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Analysis of Google Point of Interest Data Based on Scoring Key Criteria for Local Restaurants

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Abstract

Food has a very important place in human daily life. The characteristics of multidisciplinary research in food culture are quite evident and from geography perspective, the relationship between the environment and humans can be emphasized in the study of food culture. With the expansion of the urbanization process and the formation of new occupations for people, geography can have a significant impact on the cooking and food culture of the people. Geographical zoning is an important way to understand and analyze the spatial structure of food production and consumption. Today, food studies have become widespread due to the availability of web data. The aim of this study is to analyze the opinions of POI data generated by Google users based on the scoring of the main criteria. The criteria considered in this article (local access, food price, food quality, customer-oriented behavior of employees, hygiene, interior space and exterior beauty of the restaurant) are in local restaurants in Tehran's 8th district. The results of this study show that people can find their desired restaurant in a shorter time according to the main criteria and based on these criteria, give more accurate points to the restaurants.

1. Introduction

Food is a basic material element to meet the physiological needs of humans, studying its quality is one of the most important issues in the field of health and food preference due to the influence of the geographical environment can have significant regional distinguishing features. Local knowledge is underrepresented in food policy and planning (Fast et al. 2018). However, given the diverse food community operating at local scales, a collaborative approach to supporting sustainable and regenerative food systems is no small task (Fast et al. 2018). In recent years, crowd-sourced or user-generated data and web-based mapping have emerged as competitors to official data and their authoritative producers and institutions (Perkins et al. 2011). This research is designed based on the concept of city and citizen as a text (Karimzadeh et al. 2013). That is, if the city is considered as a text, citizens are authors who may translate their identity into this text and leave traces of it in the city and urban data (Rabiei-Dastjerdi et al. 2022).

Therefore, user reviews for restaurants were used in the form of Google Place of Interest (POI) data as a type of collected or user-generated data about food quality and to determine the best place, they turned into a small amount. This digital footprint can be used to describe and understand a city (Rabiei-Dastjardi et al. 2022).

In this study, considering the fact that users, in addition to being producers of points of interest (POI) data, can also use that data. Therefore, if the rating and feedback of this data for restaurants is more accurate in the form of scoring the main criteria in the applications related to restaurants, the users can score the main criteria more accurately in a shorter time for choosing the desired place, and they can choose their favorite restaurant according to the same points. In addition, the advantage of the plan presented in this article is that it reduces the time and cost of locating the considered restaurant and increases the quality of all restaurants and discovers the strengths and weaknesses of the mentioned parameters.

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2. Study Area

The studied area in this article is District 8 of Tehran Municipality, one of the urban areas of Tehran in Iran, which is located in the east of this city. The history of physical and spatial development of District 8 of Tehran Municipality goes back to 1320-1330 solar years. Region 8 has 3 districts and 13 council districts. Narmak, Majidieh and Tehran Pars neighbourhoods are among the old urban settlements of this region.

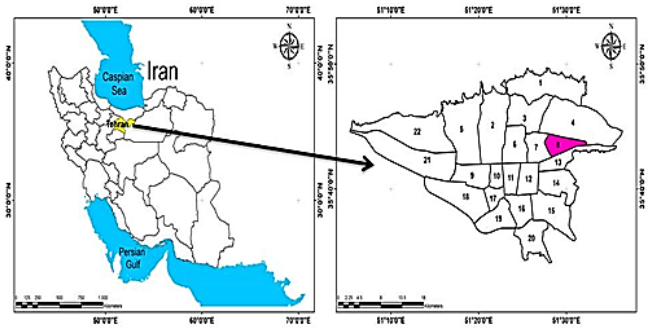

Figure 1. Location of the study area

3. Method

3.1. Data

Point of Interest (POI) data represents the location of a landmark or a building in the physical space through geographical coordinates. It has a significant role to play in connecting businesses with customers (Chaudhary 2021). The end-users use POI data to find accommodations, shopping places, transportation, and nearby emergency services. POI data equips relevant government bodies and enterprises in gleaning patterns and trends recognition, enabling them to make data-driven decisions (Chaudhary 2021). Some of the most common POI data generation methods by businesses include data extraction from open sources, user-generated data on social media platforms, extracting data from government directories, and hiring/contracting a team to manually update the company's POI database (Chaudhary 2021). Among the above-mentioned methods, data collection and verification by a dedicated team ensures an accurate and healthy stream of POI data. This method includes the use of a smartphone and a purpose-built app in which new locations were added and the existing ones were verified in real-time. The major challenges associated with other methods mentioned include inconsistency and inaccuracy in datasets as it is highly dependent on how actively and precisely the data is being gathered and updated by companies or government bodies disseminating such information (Chaudhary 2021).

In this study, the reviews of 700 users on Google were collected for 25 local restaurants in the 8th district of Tehran by the researcher in Excel software and using these comments, the main parameters for choosing an excellent restaurant were examined and scored.

