

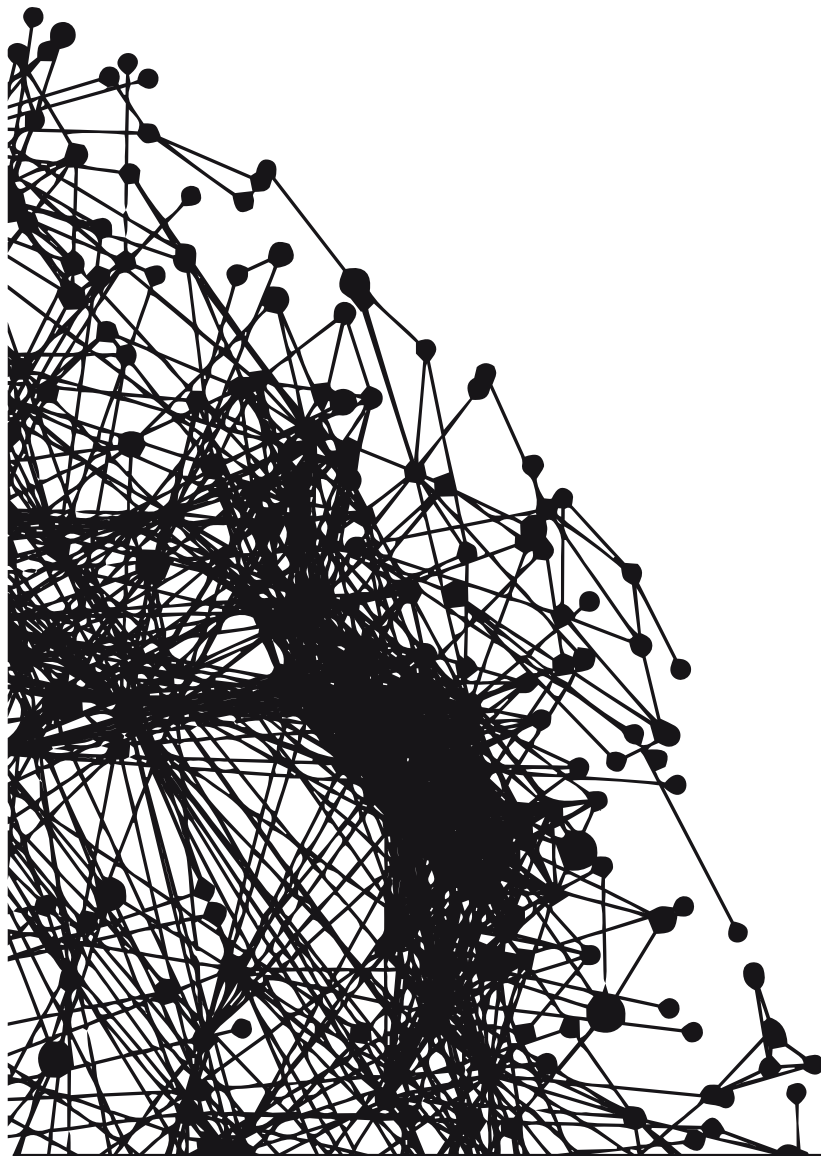
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PLACES AND TECHNOLOGIES 2014

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editors:

Eva Vaništa Lazarević, Aleksandra Đukić,  
Aleksandra Krstić - Furundžić, Milena Vukmirović

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# PLACES AND TECHNOLOGIES 2014

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## PLACE COMPETITIVENESS EXPRESSED THROUGH DIGITAL DATA. MEASURING THE PLACE ATTRACTIVENESS TRACKING THE GEOTAG DATA VISUALS

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### ABSTRACT

*The globalized and decentralized world we live in is simultaneously the arena for the competition of cities belonging to the global network. Striving to secure a better position on the international scene, responsible managements turn to entrepreneurial activities aimed at finding new forms of competitive capitalism. All efforts are directed towards improving place identity with an aim to build a strong, positive image, representing a way in which a certain place is experienced in one's consciousness. Based on the place image model of communication, which understands primary, secondary and tertiary communication, this paper aims to give an overview of contemporary techniques and tools to be used for tracking tertiary communication, as key element of the process of building strong place image. Tertiary communication is followed indirectly, not by analyzing the contents of a text, a photo or a video published online, but rather by analyzing geospatial metadata shown on maps, connected to published contents. Presented maps are formed by taking over geospatial metadata, i.e. geo-tags from five relevant internet platforms: Panoramio Google Service, Instagram, Flickr, Twitter and Foursquare.*

