

The Value of Detours

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The estimation of the value of georeferenced spaces is challenging because the value of a space depends on many factors such as recreation potential, sociability, cultural points of interest, etc. To account for these personal values, interviews and surveys can be conducted but this is costly and elaborate, and this requires a user action. Recent approaches use social media to attribute positive or negative associations of users to a georeferenced space by analysing the semantic linkages. This approach is promising but at the same time prone to biases due to a user selection bias and the interpretation of the semantics. In this paper, an alternative method based on the systematic analysis of georeferenced paths of people is proposed, which does not require direct user interaction. Underlying the assumption that people are willing to take a longer and more time-consuming path if the detour has a personal value for them, this work proposes to estimate these personal values systematically and partly automated by analysing the pathways taken. The authors suggest to conduct a first feasibility study analysing the GPS positions of people to obtain information and find patterns of the personal preferences of places, and matching them to interview or social media derived information on platial preferences.

Keywords: cultural values; routing; detours; urban green spaces

1 Introduction

What is the value of spiritual Buddhist water? What is the value of the lake where you had your first kiss? What is the value of the dirty lake, which you heard might be contaminated? What is the value of going water-skiing every Monday? And what if all four descriptions refer to same lake? The value of a place depends on the associations that are connected to it and to the phase room of possibilities, which it offers to the users. The concept of platial goes beyond the actual space in a geographic sense, but couples the space with place names, descriptions, and semantic relationships between places (Gao et al., 2013). Elaborating on this concept, it is often desirable to even include the social and cultural possibility to interact with the space. The lake becomes more than pure coordinates and metrics – it becomes a concept of its own. How can one include the social and cultural dimension into the geoinformation? Recent work suggest using social media such as Flickr, Twitter, Facebook, Spotify, etc. for attributing positive or negative associations of users to a georeferenced space by analysing the semantic linkages (Coscieme, 2015; Gliozzo et al., 2016; Lee et al., 2018; Oteros-Rozas et al., 2016; Richards and Tunçer, 2018; Yoshimura and Hiura, 2017). For example, in Twitter this may work by analysing georeferenced hashtags, which are in the same post as #lake (or to be more specific #lakegeneva). Positive hashtags such as #wonderful #greatday #unforgettable signify a large personal value of the lake, whereas negative hashtags such as #dirty #deadfish or #seenbetter signify a negative personal value to the lake. This analysis couples positively and negatively associated words with the coordinates incorporating a social labelling. However, it also inhibits some uncertainties. One uncertainty may be due to a misinterpretation of the positiveness or negativeness of some hashtags. For example, a post with hashtags #dirty #Hands #cleaned #in #Lakegeneva #thanksbeautifulnature

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would have the negative hashtag #dirty in it even though the post actually associates a positive value to the lake. A careful selection of posts and hashtags, also in combination with each other, is therefore needed for interpretation. Further, the people using social media are not representative of the entire community, as in particular young people use social media (Mellon and Prosser, 2017). Therefore, care must be taken when drawing conclusions about the whole underlying population. Depending on the application it might be an option to treat values derived from social media as presence-only data. Otherwise it is necessary to limit the conclusions only to the relevant peer group.

In this paper, a new method based on the systematic analysis of detours is presented, which seeks to include the social cultural dimension of a georeferenced space. A detour is defined as a “different or less direct route to a place that is used to avoid a problem or to visit somewhere or do something on the way” (Cambridge University Press, 2018). If one decides to take a detour, the perceived benefit of the integrated detour path must outweigh the perceived additional cost of a longer distance and typically a longer time effort. In other words, the length and time demand of the detour can be used to quantify the service provided by green spaces but also social places by means of a travel cost approach. Therefore, the choice of way contains information on the personal value which people attribute to the integrated possible paths one can take. As an example, when going from home to work, one can decide to take the fastest way. However, one can also decide to take a detour. Why would one do this? It might be that there is a bakery on the way or to simply enjoy taking the longer but more scenic or greener way, or that the shortest way is dangerous or ugly. All of these reasons assign a relative value to the integrated detour chosen relative to the integrated fastest actual path from A to B. Systematically analysing the detours chosen by a group of people may therefore provide insight into the ratio of different groups of people and may allow us to understand the personal values of the integrated paths.

2 Methods

Our aim is to estimate the personal value of urban green spaces and social places. The principle idea is to analyse, which detour a person is willing to take when going from A to B. This enables an estimation of the perceived benefits of the integrated path, which must compensate the perceived additional costs, i. e., additional time needed for the detour. By knowing the start and endpoint of the tour and therewith the fastest possible route as well as the actual taken pathway, one can learn about the personal value, which a person attributes to the chosen way that was chosen in comparison to the fastest possible. Since we have no information why a specific route was chosen we have to rely on the statistical analysis of a large number of different detours and their properties such as greenness of the route or number of places of interest along the route. To our knowledge the automated detour detection is novel as it does not require the user to recognize why and that he or she prefers a certain route as is the case in user surveys and social media. Therefore the proposed method may be an ideal complement for time-consuming and actively induced information on places.