3.2. Main parameters

The purpose of this study is to investigate and analyse web data in the form of POI data generated by Google users based on scoring the main criteria in local restaurants based on converting letter variables into numerical variables. In this research, six parameters affecting quality should be examined: 1. local access, 2. food price, 3. food quality, 4. customer-oriented behaviour of staff, 5. hygiene, and 6. interior and exterior beauty of the restaurant. The parameters, then, were converted to a quantitative level according to Table 1.

Table 1. Converting qualitative criteria into quantitative criteria

Quality Degree of Main Criteria	Quantitative Degree of Main Criteria
Very Good	5
Good	4
Medium	3
Bad	2
Very Bad	1

3.3. Research Methods

At first, the data was collected in Excel software, and according to Table 1, qualitative criteria were converted into quantitative criteria in the local restaurants of the study area, and they were examined in terms of quantity and ratio. Finally, all quantitative scores for a restaurant were averaged. At the level of quantitative characteristics, investigations were carried out using the optimization method in the software. Then the results were applied to the map of the studied area in Arc GIS software.

4. Results and Discussion

This study is useful for scoring the main criteria of local restaurants. In their opinion, users usually focus on their favorite place in choosing the main criteria in different restaurants, and the result can be determined based on choosing the best location according to the main criteria or criteria the user wants in short, the restaurant that gets the highest score among all the main criteria compared to other restaurants was known as the best restaurant.

Table 2 shows the average scores of users for six main parameters for 25 considered restaurants; finally, by averaging among these main parameters, the overall average score of the restaurant was obtained. Among the average scores, with Min operation (Equation 3), the restaurant with the lowest score and with Max operation (Equation 4), the restaurant with the highest score was obtained. [(n) in Equations (1), (2), (3) and (4) is the range of natural numbers.]

$$x, x+1, x+2, \ldots, x+n \quad (1)$$

$$x<x+1<x+2<\ldots<x+n \quad (2)$$

$$\text{Min}\,(x, x+1, x+2, \ldots, x+n) = x \quad (3)$$

$$\text{Max}\,(x, x+1, x+2, \ldots, x+n) = x+n \quad (4)$$

Table 2. Investigating the average of six main parameters for local restaurants

Name	Local Access	Food Price	Food Quality	Customer-Oriented Behaviour of Staff	Hygiene	Interior & Exterior Beauty of the Restaurant	Overall Score of the Restaurant
Sharan Food Preparation		3		2.75			2.875
Nader Restaurant	4.666667	2.615385	3.909091	3	2.75	4.769231	3.618395493
Carmado Fast Food		2.333333	3.333333	1		3	2.416666667
Sinor Restaurant			2.75	1		2	1.916666667
Soren Fast Food	4.666667	3	4	4	5	4.2	4.144444444
Walnut Cafe and Restaurant	1.5	2.25	3.538462	2.8	3.333333	4.857143	3.046489621
Khayyam Cafe and Restaurant		5	2.5	5	3.333333	4.75	4.116666667
Apple360 Pizza		1.5	3.222222	3		5	3.180555556
Mister Kentucky Fast Food		3	4.052632	4	1	5	3.410526316
Tabakhi Shakh Tala	4	1.5	3.933333	3.5	4.75	3.666667	3.558333333
Javanan Restaurant	5	2.888889	4.073529	4.034483	4	3.777778	3.962446473
Narmak Park Restaurant		3	4.666667	3	5	4.4	4.013333333
Haida		3.5	3.75	3	1	4	3.05
Bapuk Italian Restaurant		3	3.9	4	5	4.666667	4.113333333
Romana Italian Restaurant	5	2.333333	3.875	4.5			3.927083333
Babajun Fast Food		2.666667	3.166667	1	2.666667	4	2.7
Zhivan Fast Food	3	2.4	3.923077	3	4.666667	4.933333	3.653846154
Grilled Haj Abdulahi		3	4	5	1	2	3
Sibza		3	5	1			3
Khameez Burger	3	2.5	4.636364	3.5	4		3.527272727
Baguette Restaurant	2.666667	1.823529	4.02	4.035714	3.8	4.583333	3.488207283
Food Court 7 Center		3	4.5	2	3	4.8	3.46
Farhad Restaurant			4.571429	4.25		2	3.607142857
Dozli Grill	1.5	3.333333	4.153846	3	4.5	1	2.914529915
MIN	1.5	1.5	2.5	1	1	1	1.916666667
MAX	5	5	5	5	5	5	4.144444444

Meanwhile, some users are looking for a place with their desired scores. For example, a user intends to go to a place where the quality of food and the behavior of the staff in the form of customer service, and hygiene of the place are good, that is, with a score of 4 and other parameters, i.e., local accessibility, food price, and the beauty of the interior and exterior of the restaurant should be at an average level, i.e., with a score of 3. In this case, the decision-making system in locating will introduce the desired restaurant with this level of scores in the shortest time, and the user can go to his desired place.