*Keywords: Place image, Tertiary communication, Photo sharing, Micro-blogs, Geo-tagging,*

### INTRODUCTION

The model identity-communication is characterized by pragmatic approach. Pragmatism is reflected in clear display of inseparability of identity, communications and image in providing competitive advantages and in describing the key role of three components of a municipal communication system. It is based on the model which develops connection between corporate identity and process of corporate communications (Balmer and Gray 2000). The basic advantage over the stated models is reflected in showing communication as three-fold bridge between identity of a city and resulting image and reputation. The second feature of the model is

reflected in putting emphasis on general population. This does not mean that the other target groups are less important, but rather to stress the fact that all activities are performed in the name of inhabitants of a city and that final goal is improving life quality.

This model points to specific importance of identity and communication, but also the change of treatment of these elements from functional to strategic. Observing city communication as a three-fold system encompasses *primary, secondary and tertiary communication*. Primary communication is defined by presenting positive image and framework of creating strong reputation. Secondary communication is further shaped to support and strengthen primary communication. Finally, tertiary communication is expected to be positive and to achieve a result in terms of premium reputation, having in mind that the processes of primary and secondary communication have been adequately conceived and realized. Kavaratzis (2008) argues that all encounters and confrontations with a city are realized by perceptions and image. In accordance with this it is claimed that it is also necessary to plan the image of a city itself (Vermaulen 2002) and market it.

Primary communication encompasses communication effects of city activities, by which the communication itself is not the aim of these activities. It is divided into four broader areas of intervention: landscape strategies, infrastructure projects, organizational and administrative structure, and city's behavior. Secondary communication represents formal, intentional communication which is found in well-known marketing instruments, such as in-door and out-door branding, public relations, graphic design, use of logos etc.

Tertiary communication is based on **the word of mouth**, which strengthens by the use of media and by communication of competitors. It is connected to previous two modes of communication by an interrupted line and it cannot be influenced by those participating in the marketing process. *The entire process of branding and other two types of communicating image aim to encourage and strengthen positive tertiary communication* (Kavaratzis 2008, 41-43). This is especially applies to circles of population, which is also the most important target audience in city branding and the most important participants in place marketing.

If traditional diplomacy is characterized by government-to-government (G2G) relations, public diplomacy government to people (G2P), having in mind the importance of live words, place branding should include people to people (P2P) relation. By establishing this relation we achieve a result in which *all citizens become organized in such way to be a voice of quality and value of a city, generating such medium of advertising which is equal to an enormous task of communicating something so complex, yet directed towards large number of people* (Anholt 2007, 105).

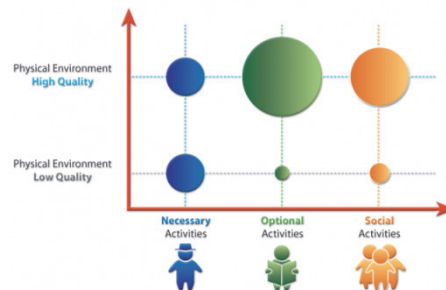
Tertiary communication appears in another form, which gains more importance every day and threatens to jeopardize the dominant influence of mass media. It is a form marked by the term the word of mouse, achieved by communication enabled by social networks, blogs and micro-blogs (Facebook, Twitter, LinkedIn, etc.). They

function on the principle of opening a personal account which enables connecting to people and organizations based on mutual choice. In such way, a person selectively picks information in accordance with personal affinities in relation to other persons and institutions.

In this paper, the emphasis is put on geospatial data which can be connected to content on social networks or portals for exchange of photos. Presenting the retrieved geo-data on a map has opened a new dimension in analyzing ways in which a city is used, based on real spatio-temporal data. By careful observation and interpretation of results of these analysis it is possible to form 1) ranking list of most visited cities and their specific locations, 2) separate locations within a city which are most visited by tourists, i.e. inhabitants, 3) ways in which people move throughout the city, 4) separate most visited locations and periods during the day when that occurs. 5) map attractiveness of specific contents on certain location and temporal interval in which this content is most visited etc.

