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Modelling Electric Vehicle Load and Occupancy at Charging Points

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The development of electric vehicles is a major lever towards low-carbon transport. It comes with a growing number of charging infrastructures that can be used as flexible assets for the grid. To enable this smart-charging, an effective daily forecast of charging behaviours is necessary. The purpose of our work is to evaluate the performance of models for predicting load curves and charging point occupancy on 8 open data sets. We study two modelling approaches: direct and bottom-up. The direct approach consists in forecasting the aggregate load curve (resp. the occupancy of the charging points) of an area/station. The bottom-up approach consists in modeling individual charging sessions and then aggregating them. The latter is essential for implementing smart-charging strategies. We show that direct approaches generally perform better than bottom-up approaches. The best model can nevertheless be improved by aggregating the predictions of the direct and bottom-up approaches using an adaptive aggregation strategy.

Keywords

Machine learning, Statistical modelling, Aggregation of experts

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