

Detecting and Estimating On-Street Parking Areas from Aerial Images

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Method step 2: estimating a parking area regression model with Bayesian inference



Need for research on parking data

Parking data important for academia and applications:

- Transport modelling
- Urban planning
- Traffic management systems

Uncertainties in existing datasets:

- Incomplete inventory of managed parking spaces
- Parking areas on private property
- Traffic areas regularly used for parking

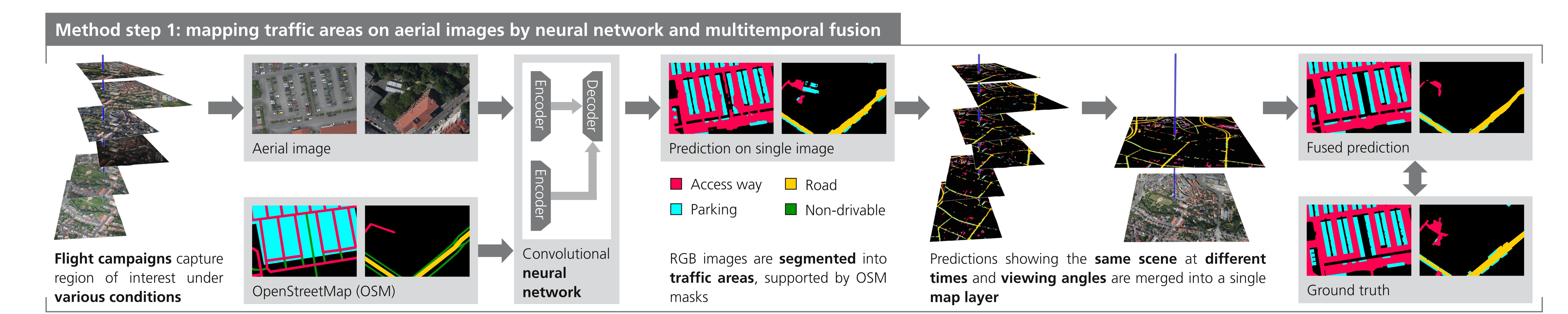
Objectives for a better understanding

- Automate large-scale mapping of parking-related data
- Explore associations between parking and spatial structures
- Estimate regression model for predicting parking spaces

Contributions to research on parking

Bringing remote sensing and statistical methods together adds value to transport research:

- Limitations of ground measurements overcome
- Various types of parking spaces automatically detected
- Citywide dataset of traffic areas generated
- Predictions of parking area at street level based on road features carried out
- Uncertainty is modeled and can be fed into applications



Regression model estimated with Bayesian inference Predicted posterior probability transmits uncertainty between hierarchies into the density follows the shape of the estimated posterior distributions of parameters observed data primary link roa Parking — OSM: tertiary secondary road ☐ Land use, less parking — OSM: service secondary link road Parking area per street meter (m²/m) service road Parking area per street meter (m²/m) Hypothesis: **predictors** for parking area per Given the distribution of observed data, a Predicted Gamma hurdle specification is choosen street meter are OSM road types and the ■ 90 % credible interval share of **land use** where parking is less likely to model zero and positive values separately Observed Parking area per street meter (m²/m)