#### FOLLOWING THE PLACE ATTRACTIVENESS THROUGH GEO-TAGS

General definition of attractiveness states that it is a quality of a person or an object which causes interest of other people. By observing it in relation to a place, attractiveness quantifies how much something is able to attract the attention and influence the decisions of one or more individuals (Uchino et al. 2005) and can help to explain a variety of spatial-temporal phenomena (Furtado, Fuleto and Chiara, 2013). Various methods were used to express attractiveness in a quantitative way<sup>227</sup>, while the very phenomenon was the subject of action of various disciplines: urban design, traffic, marketing, sociology, tourism, etc.



**Figure 54: Diagram – place quality vs. number of activities. Source: Gehl 2008**

In the domain of urban design, Jan Gehl has equated the measure of attractiveness of certain space to overall quality of a location (public open space). By establishing correlation between the quality of public open space and the number of people that people spend in them Gehl notices that by increasing the quality of outer environment the level of follow-up activities increases (Gehl 2008). The stated

<sup>227</sup> Primarily the Gravitational Attractiveness Model by Reilly and the Theory of Central Places by Christaller.

correlation is presented in a diagram (Figure 1) where it is seen that independently from the quality of outer environment the level of necessary activities does not change, but by increasing the quality of environment the level of follow-up activities increases dramatically, which causes increase in social activities. Social activities<sup>228</sup> are a fruit of quality and the longitude of other two types of activities, because they happen spontaneously during encounters.

Development of technology and increasing number of smartphones users and other electronic mobile devices has enabled new ways of measuring attractiveness of cities and specific locations, based on the intensity of visits. As a key resource one can single out spatio-temporal metadata – the geotag – which are linked to devices themselves, but also to contents created and published on the internet on various social networks.

### **Geotagging**

Geotagging is the process of adding geographical identification metadata to various media such as a geotagged photograph or video, websites, SMS messages, QR Codes or RSS feeds and is a form of geospatial metadata. This data usually consists of latitude and longitude coordinates, though they can also include altitude, bearing, distance, accuracy data, and place names. It can help users find a wide variety of location-specific information. For instance, one can find images taken near a given location by entering latitude and longitude coordinates into a suitable image search engine. Geotagging-enabled information services can also potentially be used to find location-based news, websites, or other resources. Geotagging can tell users the location of the content of a given picture or other media or the point of view, and conversely on some media platforms show media relevant to a given location.

Images are one of the oldest types of media to use geotagging. Certain formats like the JPEG format allow for geographical information to be embedded within the image and then read by picture viewers, which allows the exact location of where a picture was taken to be saved with a photograph. Smartphones with built-in cameras and GPS have made geotagging images a breeze. Some blogging and microblogging sites such as Twitter also support geotagging. This is especially popular with blogging and social networking sites that cater to a mostly mobile audience.

Having in mind the stated possibilities, i.e. the sources of spatio-temporal metadata, 8 case studies are selected to somewhat put a light on the potential of this information and the possibility of its interpretation. Case studies are grouped according to internet platform from which the geospatial data is used.

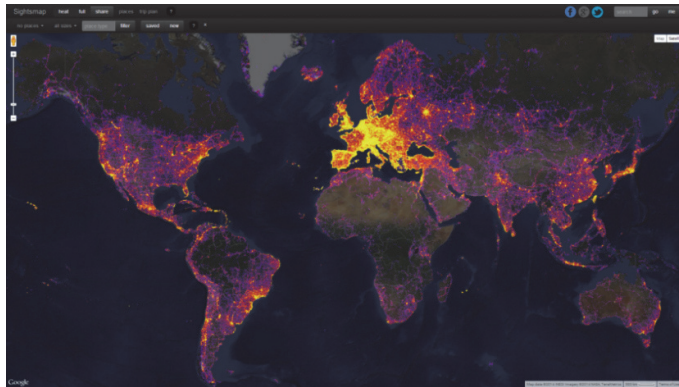
### **Google Maps Panoramio Service**

Panoramio is a geolocation-oriented photo sharing website. Accepted photos uploaded to the site can be accessed as a layer in Google Earth and Google Maps,

