Assessing the Spatial Applications of Geo-referenced Twitter Data for Retail Centre and Consumer Mobility Insight.

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Overview

- This investigation offered an exploratory analysis of the spatial distribution of 'footprints' left by geo-referencing Twitter users and their potential value for retail centres.
- Retail related Tweets were identified and their spatial attributes examined in regards to retail centre locations.
- Mobility patterns of individual users' footprints were also analysed and compared with existing explanations of retail centre catchments.

Data Usage

1. 12,477,044 geo-referenced Tweets were collected between December 2012 and January 2014 within the study area of interest, which was Greater London. Retailer interactions were identified by creating a subset of 'mentions' of 50 major high street retailers.
2. Retail centre locations and boundaries were provided by the Local Data Company Ltd (LDC).
3. Catchments created using a Huff gravity model (Huff, 1967) were provided by Pavlis, Dolega and Singleton (2014).
4. Centre characteristic data (for example, centre type and size) were obtained from the London Town Centre Health Check Annex (2013), available through the Greater London Authority (GLA) online store.

Method

1. The spatial distribution of retail related Tweets were assessed using an advanced form of kernel density estimation. The results were then compared to retail centre locational data provided by the LDC.
2. Twitter user mobility patterns were investigated by identifying users that had sent a retail Tweet within an LDC boundary. These users were assumed to be using that centre for retail purposes. Every other geo-referenced Tweet sent by these users was then collected from the full sample. Patterns of mobility for each retail centre could then be assessed using density estimations and percentage volume contours. These were compared to existing explanations of retail centre catchment.

Results & Conclusions

1. Of those that interacted with retailers using Twitter, around 1 in 5 did so whilst within a retail centre boundary.
    - However, this was not evenly distributed across all centres.
    - The majority of retail centres had little or no interactions with retailers and results suggested that such data may only be of use within dense urban spaces such as metropolitan and major retail centres (or areas of elevated retail activity).
2. The mobility patterns of users suggested heavily interconnected retail catchments with centres close and far in proximity.
    - This could be expected of metropolitan and major centres, however smaller 'district' centres expressed catchments outside the expected 'locally serving' area.
    - Users were most likely to be geo-referenced within centres of close proximity to their original centre. However, there were still apparent motivations to travel substantial distances (for example, Kingston fell into Romford's user catchment).
    - Future research should aim to understand the factors influencing consumer mobility patterns between retail centres.

References

Huff, D. L. (1963). A probabilistic analysis of shopping center trade areas. *Land economics*, 81-90.

Pavlis, M., Dolega, L., & Singleton, A. (2014). A national-scale application of the Huff gravity model for the estimation of town centre retail catchment area. [Online] In *Proceedings of GISRUK*. Available at: http://leeds.gisruk.org/abstracts/GISRUK2015_submission_34.pdf.