

SPATIAL ANALYSIS OF AIRBNB DATA IN VIENNA

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MOTIVATION

- ▶ **Airbnb:** Private and commercial real estates for rent
- ▶ How are Airbnb listings distributed in Vienna?
- ▶ Is there a spatial correlation between listings and POIs?
- ▶ Form clusters of listings and categorize containing POIs



DATA

- ▶ **Airbnb listings:** <http://insideairbnb.com/vienna>

Geographical coordinates of every single Airbnb listing in Vienna

- ▶ **POIs:** https://www.data.gv.at/katalog/dataset/stadt-wien_toplocationsinwien

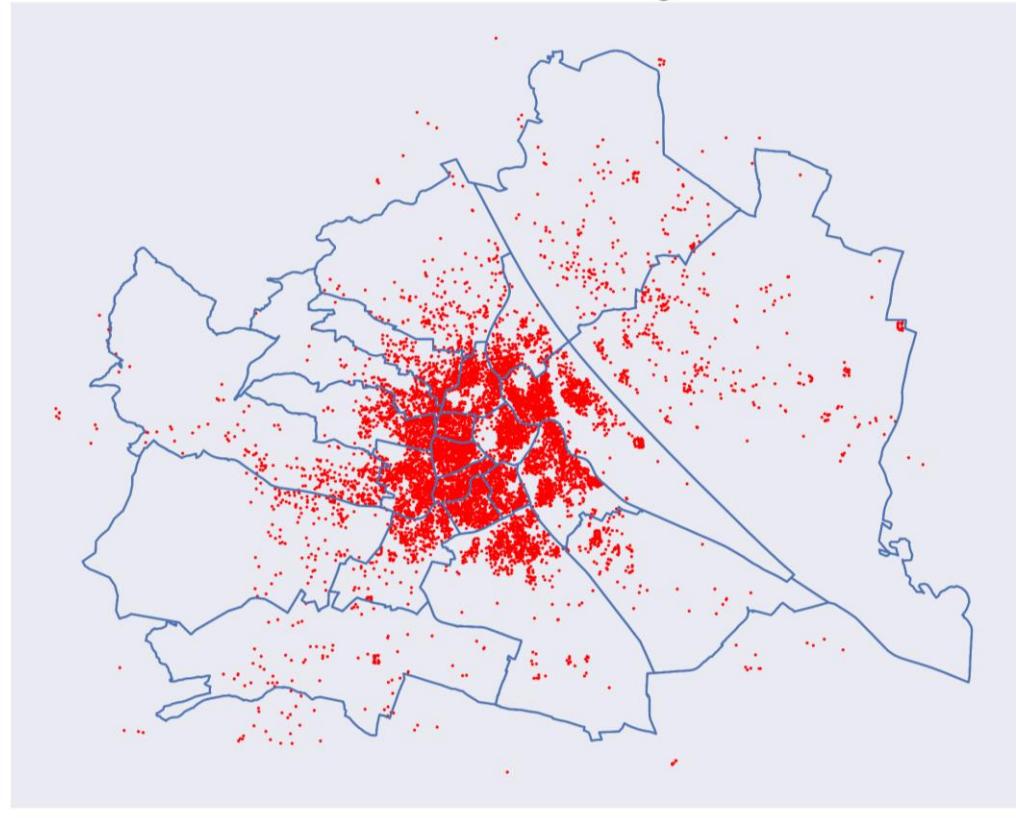
Geographical coordinates and category of POIs defined by the city of Vienna

- ▶ **District borders:** https://www.data.gv.at/katalog/dataset/stadt-wien_bezirksgrenzenwien

