



A review of methodologies for locating electric vehicle charging stations

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Search query

<p>Search string 1</p> <p>"Electrification of transportation*" OR "Electrified Transportation*" OR bev OR "Battery electric vehicle*" OR "Plug-in electric vehicle*" OR pevs OR "electrified car*" OR "electrified vehicle*" OR "electric* vehicle*" OR evs OR ev OR "electric* car*" OR "Plug-in vehicle*" OR piv OR pivs)</p>	<p>AND</p>	<p>Search string 2</p> <p>("job housing*" OR "jobs housing*" OR "job residence*" OR "jobs residence*" OR "job-housing*" OR "jobs-housing*" OR "job-residence*" OR "jobs-residence*" OR "transportation model*" OR "transportation system*" OR "transportation network*" OR "travel distance*" OR "travel demand*" OR "travel flow*" OR "path inference*" OR "route inference*" OR "commuting distance" OR "commuting route*" OR "commuting path*" OR "travel route*" OR "travel path*" OR "urban travel*" OR "urban trip*" OR "trip length*" OR "origins and destinations" OR "origin-destination" OR "origin destination" OR "origin and destination" OR "trip chain*" OR "traffic pattern*" OR "travel pattern*" OR "traffic flow*" OR "road network*")</p>	<p>AND</p>	<p>Search string 3</p> <p>(spatial* OR locating* OR localization* OR localisation* OR location* OR position* OR place* OR site*)</p>	<p>AND</p>	<p>Search string 4</p> <p>(charging* OR charger*)</p>
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Inclusion criteria	Inclusion criteria
<p>a) The paper is written in English.</p> <p>b) The paper is a primary study.</p> <p>c) The paper is peer-reviewed article published in a journal.</p> <p>d) The paper is published after 2016.</p> <p>e) The paper contains the search query in its title, abstract, and keywords.</p> <p>f) The paper focuses on electric cars for households and individuals.</p>	<p>a) The paper is not available online.</p> <p>b) The paper includes other modes of transportation rather than electric cars for households and individuals.</p> <p>c) The paper includes hybrid vehicles.</p> <p>d) The paper focuses on power system related analysis without modelling travel demand.</p>



Electrification of transportation on roads:

- 1- the operation and expansion of power system to support electricity supply
- 2- estimating electricity demand raised by electrified transportation system

minimising costs and maximising profits in power system

estimating electricity demands and exploring charging patterns to satisfy social welfare





Spatiotemporal distribution of charging demand:



1- flow-based demand

- i) the models that the charging demand is proportional to passing traffic flow
- ii) trip coverage is defined if the traffic flow passes a fixed number of charging stations

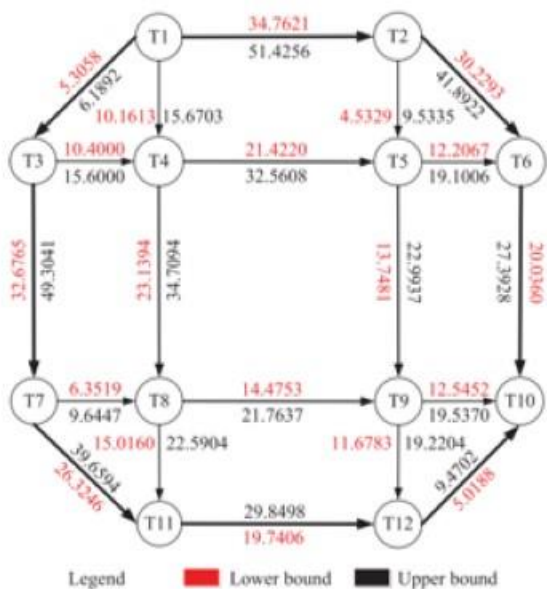


Fig. 5. Distribution of traffic flows and their bounds at the UE.