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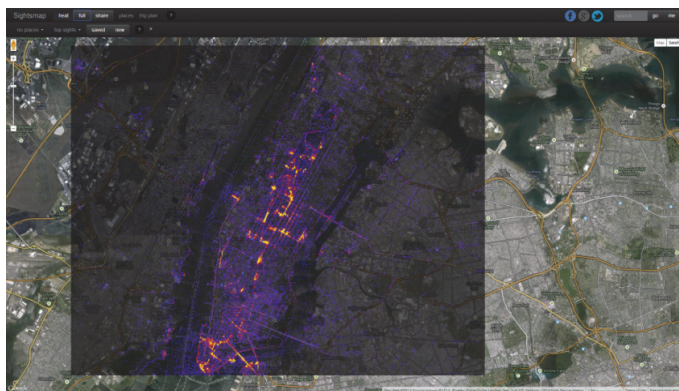
<sup>228</sup> They do not include children playing, greeting and conversation, mutual activities of various kinds or simply observing and listening to other people.

with new photos being **added** at the end of every month. The site's goal is to allow Google Earth users to learn more about a given area by viewing the photos that other users have taken at that place. Based on the data taken from the panoramio web site, a Sightmap was formed in order to better represent attractiveness of certain locations, based on the number of photographs taken on that location. The heatmap shows the places people “like” based on the number of Panoramio photos at each place in the world. The dark areas have few photos, the red areas have more and the yellow areas have a large number of photos geotagged.



**Figure 55: Panoramio photos world heatmap.** Source: <http://www.sightsmap.com/#>

Maps are available for top 15000 places in the world, sorted by the number of photos in an area of a size of a few square kilometers around the place center. The popularity ranking of places in high-res area maps is computed by combining place hotness with popularity rankings from Wikipedia, Foursquare and real-time Google places selection.



**Figure 56: Panoramio photos New York heatmap.** Source: <http://www.sightsmap.com/#>

The lists of popular places were formed based on the data gathered in this way, whose popularity was measured based on the number of photographs taken whose geographical data is linked to the location in question. According to these data, the

first five most attractive cities are: 1. New York, 2. Rome, 3. Barcelona, 4. Paris and 5. Istanbul. All of the stated (and other) cities can be analyzed in more detail by determining which specific locations in the city itself are most attractive. By analyzing New York (Figure 3), as most popular city according to this study, it was determined that its attractive locations are: 1. Solomon R. Guggenheim Museum, 2. Tweed Courthouse, 3. Empire State Building, 4. Battery Park and 5. Grand Central Terminal Park Avenue Viaduct.

Further research enables the analysis of the content of those photos, which can be used to interpret ways in which users and visitors experience this space, what attracts them and what they recommend to other users.

### **Instagram**

Instagram is an online photo-sharing, video-sharing and social networking service that enables its users to take pictures and videos, apply digital filters to them, and share them on a variety of social networking services, such as Facebook, Twitter, Tumblr and Flickr. This photo-sharing app showed strong growth in 2013. While Facebook showed 3-percent growth in active users, the behemoth social network's photo-sharing sister service gained 23 percent in active users (Knibbs, 2014).

By analyzing the content which appears most on uploaded photographs it is observed that the largest number of users of this social network takes photographs food or pets. However, third most generated contents are cities – interesting happenings, places, installations etc. Having in mind the stated, Instagram has formed a list of most popular locations and cities. Based on the trend of appearance of certain locations, a list of the most-instagrammed cities was formed. The company has up to now published lists for 2012 and 2013. According to data published in January 2014, 5 most popular cities are 1. New York, 2. Bangkok, 3. Los Angeles, 4. London and 5. Sao Paolo (Instagram 2013). Among 5 most popular city locations in 2013 are: 1. Siam Paragon Shopping Mall u Bangkok, 2. Times Square in New York, 3. Disneyland in California, 4. Bellagio Fountains in Las Vegas and 5. Disney World in Florida (Instagram 2013).

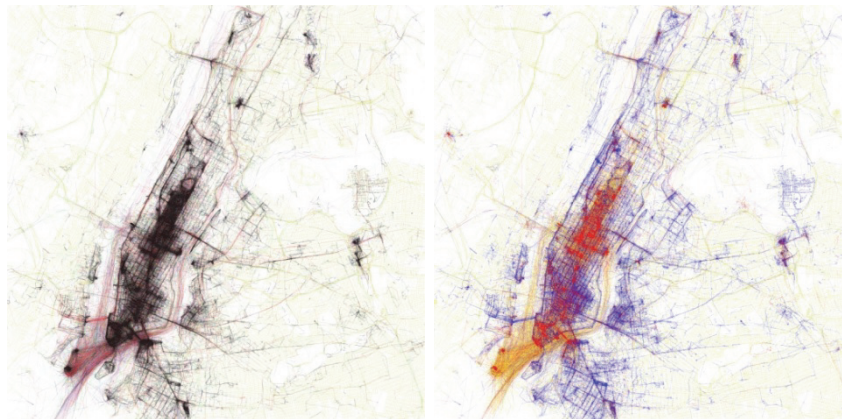


**Figure 57: Instagram photos taken on Times Square. Source: <http://www.gramfeed.com/instagram/places/3001373>**

Besides the overview interpreted in a form of a list, the analysis can be done by memorizing the very content which is published on photographs, which is also linked to a specific location (Figure 4).

