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## Detection of tourists attraction points using Instagram profiles

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### Abstract

During vacations, people try to explore new places, but it is impossible for tourists to see all interesting locations. In this paper, we shed the light on differences between favorite places of tourists and locals using Instagram profiles. The time windows based identification method is proposed to distinguish visitors from residents. The list of potential tourists' attraction points in Saint Petersburg was obtained by analysis of locals' popular places.

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*Keywords:* Instagram, geotagged photo, location recommendation, area of interest, geo-social data

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## 1 Introduction

People make photos to memorize moments or meaningful places [1]. For this reason, photo-based social networks, like Instagram, are constantly growing. By this time Instagram includes over 600 million users from all over the world<sup>1</sup>. One of the prevalent types of Instagram content is photos of visited places, historical buildings and some interesting locations. Such posts are expected to be from someone, who sees place for the first time, however, there is another tendency to post pictures from the favorite place. There is no doubt that popular places for local citizens and visitors differ [2]. The first question that is addressed in our research is: how different are popular locations of tourists and locals?

Due to time limitations, a person plans his or her visit with the help of travel guides, web sites or even using specific recommendation systems [3]. Websites and guides contain lists of “must-see” places, but these lists are usually limited to a several places. Thus, potential visitor ends up tied to a relatively short list of typical locations. Although there are user-based recommendation systems, like TripAdvisor, they usually target content integrity policies towards tourists<sup>2</sup>. Still, many places are not mentioned in the tour guides, but well-known by locals. All that leads to the second question we consider in this paper: can we expand the visible city area for tourists using the information from residents?

To answer the stated above research questions, we propose: (1) an improved method for separation of tourists and locals per posting activity; (2) a method for an automated classification of places, popular among locals, with the identification of the most interesting locations.

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<sup>1</sup> <http://blog.instagram.com/post/154506585127/161215-600million>

<sup>2</sup> [https://www.tripadvisor.com/pages/content\\_integrity\\_policy.html](https://www.tripadvisor.com/pages/content_integrity_policy.html)

## 2 Problem statement

The problem of the development of tourist areas and places of attraction has been widely studied since 1980s, when the concept of tourist area cycle of evolution was proposed [4]. The most part of articles, devoted to this topic, perform theoretical analysis of the target area [5] or use statistical methods of analyzing tourists [6]. These methods work well for relatively small cases and for particular areas, but with the development of the Internet and photo-sharing networks, like Instagram, researchers now can investigate the activity of the people in the tourist areas on the much larger scale. We can collect a large amount of posts from the social network to see, if there are any differences in the behavior of local citizens and tourists.

In Figure 1 the density map of Instagram photos, taken by locals and residents in Saint Petersburg in 2016, is presented. We can see that the clear majority of tourists' photos is located in the city center, mostly along the main street – Nevsky prospect. Popular places of residents are scattered throughout the city area. Saint Petersburg was chosen as the target city of the research, because it is a cultural and touristic center. In 2016 the city was awarded as the World's Leading Cultural City Destination and Europe's Leading Destination<sup>3</sup>. Thus, we can say that there is no better place in Russia to study the differences in behavior of tourists and residents.

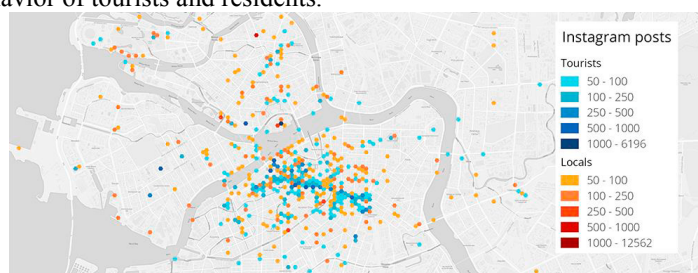


Figure 1. Density map of Instagram photos in Saint Petersburg

## 3 Proposed solution

**Data crawling.** For the analysis of users' activity on the Instagram, we require full profiles of users, which include user's information and all his or her posts with geolocation of posts where available. At the first step, we collected a sample of posts made in Saint Petersburg in the period of two months in 2016 – February and November. These two months were chosen because they represent periods of low tourist activity<sup>4</sup> and this fact allows to collect more posts of local users. The crawling of posts was initiated at four points of interest: three parks at the north, east and south of the city and the cultural center of Saint Petersburg – the Hermitage. Instagram entries were collected within the 5 km radius around these points, which allowed to cover the major part of the city. After that, we extracted all usernames from the collected dataset and collected full profiles for these users.

**Detection of city residents.** One of the most common ways to discover city visitors is to check the time periods of posted photos [7]. If someone posts pictures in the target location only in a specific time frame, he or she is considered as a tourist. However, usage of the approach with small time frames would result into situations, when tourists with relatively long vacations would be classified as citizens. Since the main idea of our research is to analyze the most popular places among locals, we need to use more accurate way to detect city residents. It was decided to expand the described approach with the use of official tourist statistics. By information from the administration of Saint Petersburg, the largest number of tourists comes from the European Union (32%). According to Eurostat<sup>5</sup>, average duration of the

<sup>3</sup> <https://www.worldtravelawards.com/profile-8085-saint-petersburg-committee-for-tourism-development>

<sup>4</sup> [http://travel.usnews.com/St\\_Petersburg\\_Russia/When\\_To\\_Visit/](http://travel.usnews.com/St_Petersburg_Russia/When_To_Visit/)

<sup>5</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Trips\\_made\\_by\\_EU-28\(%C2%B9\)\\_residents\\_by\\_duration\\_destination\\_and\\_purpose\\_2014.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Trips_made_by_EU-28(%C2%B9)_residents_by_duration_destination_and_purpose_2014.png)

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