

Defining Natural Points of Interest

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Summary

This paper contributes to the working definition of natural points of interest (NPOI). We combine a theory-driven approach exploring existing definitions of points of interest and natural features and a data-driven approach in which we systematically assess datapoints from three separate data sources, proposing a set of criteria for the classification of natural points of interest.

KEYWORDS: Points of Interest, Natural Points of Interest, Natural Features

Introduction

Points of Interest (POI) are specific locations that an individual might find interesting or useful (Chang et al, 2018). POI are a well-known notion, used in multiple contexts, for example, in studies about urban change and urban parcels (Liu & Long, 2016; Zhang & Pfoser, 2019). However, the literature defining natural points of interest (NPOI) is limited. To inform this paper's working definition of NPOI, we take a theory-driven approach to exploring natural features' definition in tourism and conservation management contexts. An exploratory approach is used to test our working definition and to identify potential NPOI data sources.

The identification of NPOI is part of a wider effort by the Ordnance Survey to characterise footpaths, assessing whether the locations of natural features could help predict potential locations of new footpaths. For this study, exploring the definition of a NPOI is essential. During the first 2020 UK Coronavirus lockdown, the percentage of people going outside for exercise increased from 59% to 71% (NatureScot, 2020). This increase in outdoors activity creates new spatial patterns for engagement with nature, prompting an additional justification for defining NPOI.

Related Work

To the best of our knowledge, no explicit definition of NPOI has been formulated. The role of the spatial attributes of natural features in testing hypotheses is acknowledged, with focus on nature-based tourism and conservation management contexts (Boyd & Butler, 2012; Zhang & Chow, 2015). To define an object requires examination of its constituent elements – Deng and Bauer define nature-based tourism as the “use of natural resources ... including scenery, topology, waterways, vegetation, wildlife, and cultural heritage” (Deng & Bauer, 2002, p.423). Studies attempt to assign value to these constituent

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elements to quantify attraction to sites. The value of these features is inherently linked to the demand for them, which varies with individuals' purpose of engagement. Boyd & Butler (2012) divide 'nature users' into two classes: 'ecospecialists', those with high-level interests in nature such as ecologists, and 'ecogeneralists', those engaging leisurely, e.g. sight-seers. As purposes for engaging with nature vary, so does demand. Colenutt (1969) provided one of the first studies to model countryside visitors' travel patterns – as with demand, usage patterns were found to link to different demographic and user groups, seasons, time of day, and accessibility.

A key question concerns which data can be used to capture and represent NPOI. Popular data sources in POI studies include GPS data, geotagged images, tweet locations, nature identification apps, and location-based gaming apps. These data have been used for example to identify tourist hot-spots and urban POI, and to model spatial patterns of visitor use to mountainous areas (Oku, Hattori & Kawagoe, 2015; Walden-Schreiner et al., 2018). A key limitation of using user-generated content is the representativeness of the data available about a place, which is frequently linked to the socio-demographic characteristics of an area, as well as to its attractiveness for certain types of activities (e.g., tourism) (Ballatore & De Sabbata, 2020). Check-in-data is an effective alternative source, consisting of a wider distribution of datapoints: as of January 2021, Foursquare has identified over 105 million global points of interest, with data collected from 550 million users worldwide (Foursquare, 2021). Each data source has their own strengths and weaknesses. As there is no established NPOI dataset, we will explore three potential NPOI datasets.

A Working Definition

This paper uses the term 'natural' in the sense of being related to nature. We define a natural point of interest as something that relates to the natural world, that an individual might find interesting or useful. 'Nature' is a semantically overloaded term with a wide range of uses, and to a certain extent has become a "meaningless panchreston" (Ducarme & Couvert, 2020, p.1). The definition of nature varies depending on its context of use and generally relates to the natural world (plants, animals, and landscapes) in contrast with the urban built environment. Our definition takes Ducarme & Couvert (2020)'s advice of being flexible, not prescriptive, and being context specific – this is necessary when exploring the concept of 'what is natural?'. For example, in some contexts, man-made features such as canals, reservoirs and nature reserves can become NPOI. Features such as rivers, or an aggregation of natural features such as a nature reserve, can also be defined as NPOI. In the context of this paper's contextualised definition of natural, this paper builds upon the POI definition by Chang et al. (2018), where a POI is defined as a specific location that an individual might find interesting or useful.

