of the system changes
c) Modifying the role the mode plays within the entire transport system in that geographical boundary, For e.g., A complementary role to the major transport corridors

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