### **Flickr**

Flickr is a photo-sharing web platform that allows its users to store, sort, search, and share photos online. For this research the sets of photos taken in 2010 by Eric Fischer carry a huge weight. The taken spatio-temporal metadata<sup>229</sup> from photos published on Flickr (and Picasso, also a photo-sharing web platform), Fischer uses and creates several hundred maps of cities which he divides into three groups, depending on ways of interpretation of the results gathered: *Geotaggers World Atlas*, *Locals and Tourists* and *See something or say something*. Within the thematic sets the maps are ordered by the number of pictures taken in the central cluster of each one – which has at the same time enabled the ranking of selected cities. According to the opinion of the author, in this way cities with polycentric character are somewhat neglected if this methodology is applied (Tokyo and Los Angeles) which probably get lower placement than they really deserve because there are gaps where no one took any pictures. The cities which are not on the list did not possess adequate data based on which a good quality map could be created. All the maps are to the same scale (a square measuring 15 miles on each side), chosen to be just large enough for the central New York cluster to fit.



**Figure 58: Eric Fischer's maps of New York: a) Geotaggers' World Atlas and b) Locals and Tourists. Source: Eric Fischer's photo stream on Flickr**

The sets titled *Geotaggers' World Atlas* and *Locals and Tourists*<sup>230</sup> (Figure 5) created during 2010 have attracted high attention of professionals and have from the very start been understood as maps of human interest, depicting a city's most photogenic and commonly visited sights. The color was used to separate spatial data in relations to temporal interval when the photos were made. Such analysis enabled us to determine which mode of transportation each photographer presumably used, considering the time stamps and distance travelled between a user's pictures. The information is color coded on each map (Figure 5a): black is walking (less than

<sup>229</sup> The photo locations come from the public Flickr and Picasa search APIs.

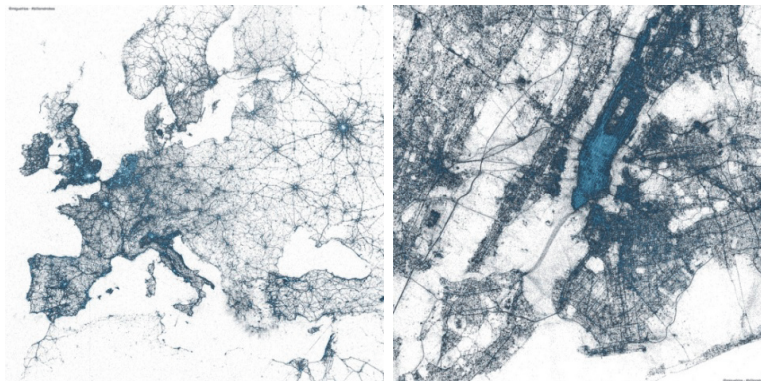
<sup>230</sup> By using the same methodology, but using data collected from Twitter and in cooperation with Gnip team, *Locals & Tourists* maps were created, published in the Mapbox platform.

7mph), red is bicycling or equivalent speed (less than 19mph), blue is motor vehicles on normal roads (less than 43mph); green is freeways or rapid transit.

The second set of maps were the maps of tourism. Some cities like Las Vegas and Venice do seem to be photographed almost entirely by tourists. Others seem to have many pictures taken in places that tourists do not visit. Photographs taken over the course of a month or more are designated by blue plots on the map and represent locals. Photographs taken over the course of a month or less were presumably taken by tourists and are represented by red plots on the map. Yellow plots are designated for the unknown.

