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## Digital Mapping: the analysis of the social realm of Urbino

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The use and the spread of social media has created a vast amount of data that could be collected in real time maps and give new insights into the use of the city. Those data are automatically produced, free and continuously updated. Our analysis tries to understand the public realm of Urbino, representing data coming from the most common social media, considering their own specificity. The outputs are some maps exploring different aspects, using data collected until 01-2013. Different social networks have been studied to catch significant results: *Foursquare* to individuate the social landmarks, as places people tend to recognize with, and the attendance ratio (check-ins/people), to understand which are the most attended public spaces; *Instagram* to profile every registered person, as to define the city users of some public spaces; *Flickr* to identify the touristical hotspot of the city.

**Keywords:** public realm, social networks, digital analysis, historic centre



## 1. Social Network Analysis

Reading the dynamics of an urban settlement has traditionally been a challenging endeavour, often requiring long hours of observation and interviews. This process has been extremely simplified thanks to the raise of new methodologies of data recollection and representation, induced by the diffusion of digital technologies.

Particularly interesting is the chance offered by the collection, organization and interpretation of data coming from social networks, passively provided by users.

Therefore, a large number of individuals can be studied, without directly involving them in the research: whether the user expresses no restrictions in terms of privacy rights, this data can be easily obtained, gathered and visualized towards proper maps. There are clear advantages in the employ of so-obtained information, primarily because they are automatically produced, free and continuously updated.

Thus, the main issue concerns the selection and interpretation criteria these data are read through. At this purpose three main features must be kept in mind:

- *The Goal.* It is necessary to clarify which is the purpose of the investigation. The research has to be finalized since the beginnings: data have to be considered as signifiers, the significance of which is attributed by the aim of the research at large. In general terms, social networks maps can help in comprehending two main factors:
  - *the use of the space in the city:* whether social media active population is usually present in that place, if they tend to come back, what is the part of the day when they tend to use the place;
  - *discover new poles in the city:* whether places are perceived as significant for a city, which are the places most talked about or that are most photographed.
- *The Target.* Geo-located data from social networks come from citizens equipped with a smartphone or another *GPS* device and, even if continuously growing, these people do not represent the most substantial portion of the population. This type of analysis, therefore, has to keep in account the number of subjects is able to observe. There are certain countries that record a higher number of smartphones-equipped citizens and among these it has to be considered the percentage that uses a smartphone to access to social networks sites. Nevertheless even in smartphone-intensive-use places, the incidence changes from area to area. For sure a research based on location services and applications will be more effective if applied on a metropolitan reality, where the quantity and use of smartphones and highly technological tools are pretty widespread. Finally, it has to be taken in account that young people are considerably more engaged with cell phones than their elders. In this sense a research founded on social networks traces can't be considered as an exhaustive cross-section of the urban reality, since it will be related to a proportion of the population with less than thirty-five years.
- *Distinctive Traits.* What has been observed is that every social network brings with it peculiar features, connected to the nature of the platform itself, to the type of sharable contents, to the main kind of user.

The main difference occurs between location-sharing applications, allowing users to continuously collect and share their current location (such as *Foursquare*, *Facebook Places*, *Gowalla*) and social media applications, whose aim is to let collect and share different kind of contents (pictures, video, comments) and eventually embed the current location of users (*Facebook*, *Instagram*).

These latter, indeed, present a more implicit will to communicate a message about a place. Even if it's the user that each time is able to choose whether including or not his geographical position in the content he means to share, his location is not the chief focus of his social interaction: it's a sort of side effect. This circumstance is particularly meaningful, as this kind of digital footprints on the city can be considered as a more spontaneous pattern of the truly most attended places by smartphone-equipped dwellers: those are the real venues where people spend their urban lives and from which they socially interact.

A different speech regards the location-sharing applications (*LSAs*), such as *Foursquare*. These applications have to be seen as an apparatus aiming at creating social interactions among users, where

the shared content is not a picture or a written message, it is the declaration of the current location. Thus, information about venues becomes a tool to catch the attention in a one-to-many/one-to-all process and to boost self-representation. The places where people check-in using *Foursquare*, for instance, do not necessarily embody the places of the city where the users spend the most of their lives, but they represent instead the spots and nodes they consider as most representative and they mean to broadcast.

Briefly, it is enough fair to assert that the choice of the social networks to place under analysis is essential. Since it gives enough precise indications about the kind of response it is possible to obtain from each of them.