We plan to test our proposed method in a first feasibility study. The analysis requires a high resolution of GPS data of about 1 minute to differentiate the mean of transportation and any stop in the mean time, a sufficiently high and representative sample size over the specified area, and a sufficiently long time duration of GPS tracking to rule out effects of weather conditions etc. Finally, in an ideal setting we are able to match and cross-check our findings with a bottom-up approach (i. e., user surveys and social media) conducted with the same participants. A possible data set for this analysis could be provided within the Psychogeography Project¹, in which GPS sensors as well as GPS triggered e-diaries are used to capture the position and mood of the participants by self-labelling (Törnros et al., 2016).

3 Expected Outcome

We believe that the presented new way to attribute a value to an integrated path way may enable us to:

Assign a Personal Value to Spaces. The allocation of aggregated personal values to urban green spaces, points of interest, and other route factors provide valuable information for city planners and architects to reflect on which spaces are valuable to the citizens. By analysing the GPS data systematically it may be possible to detect universal patterns and properties of places and urban

structures of commonly high (or low) value and to analyse this under consideration of additional covariates. Making the personal, cultural, and ethical values measurable and quantifiable may improve the ability for decision makers to include these “soft” factors in decision making.

Allocate Conflicting Spaces. One finding of this analysis could also be to find “conflicting spaces” in which the value of a space (the willingness to make a detour) varies greatly. These interesting cases may be studied in more detail. If available an analysis of the background of the users (gender, age, level of education, mean of transportation, etc.) in correlation to the detour may provide insight into societal and cultural differences. This may help understand conflicts, which may arise when planning new construction projects.

Study Different Weather Conditions. As the choice of detour depends strongly on meteorological conditions (e. g., shady routes in hot weather, covered routes during rain falls, etc.), the meteorological conditions should be tracked and analysed at the same time. This allows a distinction of the value of a path depending on meteorological conditions.

Study Different Cultures. In the long run, this study can be repeated in different regions of the world to enable a top-down detection of structures (e. g., forest, meadows, cities, monuments, lakes, etc.), which are evaluated differently in different cultures. The detected differences in cultural preferences are a possible starting point for a more detailed bottom-up analysis of these patterns, which may include user surveys and interviews. Note that a global data set would be needed for such an analysis.

Weighting Routing Applications. We expect that the derived information can be used to derive personal weights required by applications for healthy or green routing.

4 Challenges

The described method of using detours as a measure for personal value has the goal to describe platials rather than spaces. It seeks to include social, cultural, and personal values by making them measurable. However, are there certain parameters, uncertainties, and behavioural patterns that require special caution and possibly special treatment in the analysis?

Not Knowing the Way. The reason for a detour may be pleasure in the detour, but it could also be that the citizen got lost or did not know that a faster way exists. One may assume that the percentages of people who get lost are relatively small compared to the people who know the way. In order to eliminate the effect of different route choices due to very small differences in the route time that cannot be resolved by the citizen, a detour time threshold must still be set under which two ways are defined as indifferent. The value of this threshold will be varied and further discussed.

Biases by the Selection of Data. The participants in the proposed approach need to be selected carefully such that they are representative of the population. Even if the sampling design was set up with a representative sample in mind a self-selection bias might be present. The conclusion must therefore take this bias into account. Additionally, some people hardly ever take detours, e. g., as they are always in a hurry. Their personal value will not be included in this analysis leading to an additional unavoidable selection bias.

Motivation of Detours. There are various motives for taking a detour. It might be for pleasure in green or scenic landscapes, it might be for a specific functional reason (to visit a friend or a bakery), it might be to exercise or it might be for sociable reasons. All these reasons provide a certain personal value to the way. A distinction of motives requires additional information on the users as, e. g., from a user survey. We plan to use the data from the Psychogeography Project to better understand the motivation of detours and to make sure that the detour is always associated to a higher benefit. Note that a differentiation of “exercise routes” (jogging or taking a stroll during lunch break) and “destination routes” (moving from A to B) should be possible because exercise routes are typically circular routes and destination routes are typically linear routes.

5 Summary and Outlook

This paper presents an idea of how to integrate a personal, social, and cultural value to georeferenced space by systematically measuring the willingness of taking detours. Analysing which detour a person is willing to take when going from A to B provides information on the personal benefit of the integrated detour path, which must compensate the additional time needed for the detour. In contrast to previous approaches, the presented method does not depend on an active labelling of a user. The great advantage is that the social value of different places can be computed automatically and comprehensively without lacking any perceptions in a top-down approach. In a next step, it may therefore serve as a tool to detect the perception of people on different places depending on factors such as different social groups or weather conditions.

This method may be helpful for city planners, architects, social scientists, conflict researchers, and policy makers because the personal evaluation of a place of the citizens need to be known to these people. The method still encounters challenges especially regarding biases in data selection, lack of knowledge of the fastest path, and the lacking information on the motivation of people. We suggest comparing the results to actual anthropological and social-science-based approaches like interviews, surveys, observations, etc. in order to make sure that this method successfully points to the personally valuable places and to distinguish the motivation for a detour. This process of matching the top-down approach with bottom-up observation can be considered as calibration of the presented automated analysis of the value of detours. The data of the Psychogeography Project on the georeferenced mood of participants can provide information on mood changes during detours and may therefore be used as a qualitative check of the personal values of detours. A scientific collaboration with respect to environmental and health sensitive routing is planned. Asking the users of an environmental and health sensitive routing app to provide feedback on a route will provide a bottom-up observation, which can be matched with the data of this study.

Notes

1. https://www.geog.uni-heidelberg.de/gis/psychogeographie_en.html



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