Natural points of interest data

With the goal of illustrating the applicability of the definition, we explore the efficacy of three datasets as sources of NPOI data. The strengths and limitations of these data sources, chosen with consideration of their applicability to the wider study, are summarised in **Table 1**. To test the effectiveness of this paper's NPOI working definition, ten sample datapoints from each of the data sources were explored and assessed against a rubric which was used to inform the data's classification as either a point of interest (Y), or not (N), or as 'subjective' (S) where classification was open to interpretation (**Table 2**). The datapoints were systematically chosen to best challenge the definition of NPOI, with some points chosen in the knowledge that they would/wouldn't be NPOI, and some that would require further discussion. OpenStreetMap^{††} (OSM) data proved to provide the most examples of NPOI, with Scenic-or-Not^{‡‡} (SoN) providing some subjectively classified NPOI, and iNaturalist^{§§} (iN) providing no NPOI data points. We chose to test the definition using just ten sample points with the purpose of exploring the data, not with the goal of having statistical significance.

^{††} <https://www.openstreetmap.org> (Accessed, March 30th, 2021).

^{‡‡} <https://scenicornot.datasciencelab.co.uk> (Accessed, March 30th, 2021).

^{§§} <https://www.inaturalist.org> (Accessed, March 30th, 2021).

Table 1 Strengths & Limitations of Potential NPOI Data Sources

Data Source	Strengths	Limitations
<i>OpenStreetMap</i>	Accessible, highly detailed, variety of features, worldwide coverage, validated, large number of datapoints.	Data needs filtering before analysis.
<i>Scenic-or-Not</i>	Accessible, covers 95% of Great Britain.	Two attributes (location & rating), ratings are subjective.
<i>iNaturalist</i>	Filterable data, partially validated, worldwide coverage, large number of datapoints.	Focus on plants & animals only, animals move (can't pinpoint to a single location).

Of the ten OSM data points sampled, four were classified as NPOI, four were not, and two were subject to interpretation. The four defined as NPOI included 'picnic table - woods, a reservoir, ancient woodland, and nature reserve'. All OSM points, apart from 'farm woodland' which was classified as subjective, were classified as POI based on Chang et al. (2018)'s POI definition. Several OSM NPOI are man-made features located in nature, or have become natural features over time, highlighting the flexible nature of the definition. 'Shop, B&B, caravan site, and archaeological dig' are not defined as NPOI despite being POI. Both 'farm woodland', and 'grass airfield' are subject to the individual's interpretation as to whether they are NPOI or not, as whilst both are located in nature and could be classified as natural features, their classification as a POI is subjective.

Whilst all of the iNaturalist data were natural features, none were POI, and none were classified as NPOI. A key limitation with this data source and in defining animals and plants as POI or NPOI is that these features can move, and in some cases only appear seasonally. This makes it hard to identify a precise location for the NPOI.

Of the ten SoN data points sampled, 'commercial forest and national park' was the only NPOI. 'Countryside, farmland, river and forest, and cliffs and sea' were classified as being subject to interpretation as whilst all are natural features, they are not POI as knowledge of their location is potentially only useful to a small number of individuals. The context the features are presented in is important as they may be classified as NPOI if they are part of a national park or are part of a recommended sight-seeing walk for example. 'Cottage, chapel, farm, and crossroads' were not classified as NPOI due to their urban or suburban locations.