## 2. Social Network Analysis in Urbino

Referred to the case of Urbino, a research based on social network traces results to be particularly significant.

Actually, Urbino is a small town in the central part of Italy characterized by a condition of spatial isolation, either due to the hography of the site and to the lack of heavy infrastructure of the area. Moreover, Urbino houses an important university and the number of students its historic centre hosts, mainly as temporary inhabitants, is almost equal to that of native dwellers.

The digital mapping suits particularly well these conditions. Specifically the first feature, the geographical isolation in which the city lays since its foundation, makes Urbino ideal as an in vitro test to observe the social dynamics through social network traces.

Actually, the most important factor in an in vitro test is the possibility to isolate the object of analysis from any other source of contamination. Urbino is located on a selective culture medium, where no contaminations with exogenous factor are possible and the number of interaction of the inner members – even if conspicuous – is easily controllable and manageable. Furthermore, these contributions can be immediately addressed in the urban planning.

Finally, the high percentage of young population – especially in the historic centre – can offer a positive answer the main question: “Is the sensible portion of users significant to the terms of the research?”

## 3. Methodology

The social networks observed in this analysis are mainly three.

- *Foursquare*. It is a mobile application, though which members could note their locations and find out where friends are.
- *Instagram*. It is a mobile application that enables online photo sharing. Users could take a picture, apply a digital filter to it, and share it, with its location.
- *Flickr*. It is a located pictures gallery edited on the web and at home.

The data we collected are all the contents produced by users until January 2013.

The data under observation refer to a range shifting from 1000 to 5000 contributions.

Considering then the students as the main profile using social media, that is a 20-30% of the whole section.

What is relevant to bring to the attention is how the here proposed interpretation of data revealed via social platforms is not intended as a reading of statistics. The one at issue is a qualitative, not quantitative, research, the purpose of which is to define a possible methodology for the use of data coming from digital devices within the urban planning operations.

Moreover, the proposed interpretation and graphic representation of the data on the maps was “analogically” made by the authors of the research. Interactions, in fact, have been sought directly from

the chosen social networks, by geo-location (for example, “within four kilometers from Urbino”) or semantic (“Urbino public spaces”) querying.

The research carried out in these terms leads to a limitation that is related to the query settings imposed by the social networks. The returned information, actually, does not necessarily represent all the data that have been produced within a certain urban venue since the foundation of the social network, but there might be limitations both in time and in terms of the amount of available data.

The platform, in fact, can establish that the research is made exclusively on data produced within a certain period of time (for example, the last four weeks) or that to each search corresponds a maximum fixed number of spotted answers.

In the circumstances, the maximum number of search results is not a major problem, since generally the fixed limit is definitely higher than the amount of interactions produced in a really small reality like that of Urbino. Time limits, otherwise, could adversely affect the results of a survey conducted as a statistical analysis.

#### 4. Proposed interpretation of data.

##### Popularity map (Figure 1)

The relevance of the *Foursquare* for our analysis deals with the fact that the geo-localization made by the user is not one of the extra-information that goes together with the shared content, it constitutes the shared content itself.

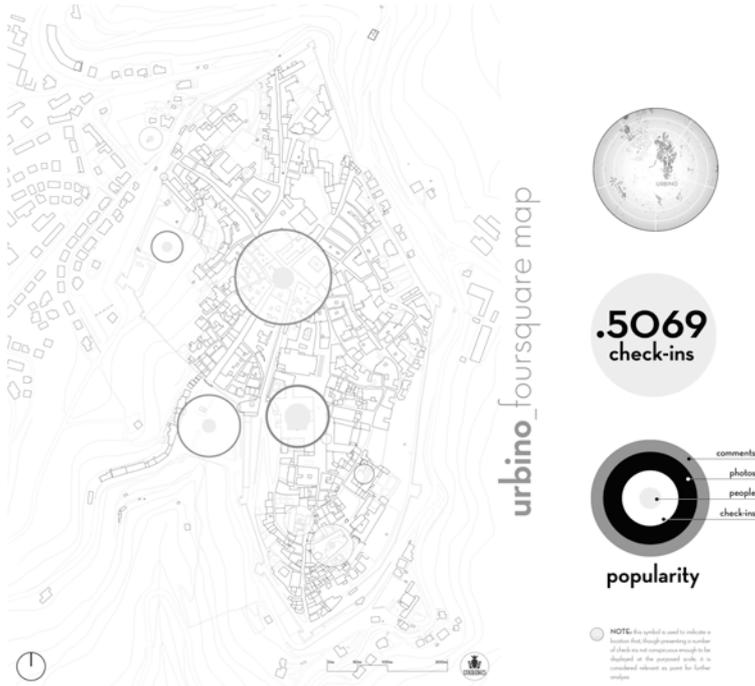


Figure 1. Popularity Map

The here (Figure 1) reported analysis has been conducted until January 2013, considering the *Foursquare* interactions geo-localized within one kilometer from the center of Urbino

