Exploring association rules of OpenStreetMap tags within green spaces across cities in Northern Ireland and India.

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BACKGROUND

- Previous mapping of public urban green spaces based on OpenStreetMap (OSM) and Sentinel-2 imagery has demonstrated the potential for OSM to contribute to identifying and understanding urban green spaces.
- Spatial co-occurrence patterns between features are an essential source of knowledge. They describe how the presence of specific object types influences the probability of occurrence of other object types. For example, a gas station is usually located next to a road.
- We try to identify regional variations in OSM tags that co-occur and explore association rules for tags within green spaces across cities in Northern Ireland and India.

METHODS

- Step 1 – we identified potential green space (GS) OSM tags.
- Step 2 – we extracted features for the GS tags across 26 cities in Northern Ireland and 28 cities in India.
- Step 3 – we extracted all OSM tags occurring within the identified GS.
- Step 4 – association rules were derived in the form of X→Y, where X is an itemset called the antecedent, and Y is an itemset called the consequent based on the apriori algorithm.
- Parameters used for the association rules: minimum confidence *(probability of finding the consequent in the transactions given the antecedent)* of 0.7, minimum support *(defined as how often a rule is applicable in the dataset)* of 0.01, minimum lift *(ratio of the observed support to that expected if the two rules were independent)* of 1.5 and a maximum rules size of 2.

RESULTS

- The most frequently occurring OSM tags within the identified green spaces were identified, and the top 20 are shown in Figure 1.
- The association rules identified were ranked in the decreasing order of 'confidence', and the top 20 are shown in Figure 2.

Figure 1. Top 20 frequently occurring OSM tags within GS across cities in Northern Ireland and India

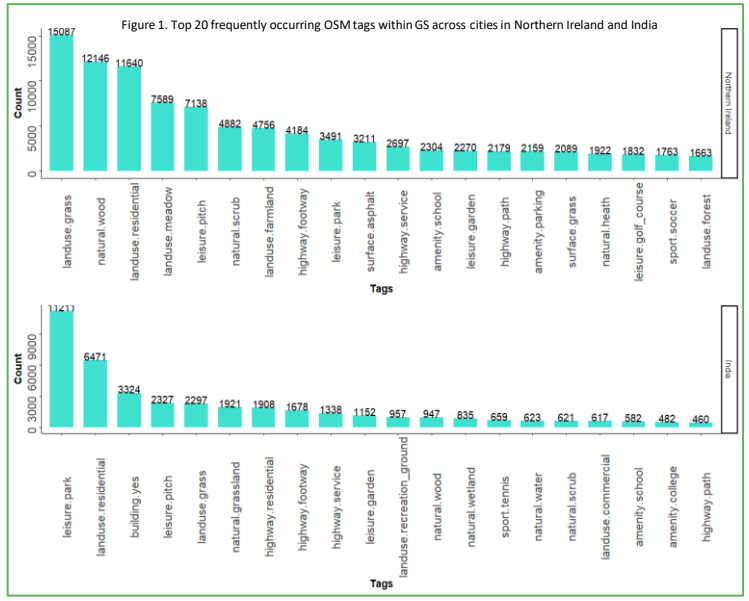
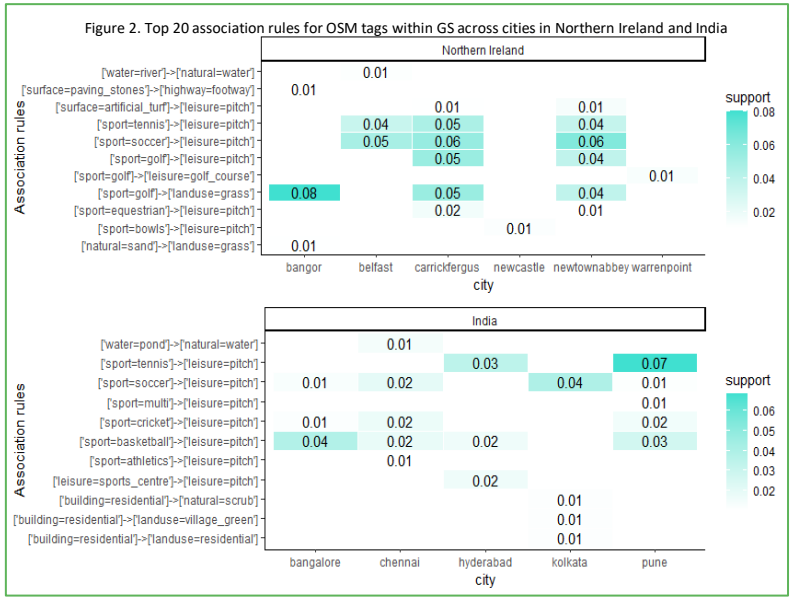


Figure 2. Top 20 association rules for OSM tags within GS across cities in Northern Ireland and India



CONCLUSION

- The variability in the number of different OSM tags in different study areas necessitates using association rules to understand and manage this diversity effectively.
- Furthermore, identifying concrete association rules enhances the interoperability of OSM data with other databases to enrich the study of the influence of green space on health.

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