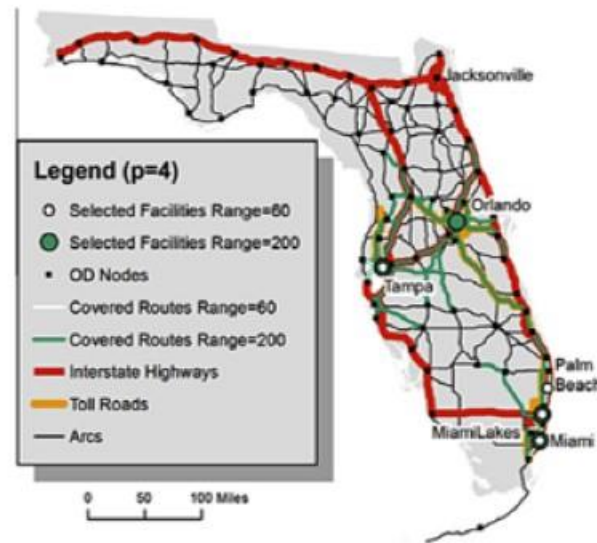


Fig. 4. Locations of AFSs and paths covered with ranges of 60 miles and 200 miles, $p = 4$.

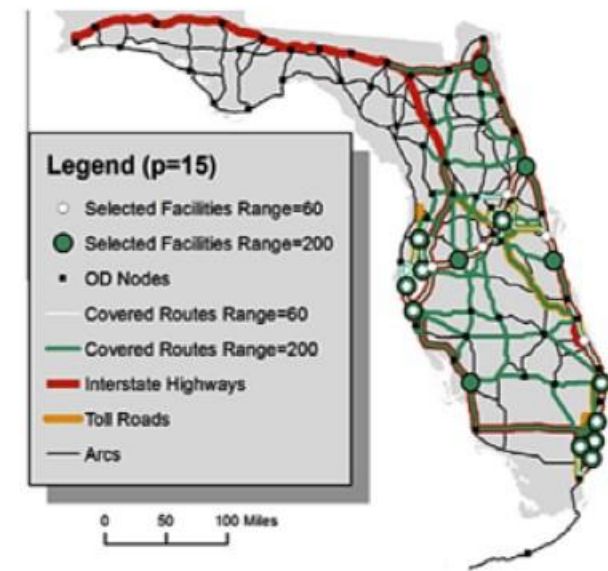
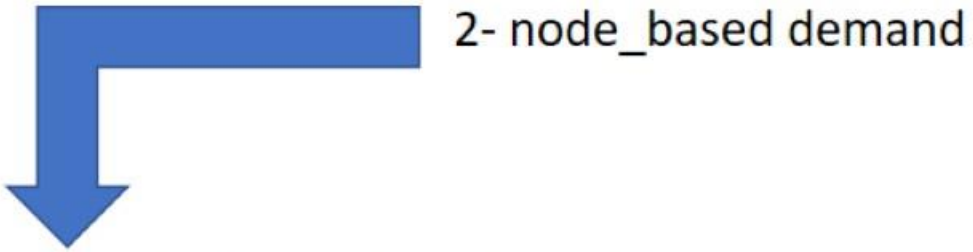


Fig. 5. Locations of AFSs and paths covered with ranges of 60 miles and 200 miles, $p = 15$.



Spatiotemporal distribution of charging demand:



- (i) destination-based allocation
- (ii) battery SoC tracking

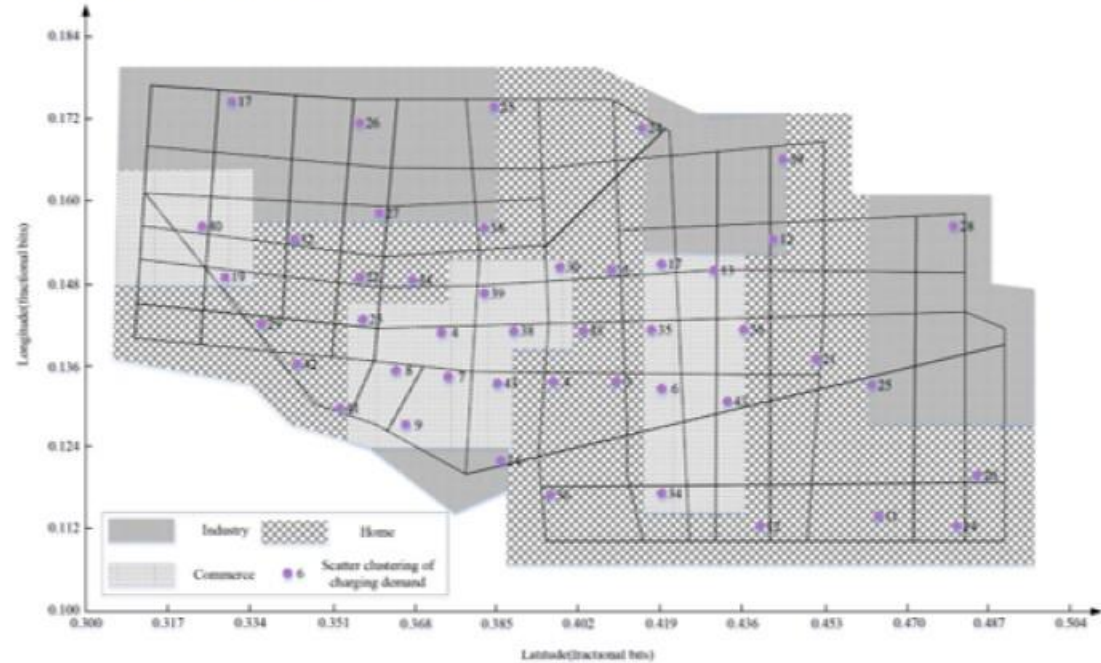


Fig. 9. Scatter Clustering results of charging demand in summer.

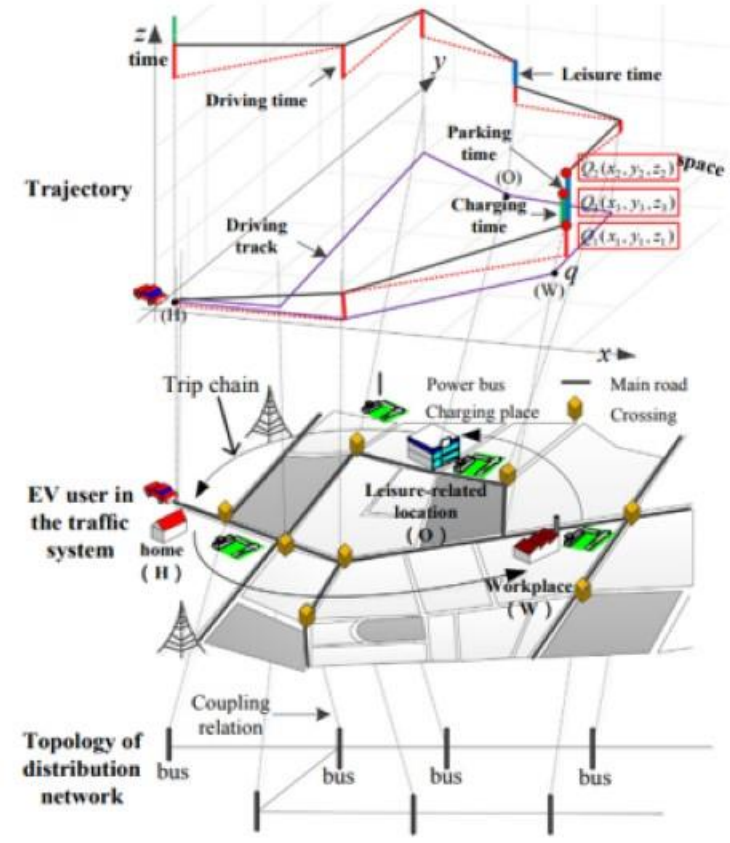


Fig. 1. Vehicle-transportation-grid trajectory.

