

Route Planning for Electric Vehicles: Taking Energy Efficiency, Distance, and Reloading Opportunities into Account

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Abstract: Electric Vehicles (EVs) exhibit important advantages compared to fuel driven cars: The necessary energy can be produced from regenerative sources like wind, hydropower, or solar energy. In use, there is the possibility to recuperate energy during deceleration phases or when going downhill. Furthermore EVs typically exhibit lower emissions to their immediate environment in terms of combustion gases or noise levels. On the other hand, current EV technology still suffers from inconveniences which prevent an even faster acceptance of E-mobility: Due to weight and space constraints, EVs only have a limited energy reservoir constraining their cruising ranges. Moreover, reloading typically takes quite a long time, and due to the non-ubiquity of loading stations is not always possible. All these aspects have to be considered when computing reasonable routes for EVs. This poses interesting research tasks as computing energy-optimal paths, or finding shortest paths on which the EV does not run out of energy or reloads at most once. The talk will focus on recent trends and improvements in the area of EV-route planning. This includes methods for placing loading stations in road networks such that EVs can drive on conventional shortest path without range anxiety.

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