In our research we decided to refer to an evaluation criterion we called *popularity* and identifiable as the sum of parameter that can be reported on Foursquare: check-ins, photos, people, comments. The higher the amount of these four, the most popular a place has to be considered on the social platform.

It has to be noticed that the parameters identifying the evaluation criterion of popularity are not particularly relevant if considered separately, since it is not possible to frame a group of user or a defined attitude considering a single element per time. Pictures, for instance, are not necessarily connected to a touristic vocation of an area, since they could be – and actually are – both uploaded by tourists yearning to share their suggestive captures of the city, as well as by dwellers, sharing images from their daily lives. A cross interpretation is instead extremely powerful and reveals hidden dynamics the interpretation of which is exceptionally significant for our research.

**Attendance ratio map (Figure 2)**

The *attendance ratio* (Figure 2) represents the relation between check-ins and people, in *Foursquare*, that is the number of check-ins and the number of users that checked-in. For instance, whether a place records five-hundred check-ins from a hundred different people, it will mean that those people came back to that place – and they checked-in – five times. It is a relevant value for the analysis, since it gives an address to what kind of users and what kind of relationships they establish with spaces.

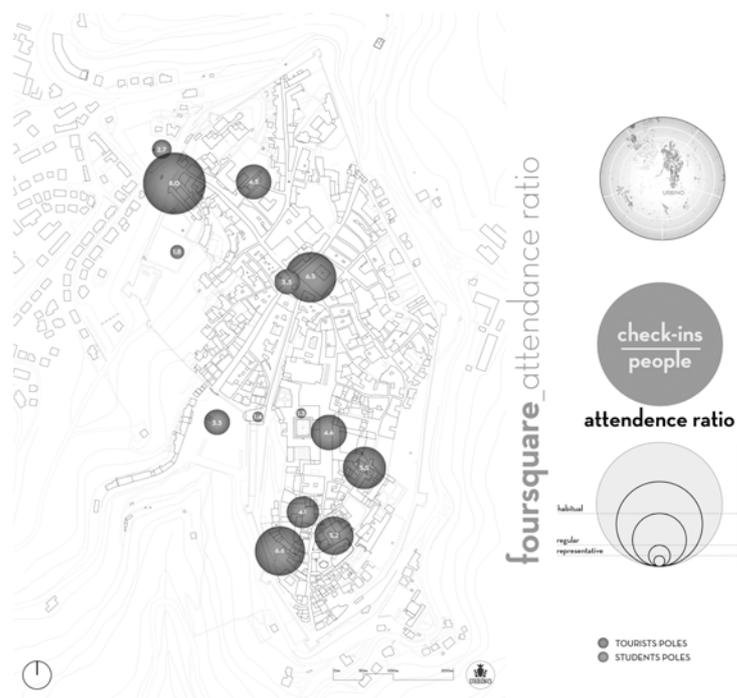


Figure 2. *Attendance Ratio Map*

In fact, an attendance ratio close to the unit value – which means with a number of check-in almost equal to the number of persons who checked-in, suggests a type of space visited once in a lifetime, to which is assigned such an importance that make the user want to witness and share the visit within his social sphere.

The first hypothesis is that this kind of attendance ratio is connected to the symbolic value of space. It generally regards extremely representative places, with a high incidence of tourists.

The second hypothesis, instead, generally related to the first one, concerns more the design of the space and relates more closely to native residents and long-term users. It regards those public spaces that have not been designed to meet long lengths of stay and are exempt from benches, trees, covering structures, ergonomic surfaces or materials. The user, even if living or spending a long time in that city, probably a few steps far from that place, doesn't come back and, in case he does, he doesn't stay there enough to check-in.

The places which have an attendance ratio between two and five are commonly frequented places, presumably by the inhabitants of the city. Those generally are meeting places, squares, gardens, small parks, which are often facing entertainment and retail activities, including bars and cafes.

Public spaces that present an attendance ratio greater than five are identified as habitual places. The number of check-in is significantly higher than that of the people who have carried out, this means that a given number of users continue to return to that place with a given frequency and check-in.

