A smart app to find personalised routes with charging stops

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Electric Vehicles and Challenges

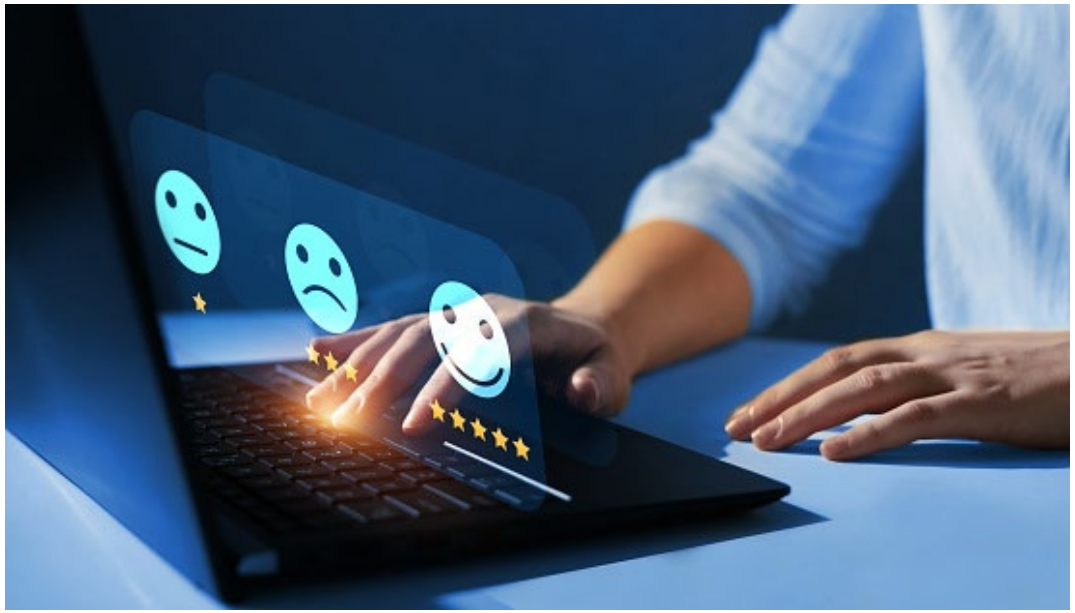
Electric Vehicles

Transport is the largest source of emissions in the UK

Electric vehicles promise to solve this.

Study on EV Charging

- Study EV drivers' preferences for choosing charging stations and the main challenges they face.
- Understand the EV drivers’ challenges on charging their vehicle on long trip



How we did our Study on EV Charging

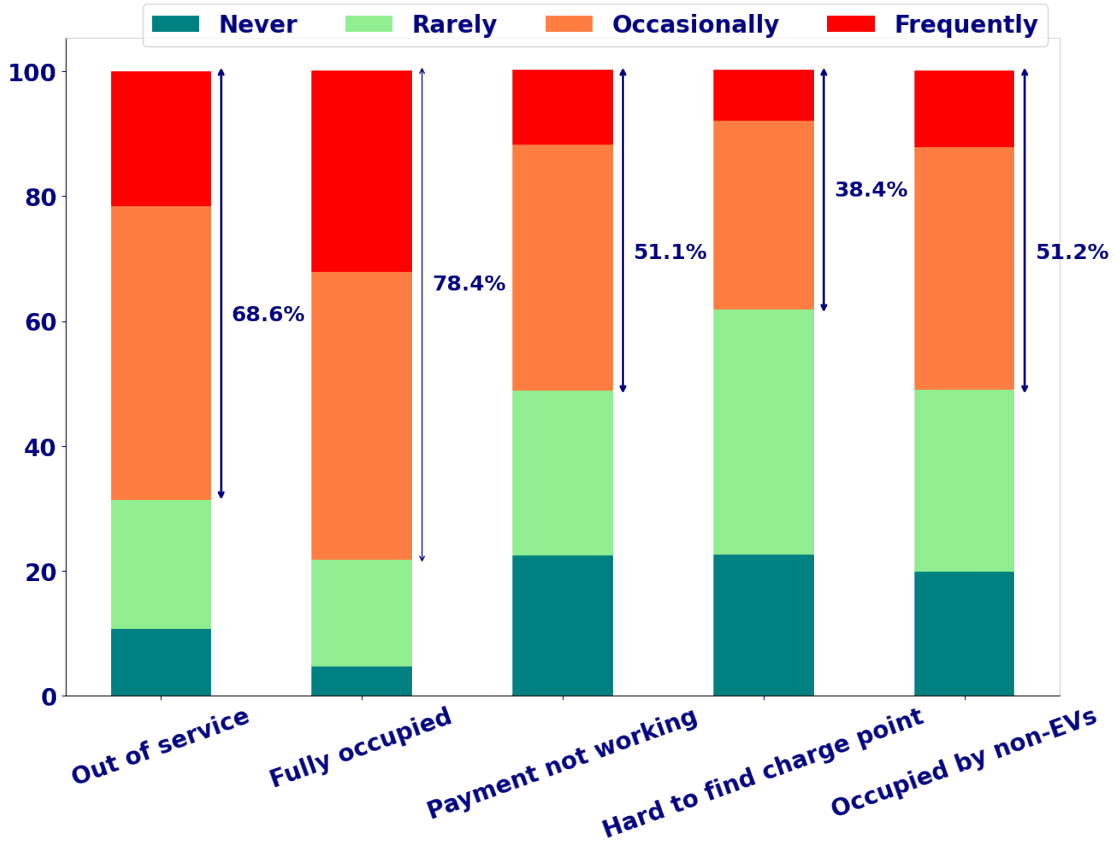
Conducted a large-scale survey of 1278 EV drivers with experience of charging on long journeys.