### **The geography and the topography of tweets**

Twitter is an online social networking website and microblogging service that allows users to post and read text-based messages of up to 140 characters, known as “tweets”. *With its open API, Twitter has become one of the most popular data sources for social research, yet the majority of the literature has focused on it as a text or network graph source, with only limited efforts to date focusing exclusively on the geography of Twitter, assessing the various sources of geographic information on the service and their accuracy* (Leetaru and al. 2013). The authors report that the few studies make use of the geographic information attached to tweets, while papers like Poblete, *et al.* (2011) have used it primarily as a filtering mechanism rather than focusing on the geography itself. Geotagging occurs when Twitter users make their location available so that others can see exactly where the Tweet was sent from. Only a small proportion of all Tweets are geotagged, but they provide a “gold standard” dataset, helping us gain even deeper insights into the way people Tweet (Leetaru and al. 2013).

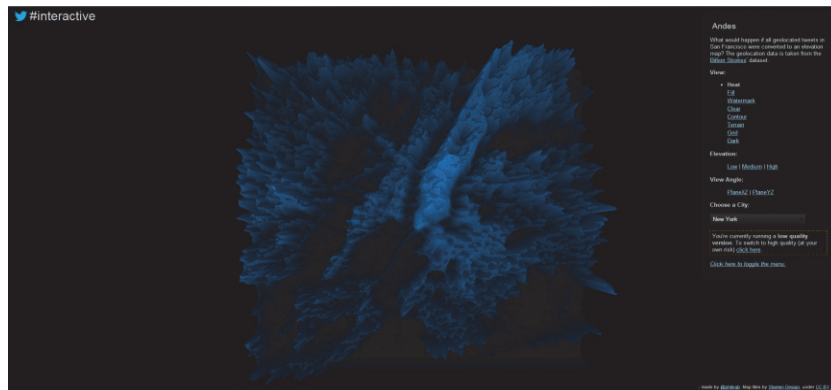


**Figure 59: Map of the tweets since 2009: a) Europe and b) New York. Source: Rios 2013**

The researches made by Miguel Rios (2013) from Twitter Visual Insights Team are particularly significant for researching attractiveness of cities and their locations. By visualizing the geotagged tweets (Figure 6) published from 2009 to 2013 the contours of “active” counties, cities, locations, main roads and even waterways (fluvial and maritime traffic) have been outlined.

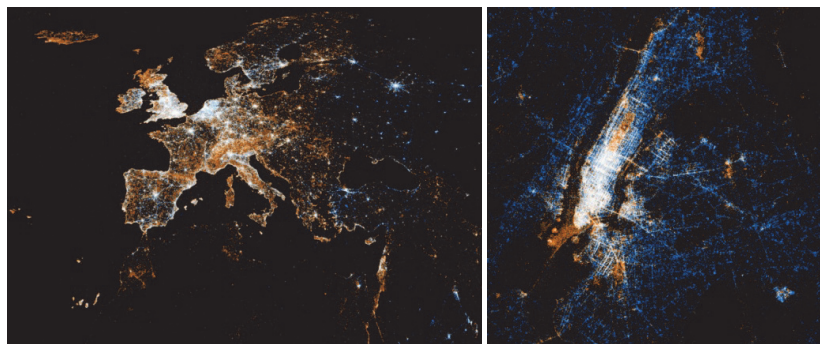


The second important research of the same time is titled “Using Topography of Tweets”. In difference to “geography of tweets”, which portrayed concentration using various shades on certain location, these diagrams do so by introducing the third dimension (Rogers 2013). In such way new topography of locations was developed, reflecting not the natural one, but rather the Twitter’s landscape. The peaks represent the places most Tweets are sent from, the troughs the fewest. Explore New York closely and you can pick out the Brooklyn and the Queensbury bridge — even the Staten Island ferry (Figure 7).



**Figure 60: New York’s topography of tweets. Source: Rogers 2013**

Fischer used red dots for Flickr pictures, blue for Twitter and white for both – all publically available data in the Flickr and Twitter APIs. To some extent, the density reflects the density of footfall in different parts of the city, but with Flickr, geographic visualizations tend to reflect a more cultural consensus of photogenic places or tourist spots.



**Figure 61: See something or say something in a) Europe and b) New York. Source: Eric Fischer’s photo stream on Flickr**

The research has demonstrated that the geographies do not overlap because the places people take pictures of are not the places they tweet from. That is, people take pictures of tourist destinations; people tweet from where they live. It is no less

than a visual map of how differently cities look when you view them through the eyes of a tourist or a native.

### Foursquare

Foursquare is a location-based social networking website for mobile devices, such as smart phones. Users "check in" at venues using a mobile website, text messaging or a device-specific application by selecting from a list of venues the application locates nearby. Location is based on GPS hardware in the mobile device or network location provided by the application, and the map is based on data from the OpenStreetMap project.