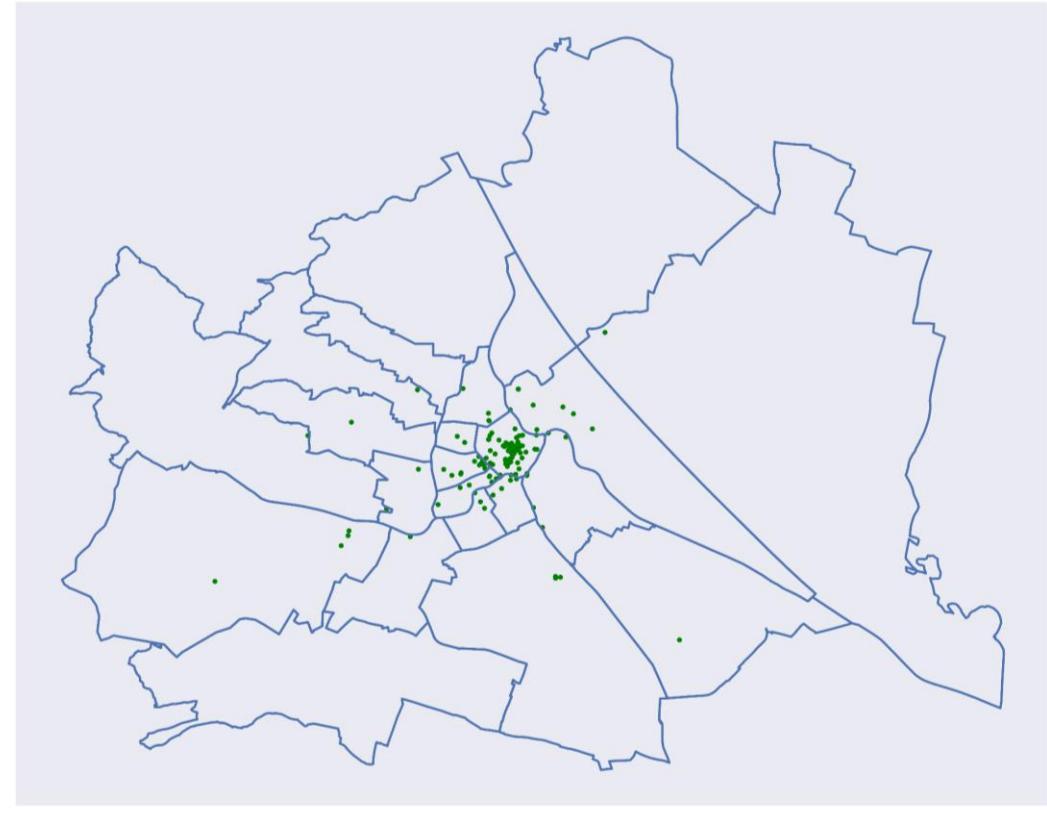
Polygons of every viennese district

DATA

Overview on all AirBNB Listings in Vienna



Overview on all POIs in Vienna

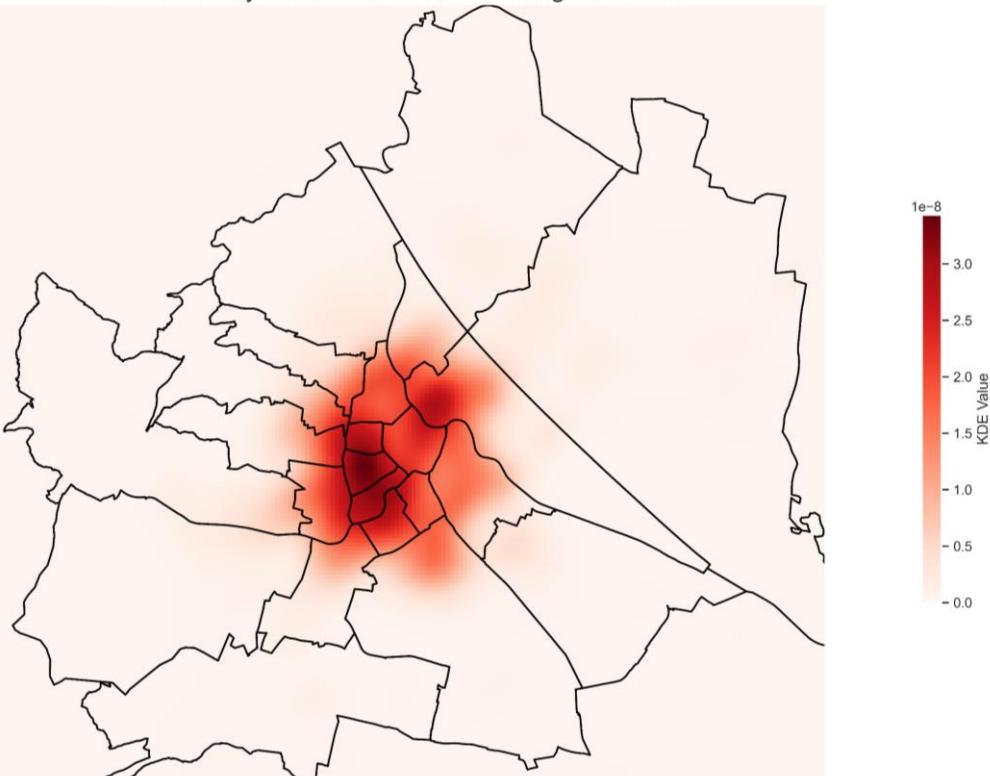


METHODS

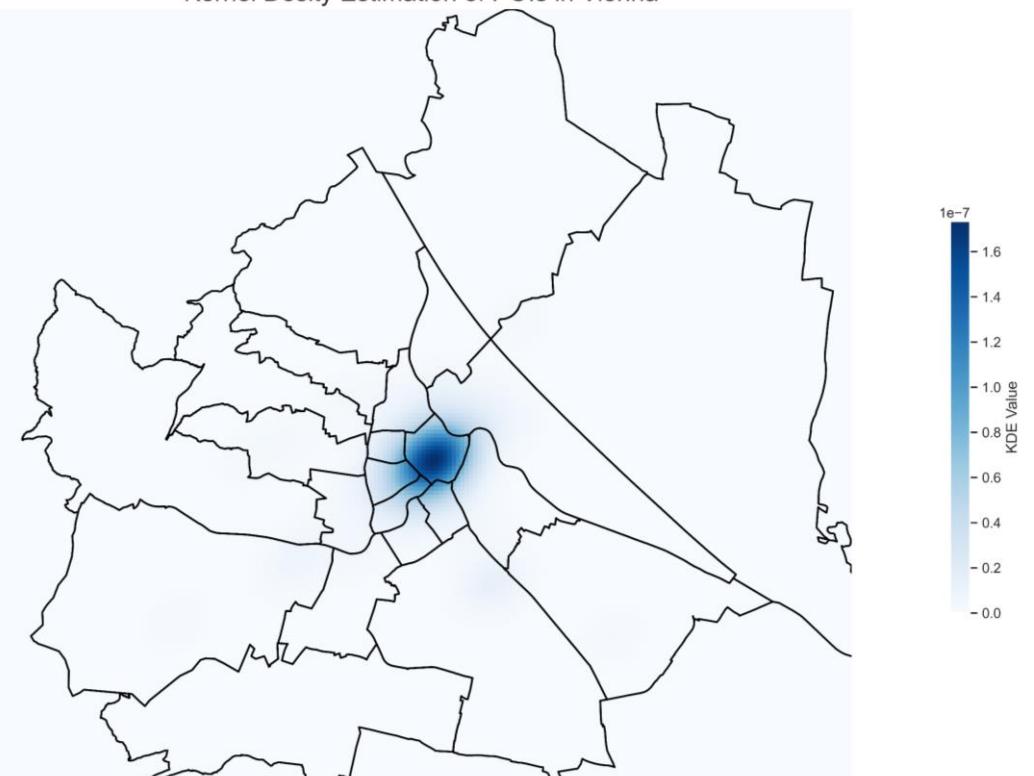
- ▶ Kernel density estimate (KDE) of Airbnb listings and POIs (cell size: 144 m x 120 m)
- ▶ Scatter Plot: KDE Airbnb vs KDE POIs
- ▶ Clustering with DBSCAN ($\varepsilon=200$ m, MinPts=45)
- ▶ Applying crisp boundaries with convex hulls to 5 biggest clusters
- ▶ Spatial join of hulls and containing POIs
 - Analyzing types of POIs in each hull

