Deriving Spatio-Temporal Geographies from mobile GPS data: A data-driven approach

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Project Abstract

This study builds upon previous work in the area of deriving functional neighbourhoods using spatially augmented community detection. The paper presents a methodology of deriving functional neighbourhoods from mobile phone GPS traces in order to better understand the urban city space. First, the dataset was transformed from a collection of mobile phone GPS traces into user trajectories (i.e. stops and trips). Next, the stops identified were classified into home, work and leisure stop points and subsequently filtered so that only leisure stop points remained. Finally, community detection was accomplished by feeding the filtered stop points into a network graph and running a spatially augmented community detection algorithm on the resulting graph as described in Calafiorea et al. (2020). The output of the community detection is in the form of Spatio-temporal geographies that show the *'living boundaries'* of the residents of New York City since they are modelled based on the user-to-place interactions of the data.
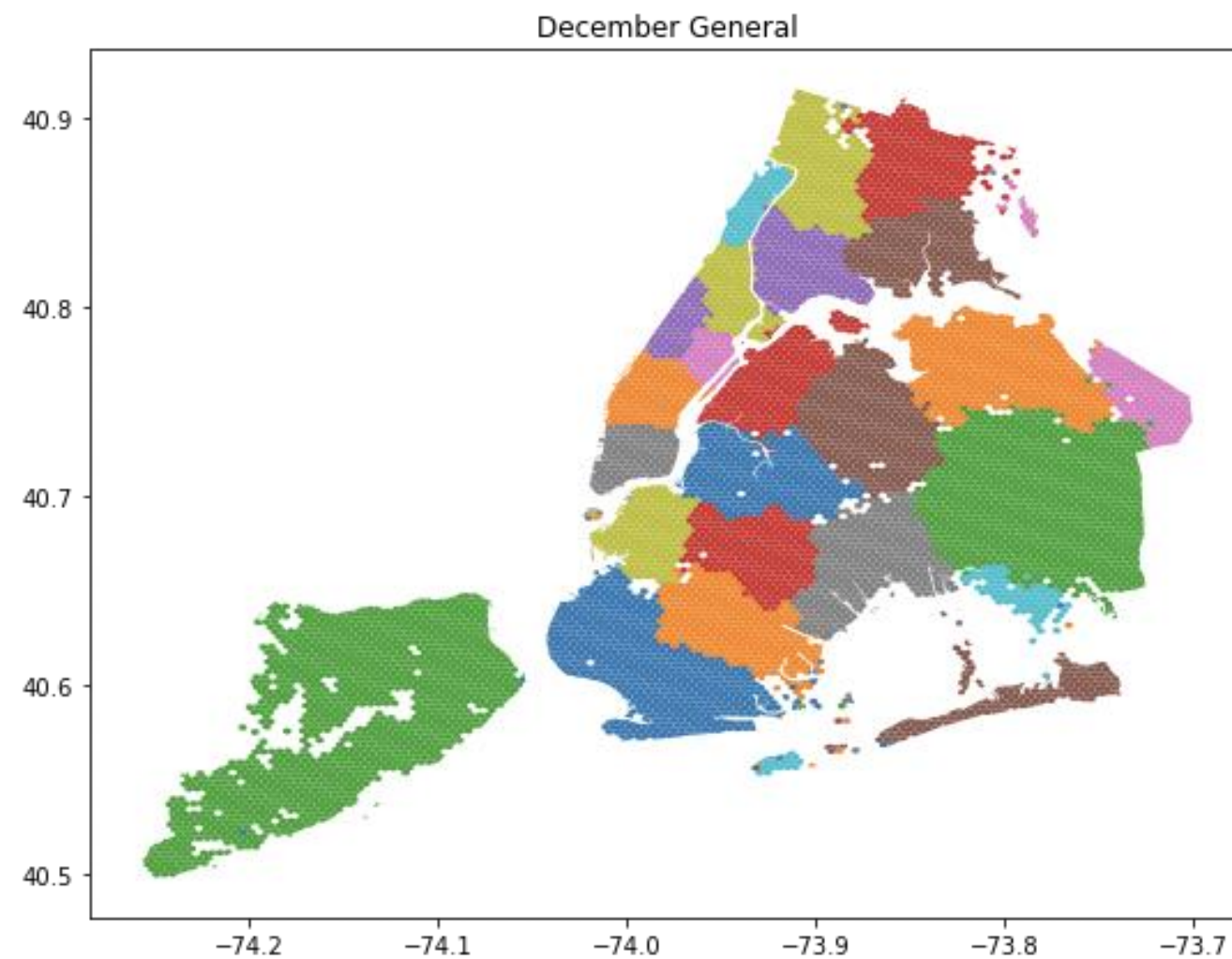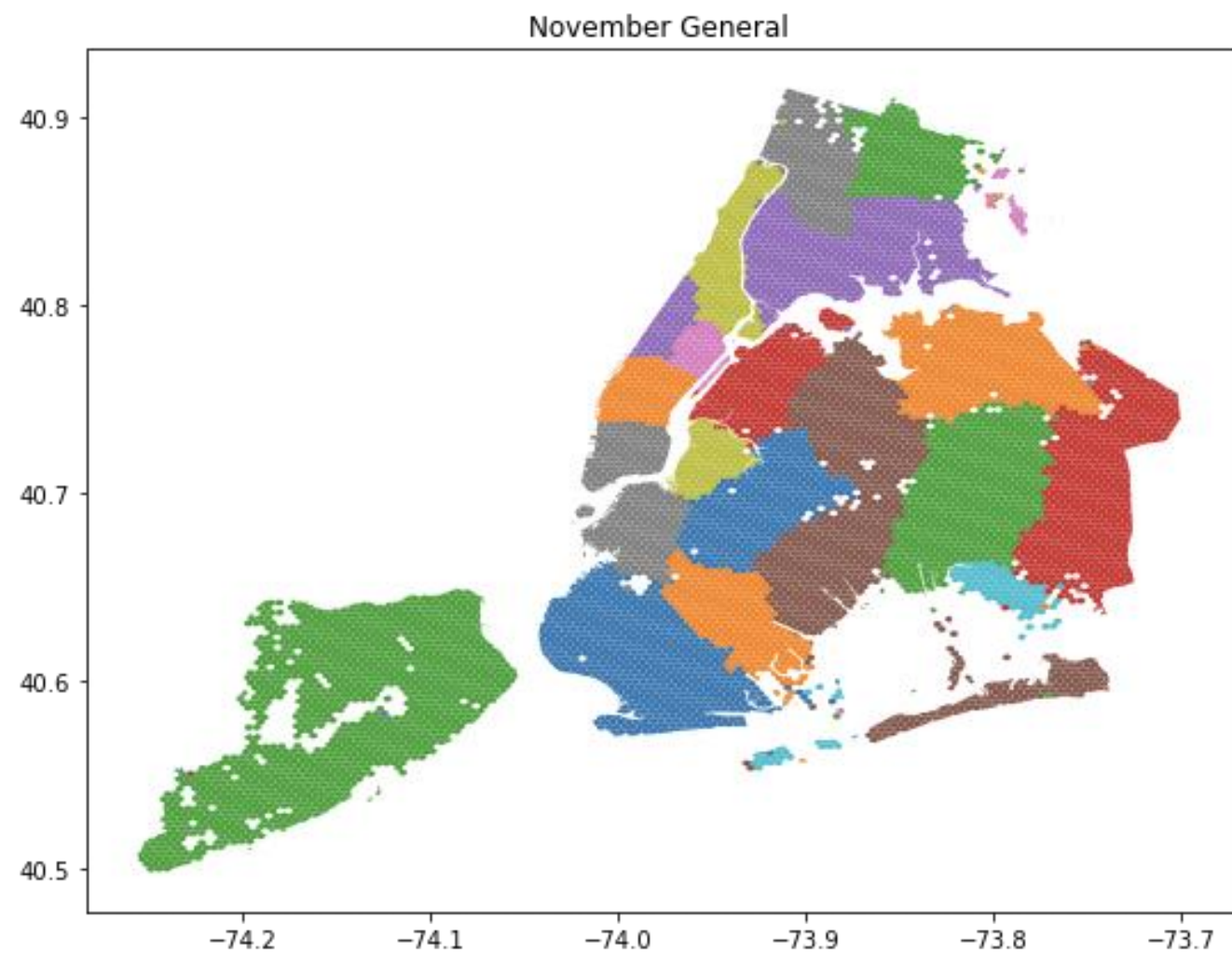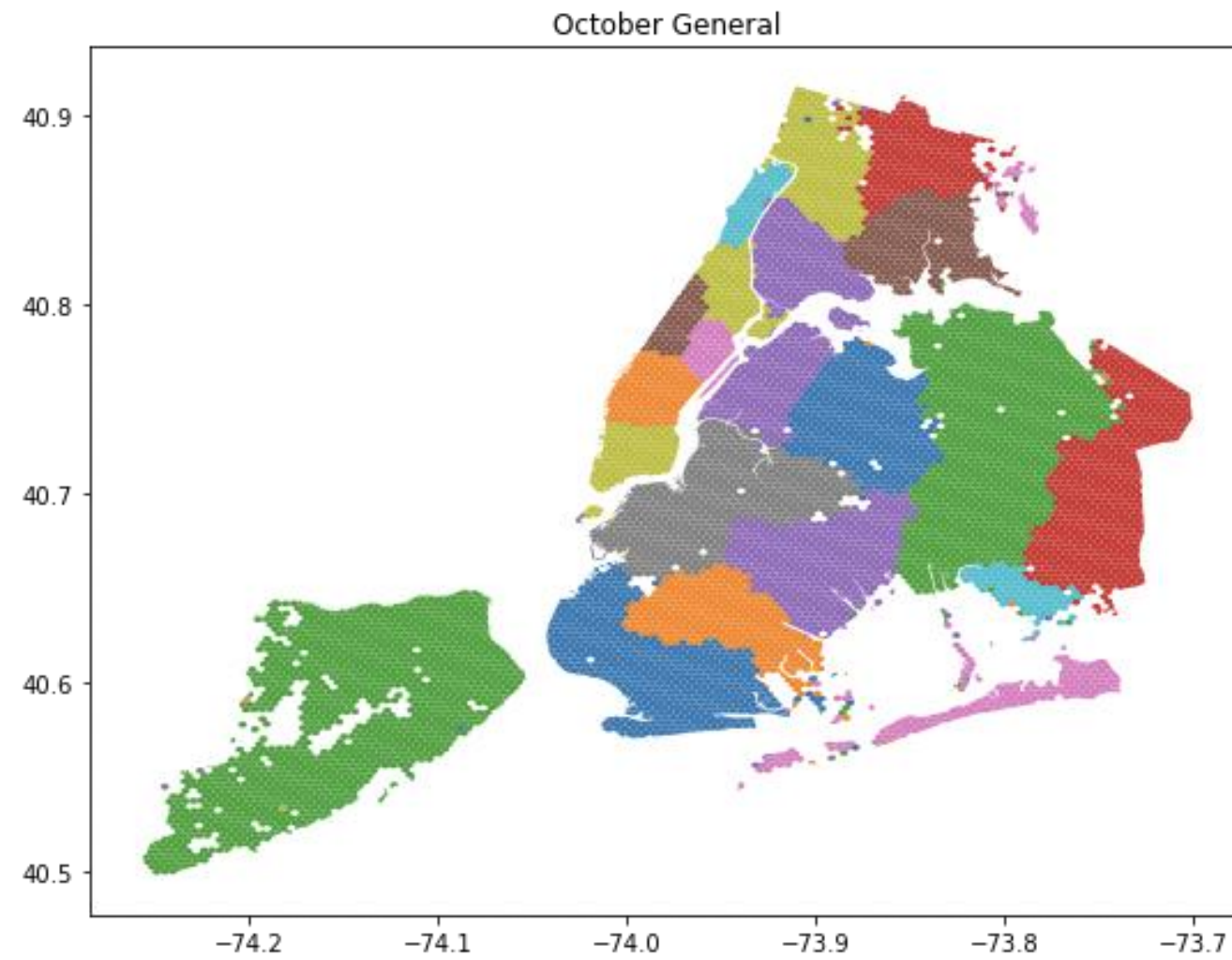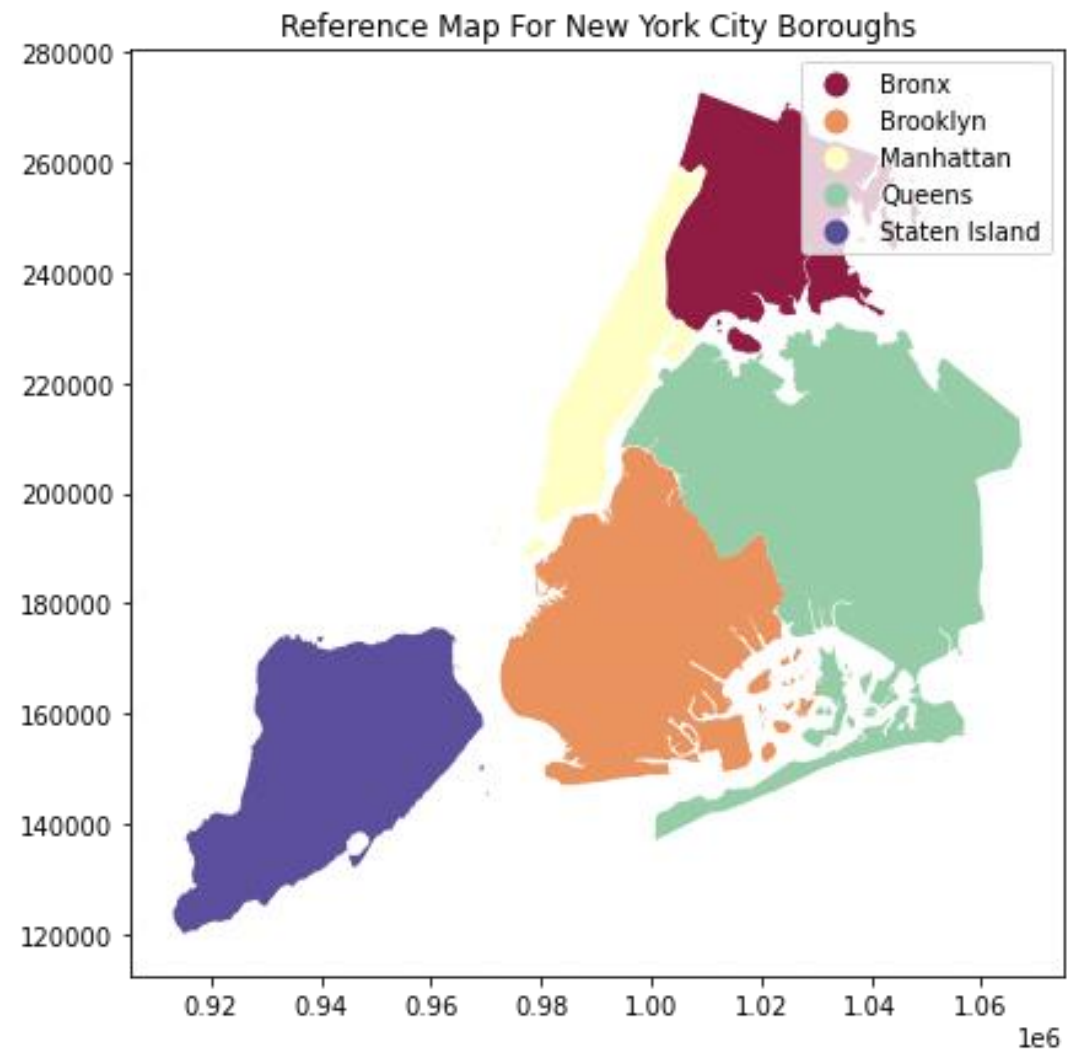
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Figure on the left shows:
1. A reference map for the administrative boundaries of New York City (Boroughs) and

2. The Spatio-temporal geographies derived for the months of October, November and December.

They are self-organizing maps that are generated from user-to-place interactions hence the term "living boundaries".