Electric vehicle charging in smart grid: A spatial-temporal simulation method Xiang Y, Jiang Z, Wang Y Energy (2019) 189



Travel demand modelling:

Macro

Trip-based approach

Trip generation

Regression
Categorical
Neural network

Trip distribution

Growth based
Gravity based
Neural network

Mode split

Traffic assignment

Spatial
Temporal
Behavioural



Traffic zones

Micro

Activity-based approach

Activity patterns (trip chain)

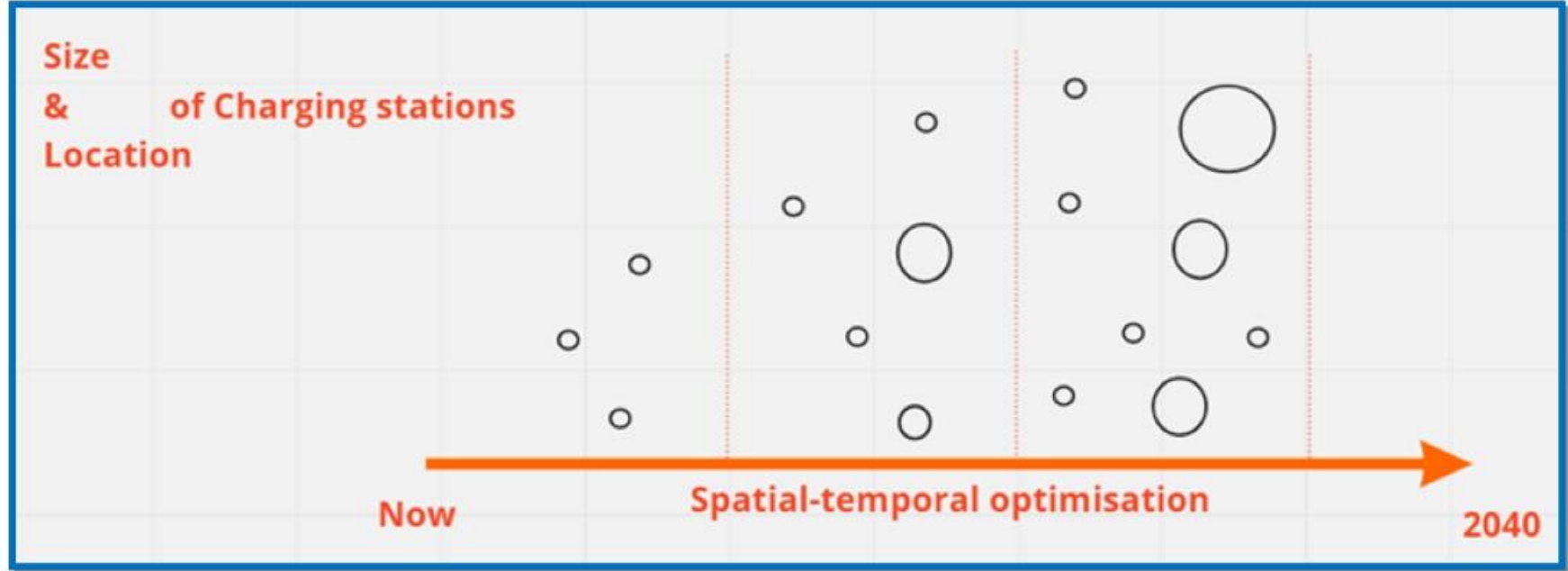
Utility based
Rule based

Activity time

Activity duration



Activity zones



Electricity supply operation

Electricity demand estimation

Travel demand modelling





Thank you