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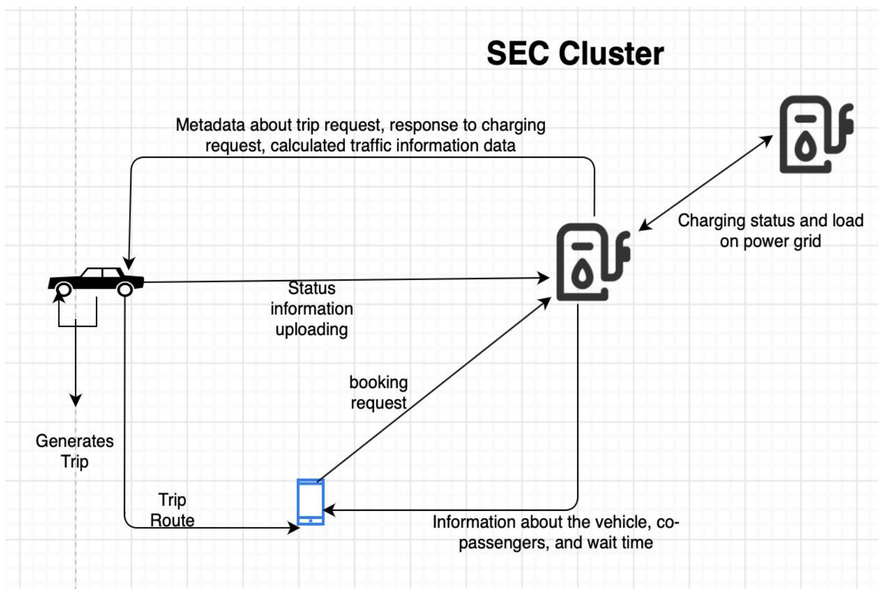
A Decentralised framework for Adaptive Ride-sharing and Management of Electric vehicles (UN SDG No. 9 and 11)

Avinash Nagarajan, Dr. Ignacio Castineiras, Dr. Alan McGibney, Dr. Pio Fentan

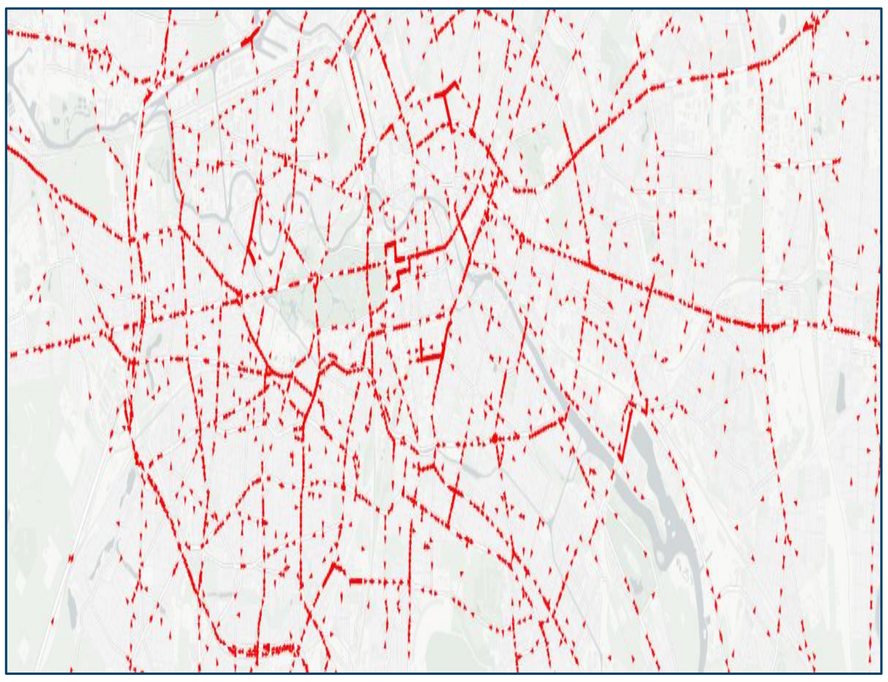
Research Goal



There has been significant progress in the technology to enable mass electric vehicle (EV) roll out as well as progress in the decarbonisation of the energy grid through the use of Renewable Energy Sources (RES). However, the generation and availability of RES is volatile by nature, making it very challenging to service the demand for green transportation systems.

To address this, we propose to design, implement and evaluate new models of adaptive ride-sharing to assess its impact in improving resiliency in green transportation systems. Different algorithms for optimising ride-sharing with sustainability as a key criteria (eco-routing) will be developed, assessed and compared. A decentralised approach for a range of settings in adaptive ride-sharing will be investigated, including the use of blended charging infrastructure (containing both fixed and mobile stations) to support the longevity of the EV trip.

Current Progress - A Heuristic allocation Simulation



To implement such a system, we first need to set on stone a way to simulate and visualise such a system in real-world.

In our most recent work, we implement a heuristic reactive ride-sharing algorithm with the constraints of SEC and simulate it in multiple simulators such as MATsim and SUMO.

We conducted experiments with each type of simulator to analyse their accuracy of a real-world illustration.

Our next step is to conduct experiments simulating reactive ride-sharing algorithms where allocation happens following a decentralised mechanism leveraging edge computing.

MTU Ollscoil Teicneolaíochta na Mumhan Munster Technological University

Host Institution UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Maynooth University National University of Ireland Maynooth

TU DUBLIN Ollscoil Teicneolaíochta Bhaile Átha Cliath Technological University Dublin

Trinity College Dublin Coláiste na Tríonóide, Baile Átha Cliath The University of Dublin