- Online Surveys:
  - shared on LinkedIn, Twitter, Facebook Ads, University News 1,072 responses gathered
- In-person Surveys:
  - Interviewed 206 EV drivers at Cobham, Fleet, Winchester charging stations and Fully Charged, LIVE event in Farnborough

Lack of Infrastructure

How frequently are your chosen stations affected by the following issues?

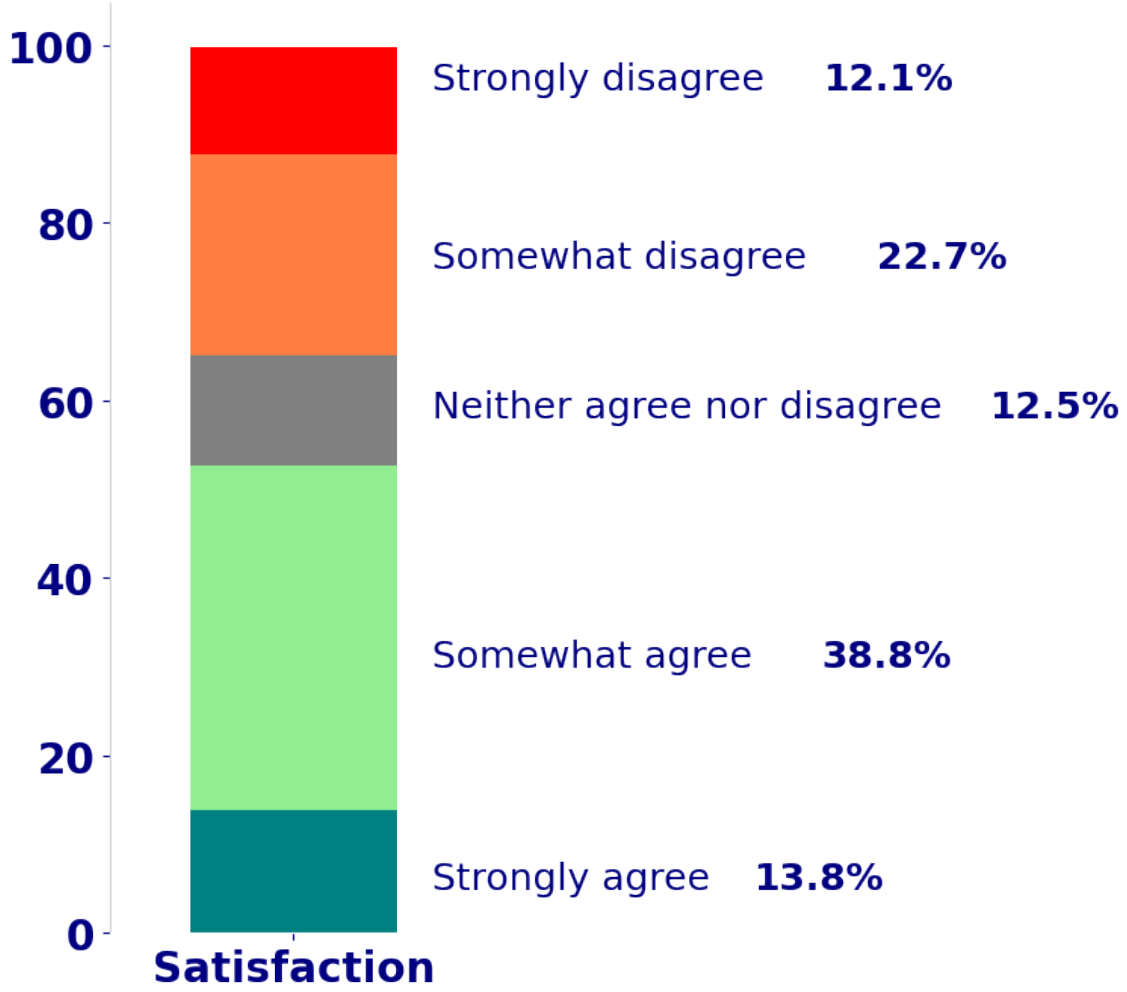
- Station is out of service
- Station is already fully occupied
- Payment method is not working
- Difficulties in finding the charge point
- Parking space is occupied by non-EVs