Conclusions and Further Applications

This paper contributes to the working definition of a NPOI. With the goal of identifying an appropriate data source for NPOI and to test the NPOI definition, this paper recommends OSM data as a NPOI data source. Whilst both SoN and iNaturalist provided interesting sources of natural feature data, they were not appropriate as NPOI data sources, especially in the wider study context of this paper. This paper's definition of NPOI is specifically designed to be flexible to the context of the individual's use and is highly context dependent. Because of its flexibility, this working definition has a range of applications in future studies; for example, in identifying nature-based tourism sites, in identifying areas for conservation management, in hiking and outdoor activity planning, and in agriculture and land management contexts. A key potential area for future work is the exploration of the temporal aspects of a feature being defined as a NPOI.

Table 2 Rubric used to test the NPOI definition (OSM = OpenStreetMap, iN = iNaturalist, SoN = Scenic-or-not) (Y= yes (in grey), N= no, S = subject to interpretation)

	Other details	Animal	Vegetation	Water	Tourism	Man-made	Amenity	Historic	Accessible	Landscape	Urban	Rural	POI	NPOI
OSM1	Picnic table -woods	N	N	N	N	Y	Y	N	Y	N	N	Y	Y	Y
OSM2	B&B	N	N	N	Y	Y	Y	N	Y	N	N	Y	Y	N
OSM3	Farm woodland	N	Y	N	N	S	N	N	N	S	N	Y	S	S
OSM4	Reservoir	N	N	Y	Y	Y	Y	S	Y	Y	N	Y	Y	Y
OSM5	Caravan site	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y	N
OSM6	Archaeological dig	N	N	N	S	Y	N	Y	N	N	N	Y	Y	N
OSM7	Ancient woodland	N	Y	N	Y	S	Y	Y	Y	S	N	Y	Y	Y
OSM8	Grass airfield	N	N	N	S	Y	Y	N	N	S	N	Y	Y	S
OSM9	Nature reserve	Y	Y	Y	S	Y	N	N	Y	S	N	Y	Y	Y
OSM10	Shop	N	N	N	N	Y	Y	S	Y	N	Y	N	Y	N
iN1	Fungi	N	Y	N	N	N	N	N	N	N	N	N	N	N
iN2	Teasel	N	Y	N	N	N	N	N	N	N	Y	N	N	N
iN3	Snail	Y	N	N	N	N	N	N	N	N	N	N	N	N
iN4	Swan	Y	N	N	N	N	N	N	N	N	Y	N	N	N
iN5	Moth	Y	N	N	N	N	N	N	N	N	N	Y	N	N
iN6	Spider	Y	N	N	N	N	N	N	N	N	N	Y	N	N
iN7	Mares Tail plant	N	Y	N	N	N	N	N	N	N	N	Y	N	N
iN8	Moth	Y	N	N	N	N	N	N	N	N	N	Y	N	N
iNa9	Snail	Y	N	N	N	N	N	N	N	N	N	Y	N	N
iNa10	Chameleon plant	N	Y	N	N	N	N	N	N	N	Y	N	N	N
SoN1	Chapel	N	N	N	S	Y	S	Y	Y	N	Y	N	Y	N
SoN2	Countryside	N	Y	N	N	N	N	N	N	Y	N	Y	N	S
SoN3	Cottage	N	N	N	N	Y	N	N	N	N	N	Y	N	N
SoN4	Farmland	N	N	N	N	S	N	N	N	N	N	Y	N	S
SoN5	Cottage	N	N	N	N	Y	N	N	N	N	N	Y	N	N
SoN6	River & forest	N	N	Y	N	N	N	N	N	Y	N	Y	N	S
SoN7	Cliffs & Sea	N	N	Y	N	N	N	N	N	Y	N	Y	N	S
SoN8	Farm	N	N	N	N	Y	N	N	N	N	N	Y	N	N
SoN9	Crossroads	N	N	N	N	Y	N	N	Y	N	Y	N	N	N
SoN10	National park	N	Y	Y	Y	S	N	N	Y	Y	N	Y	Y	Y

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OpenStreetMap® is open data, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF), © OpenStreetMap contributors^{***}. Scenic-or-Not is open data, licensed under the Open Data Commons Open Database License (ODbL) by the Data Science Lab^{†††}. iNaturalist data are available under a range licenses or waivers, and they were downloaded via the iNaturalist export tool^{‡‡‡}.

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