KERNEL DENISTY ESTIMATE (KDE)

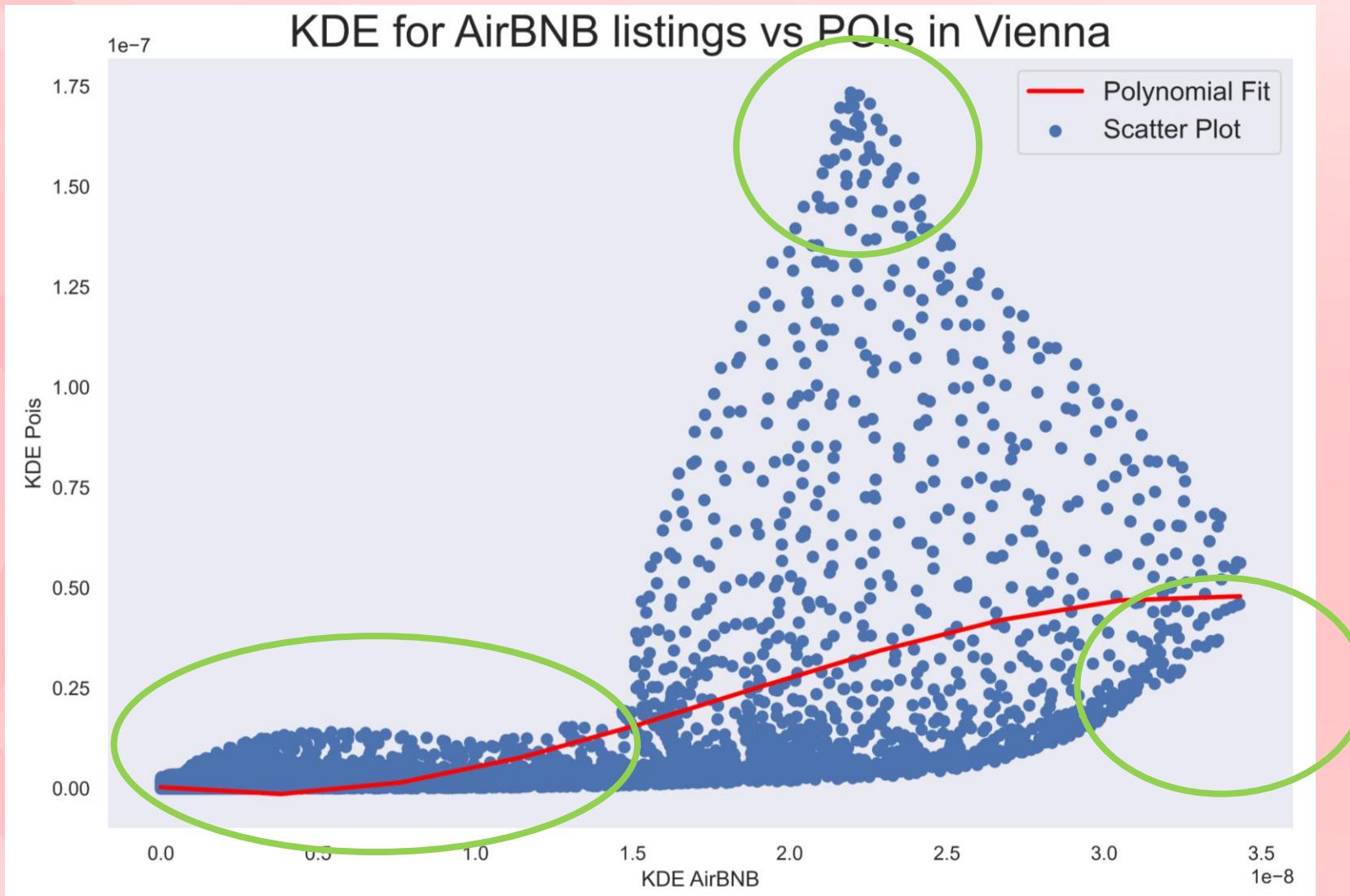
Kernel Desity Estimation of AirBNB listings in Vienna