In Fig 2, the results of the findings of Table 2 are shown on the map of the 8th district of Tehran.

In the existing applications, the user can choose the restaurant he wants and go there, taking into account the general rating of other users, but in these applications, the rating of any minor parameter has not been done in detail.

The advantage of this design compared to existing applications is that users can record their opinions in the form of parameters in a more precise and accurate way and while searching for your favorite place according to these parameters, go to the restaurant you want based on the main parameters mentioned and have a good time there.

This plan reduces time and cost in locating the considered restaurant and increases the quality of all restaurants in the mentioned parameters; finally, the results obtained from this data in this paper can be used in the analysis of other types of point-of-view (POI) data.

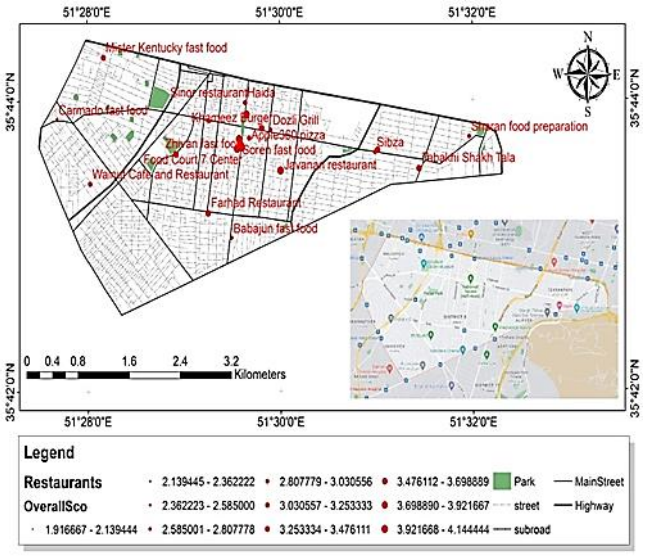

Figure 2. Rating map of local restaurants in district 8 of Tehran

3. Potential Challenges

The findings showed that using user-generated data in general and Google POI data in particular, the method and tool proposed in this research to measure and locate local restaurants have challenges due to various factors, which can be explained as follows:

- One of the main arguments in recording user opinions for local restaurants is that only giving stars without recording the opinions accurately and leaving opinions and scores without a framework and, in general, cannot record the strengths and weaknesses of a place in detail, and there is no such process in the existing applications related to this issue either but having multiple criteria for restaurant data is partially efficient for scoring, saving time and resources.
- On the other hand, the geography of each user-generated data platform and its richness depends on the socioeconomic context (e.g., population density, ethnicity, education, and income) (Ballatore et al. 2020). For example, the digital divide excludes people with less digital skills or access to digital devices from generating user-generated data (Schradie 2011). Some people do not provide reviews while using user-generated data and platforms due to their cultural values, age, and lifestyle (Wilson et al. 2012; Edelmann 2013).

In this study, Google POI location data were used as partial solutions for this problem (Rabiei-Dastjerdi et al. 2022). In general, from the social, cultural and behavioural points of view in applications, users' comments should be such that their main parameters in these fields should be maintained in the accurate recording of the opinion and also the choice of the desired location.

5. Conclusion

The food that is consumed daily is of great importance. In addition to food, the place where people eat and the main parameters related to these two (such as the quality of raw materials for food and cooking, food hygiene, food health, environmental hygiene, food price, the behavior of people who are present in the environment, the beauty of the environment, etc.) are also very important.

The registration of points of interest (POI) is considered a kind of collaborative mapping and often, participatory mapping research is dedicated to specific communities or social groups facing local issues (indigenous-rural-community, urban, environmental-natural resources) (Fagerholm et al. 2021; de Carvalho et al. 2021).

This study developed a POI system to enable and engage customers, employees and managers of local restaurants and generate new information about regional food quality. This represents an attempt to move towards more systematic and controlled POI creation. This method describes the project, the participants, the Geo-web, and the data components needed to create the POI. This study leads to the creation of a quality data set of local POI restaurants and a map to select the best restaurant from the point of view of the main parameters proposed in order to reach the user's desired location more easily. The new data will enhance the knowledge of regional decision-makers and highlight the decision-making spatial data directly reported by Geo-web contributors. While the scope of this study ends here, the primary recommendation for food regulatory bodies and stakeholders in this field is to develop relevant local regional food policies to be adopted by the relevant trade union and supports a community-based food decision-making system. The impact of this research on regional and urban food policy, and the development of programs and regulations that accompany it, will be determined through the continued engagement of the region's food community—both formal food policy stakeholders and all those who share their comments.

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