Overall Satisfaction of EV drivers

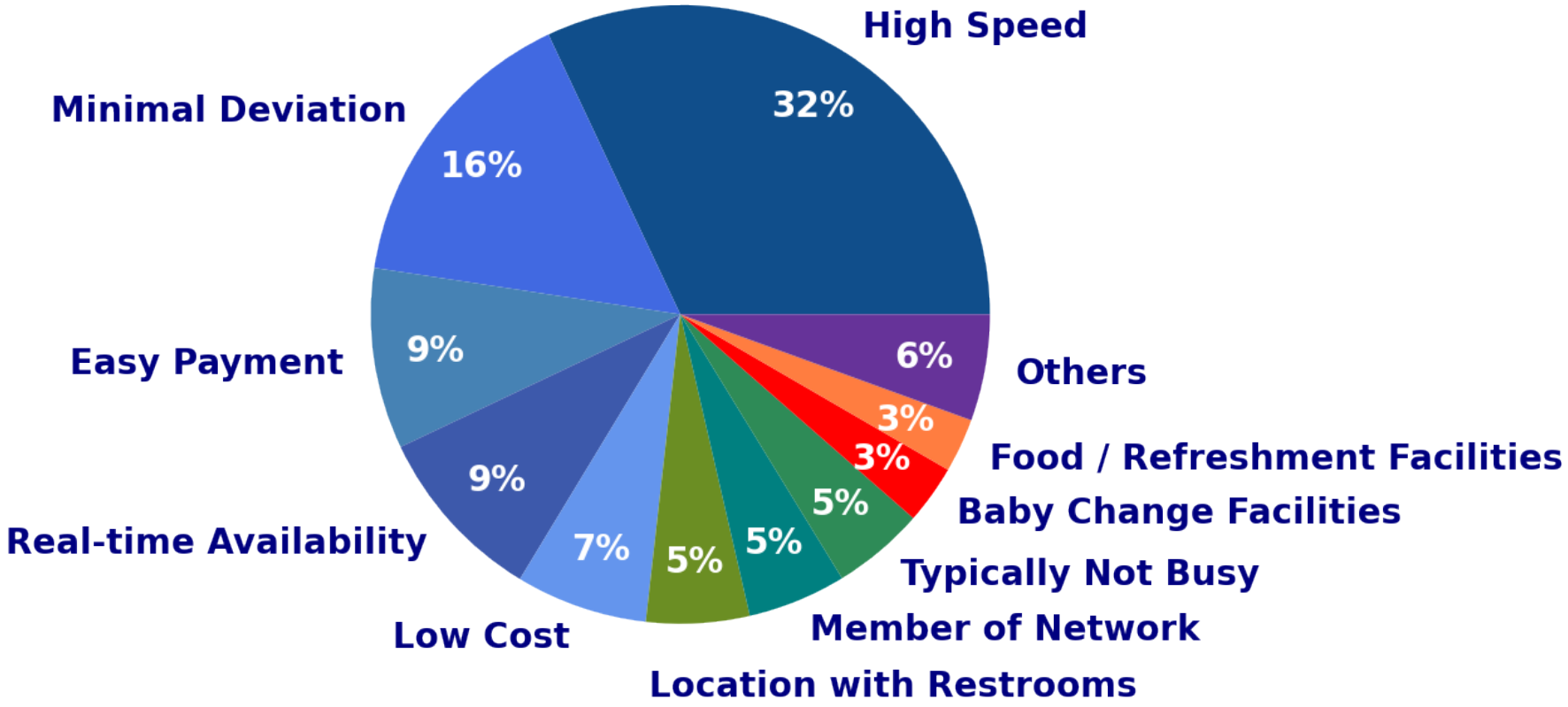
To what extent do you agree with the following statement?