Having in mind the specificity of this social network and the analytical possibilities which it offers, a selected research followed the 24 hour activity in six cities (New York, Tokyo, London, Istanbul, Chicago and San Francisco) in relation to the character of a location where users checked in. By observing the diagram, the chart shown on the left side, one can follow which activity is most present and which location is most visited in each period during the day. It gives a better sense of why Foursquare's trove of data is such a treasure: *It not only indicates where people are but, more significantly, how, when, and why they're going there* (Foursquare 2013).

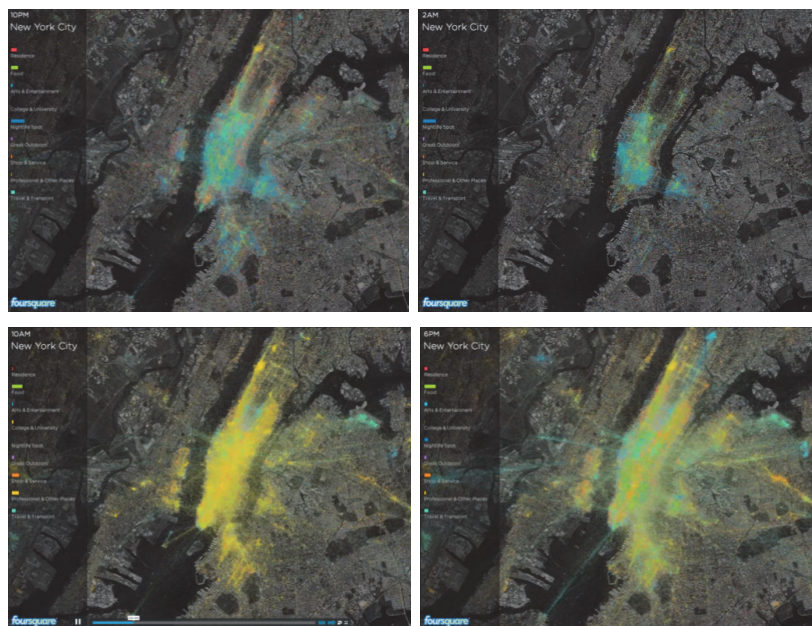


Figure 62: New York activity at a) 10PM, b) 2AM, c) 10AM and d) 6PM. Source: Foursquare 2013

Color-coded signals show at what times of day and by what means users travel to various locations. In New York, for example, you can see yellow streaks of light zoom into Manhattan as users commute to work, and then slip away as they head home; at night, the city lights up in blue as more users head to nightlife spots. The researchers used the methods of comparative analysis, where they compared ways

in which citizens of New York and Tokyo, for example, use their cities, following the same temporal interval throughout the day.

## CONCLUSIONS

Demonstrated case studies are only a segment of published researches with an enormous amount of data, which can be obtained and interpreted by downloading it from various social networks. This paper solely selects the researches based on geotagging and presented by using maps, as ways of presenting spatio-temporal data.

Observed from the aspect of urban design, the contemporary period, also characterized as the period of iPhone revolution, has created new perspective in real-time analysis of ways in which cities function. Each of the five selected platforms, which have a character of a social network can be observed as ways of tertiary communications, especially in two ways. The first way comes down solely to position which the geotagged information provides, whose number can be in the widest sense understood as high attendance of a certain location caused by its attractiveness. The second way takes into account the temporal dimension of the concrete spatial record, which is later interpreted in a form of speed of movement, interval of presence at each location. When the information on the character of certain location is added to that, way of life of a city and preferences of its inhabitants can be easily analyzed.

In the context of place attractiveness, which is quantified in this way, general interpretation can be that a geotag confirms someone's presence at a certain location in a certain time, which is also a confirmation that at that place at that time something interesting happens. *However, when that is recorded with a photo, this can be interpreted as if it gave birth to a wish to document it* (Fisher 2010).

Research conducted on the basis of these data may indicate the success of certain interventions in space from the aspect of urban design; it can determine the value of a particular location from the economical aspect, or the ways people use the city from the aspect of urban sociology. Depending on the availability of these enormous amounts of data taken from social networks and creativity of their presentation and interpretation, opens a wide field of studies of the city and the ways in which it functions.

## ACKNOWLEDGEMENT

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