Kernel Desity Estimation of POIs in Vienna

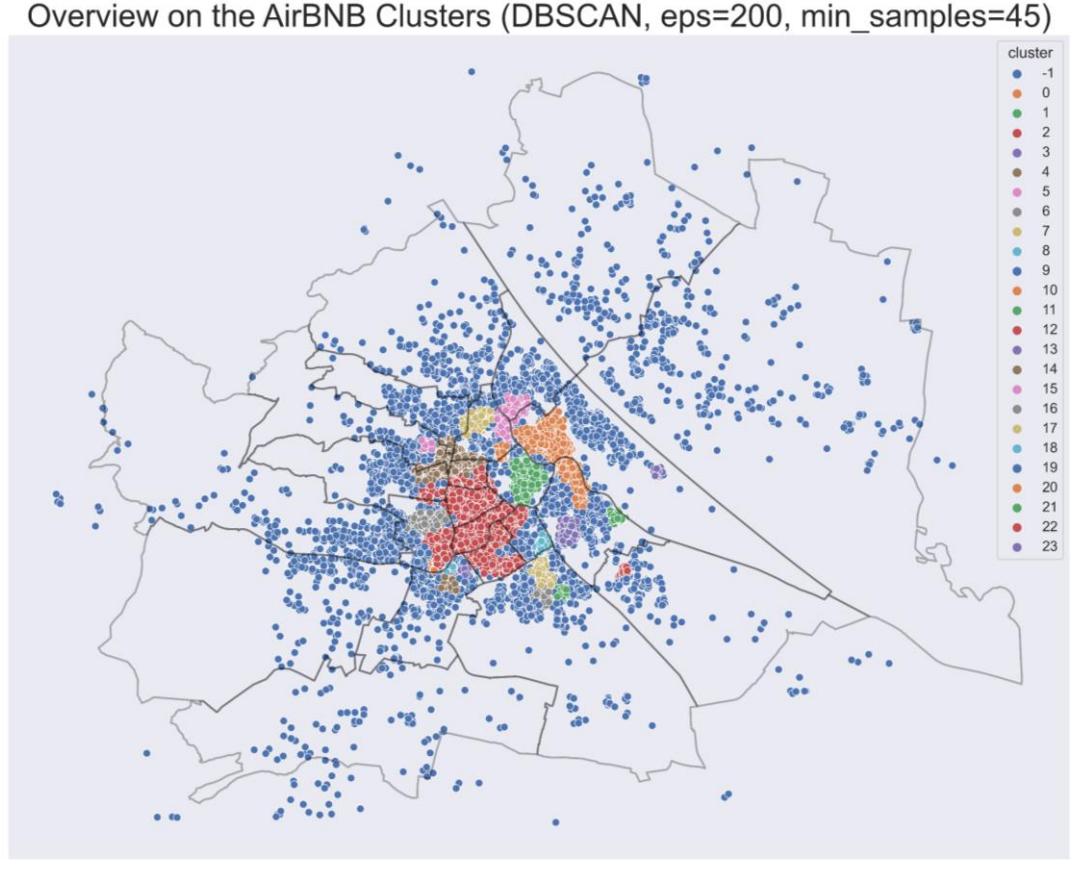


KDE CORRELATION

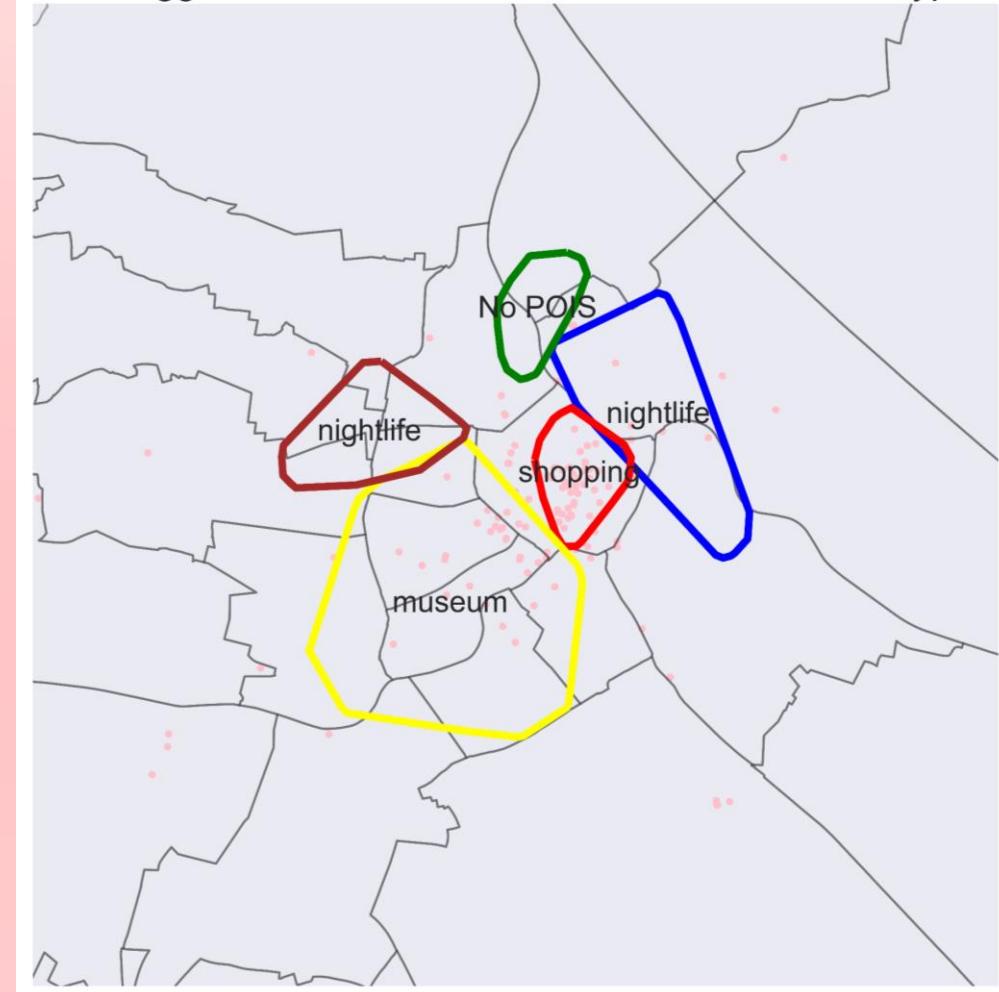


CLUSTERING + CONVEX HULLS

Overview on the AirBNB Clusters (DBSCAN, eps=200, min_samples=45)



Five Biggest Point Clusters and most common POI-types



CONCLUSION

- ▶ In general: More POIs → More Airbnbs
- ▶ **But:** Maximum of Airbnb density not where maximum of POI density
→ Assumption: Not enough space for Airbnbs
- ▶ Applying crisp boundaries allows thematical categorization of clusters.

SHORTCOMINGS & FUTURE WORK

- ▶ Apply more density functions like a F-function for comparison
- ▶ Analyze other correlations between listing densities and housing prices, amount of bars, restaurants, public transportation possibilities
- ▶ POIs are subjective. People have different interest. How is a POI defined?
- ▶ How do listing prices correlate with distance from city center or density of POIs?