"In general, I am satisfied with my experience of using public charging stations on long journeys."



Diversity of Preferences

Drivers vary significantly in how they choose charging stations, showing a diversity in needs and individual preferences.

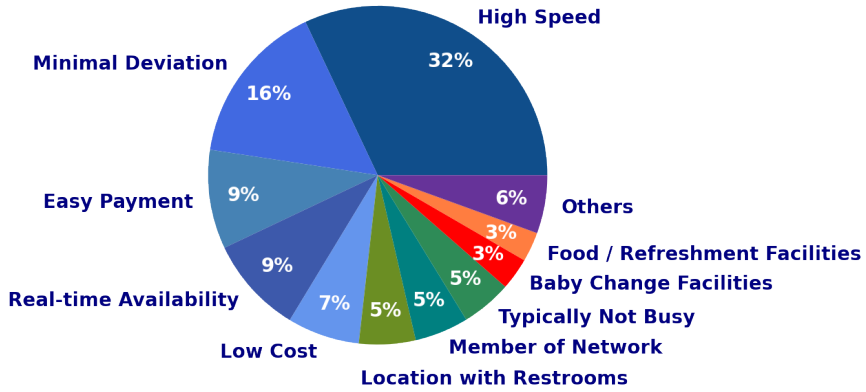


EV Charging is Frustrating

Range anxiety

Queues are common

Various stations



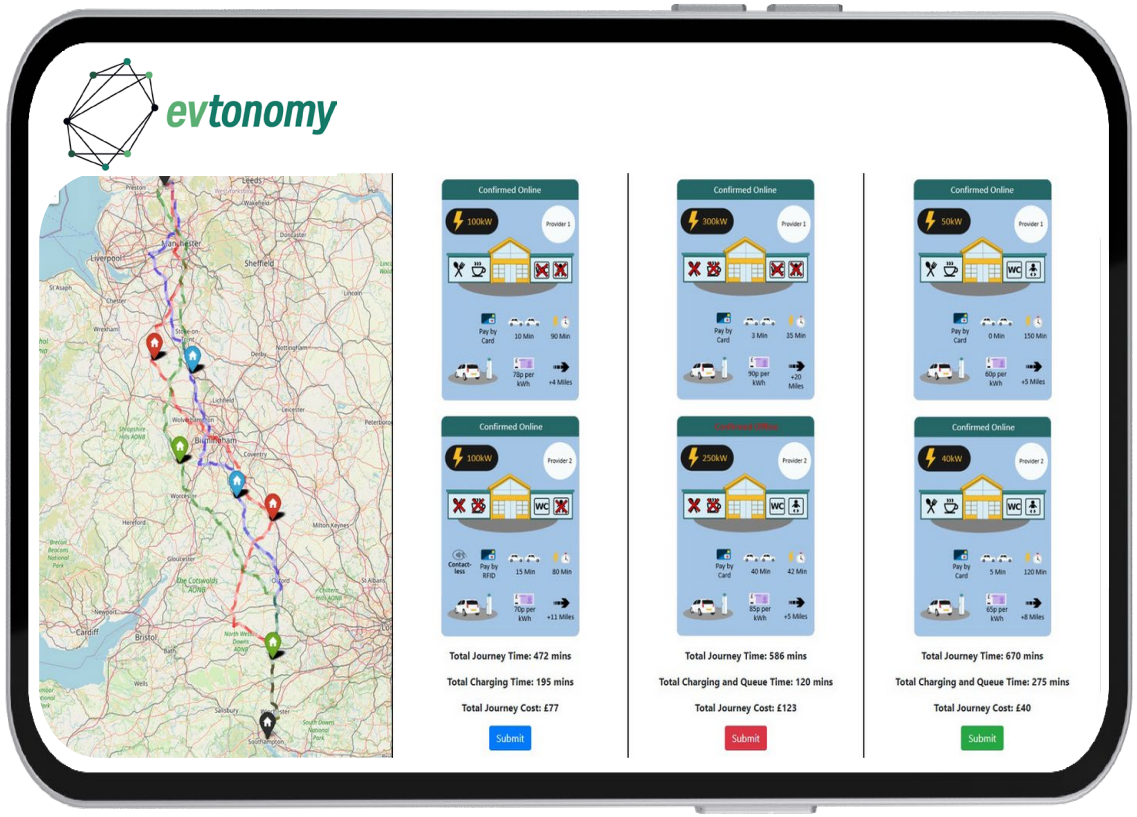
EVtonomy

An AI-powered platform that makes electric vehicle charging **painless**.

Electric Vehicles: Why AI is necessary

- **Charging Station Optimisation:** AI can optimise charging station locations based on historical usage data, traffic patterns, and EV distribution. It can also predict peak charging times to help drivers avoid long waits at busy stations.
- **Route Planning:** AI-powered navigation systems can suggest the most efficient routes for EVs, taking into account factors like traffic, elevation changes, and the locations of charging stations along the way.
- **Personalized Recommendations:** AI can provide personalized recommendations to EV drivers based on their driving behaviour and preferences, such as suggesting eco-friendly driving tips or recommending EV models that best suit their needs.

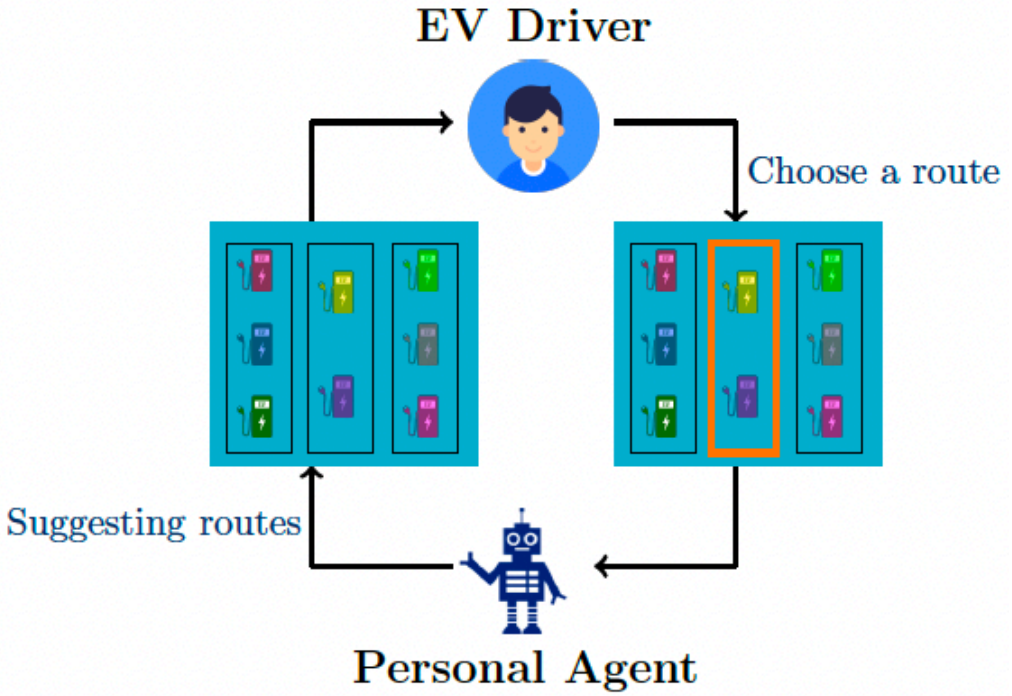
EVtonomy



- Uses AI to rapidly **learn individual preferences** and offer personalised stops (eg. save money or save time)
- Reduces the risk of facing unavailable stops by proactively **planning backup stops.**

Personalised EV Routing Using Interactive Learning

- EV driver have some preferences for choosing charging stops
- Preferences can be how to trade off cost, travel time, charging time and facilities at stations
- These preferences are initially unknown
- Intelligent agent interacts with the driver
- Suggesting potential routes



Estimating waiting time and balance it

- Optimising the routing of electric vehicles (EVs) to charging stations via a multi-agent reinforcement learning (MARL)
- Demand balancing system to reduce queuing time.
- This is simulated on SUMO to train and test agents
- Varied learning strategies are also explored to determine the appropriate behaviour patterns between the agents, including competitive and cooperative learning.

Thank You

Get in Touch

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