An attendance ratio of this kind is chiefly caused by two coexisting reasons.

The first implies that at issue is a place that involves a regular attendance: such as universities, libraries and offices. These are places where people return frequently, mainly due to the nature of the activity that took place there.

A high attendance ratio can be considered as a form of common practice on a space and this is fueled by the operating mechanism of *Foursquare* itself. Since the platform makes the user gradually conquer higher virtual badge the more he checks-in in a place, until arriving to the status of mayor. This system allows the user to identify in one place and get aware of the presence of other people which are doing the same and collaborate – or virtual challenge – with them in the creation of a site-specific community.

### **Profiled use of space map (Figure 3)**

*Instagram* enables us to reconstruct a sufficiently detailed profile of its users, which is tremendously relevant to outline more precisely the urban phenomena we mean to observe.

The profiling process starts from the description the user embed to his *Instagram ID*, reporting data about his age, the city where he lives, his job.

Whether the information provided directly by the user are not available or are considered not sufficient for the purposes of the research, it is interesting to observe where the pictures were taken. This reveals information about the movements within the city and out of it; for instance, if a user has taken most of his picture in Rome and just few in Paris – furthermore in a limited time frame – it is quite fair to affirm that he lives in Rome and has visited Paris for a few days as a tourist.

Clearly it is not always so easy to identify the dynamics that govern the life of a user based on his movements. In case the number of pictures and their location are not per se significant, the observation must move toward the evaluation of the content of the picture itself. Suppose a member of the social network would display a pretty similar number of photos taken in separate locations at the maximum distance of a couple of hours from each other, the image content may be extremely important to understand the type of user.

Therefore to the first place may be associated photos of interiors – a home cooking, a couch – still in the picture may appear elements of a exclusively homemade clothing or even be associated with tautological descriptions – "home sweet home". The second of the two locations listed may be reserved for photos in which appear classrooms, the interior of an office or simply outside pictures. In this case it will be suitably safe to assume the user is a commuter, who lives in the first place and goes to the second location – and the frequency can eventually be established on the uploading dates of the pictures – for work or study.

Applying this methodology of observation to the case of Urbino, by February 2013 we identified one hundred sixty *Instagram* users, which were using the geo-location option in sharing their contents. These profiles have been studied to identify which were the most attended places in the urban centre and who the users actually were. This latter observation is really powerful to the terms of our research, since it permits to identify which are the most attractive spots of the city for students, tourist, commuters and inhabitants and how their dynamics influence each other. It also reveals the places that do not appear in this mapping, probably because they are felt like less representative, unappreciated or simply unknown.

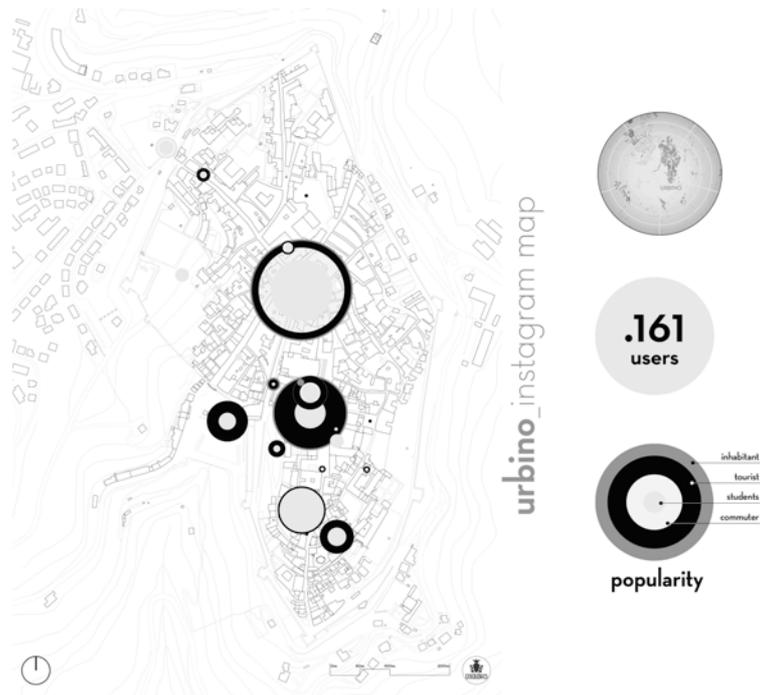


Figure 3. *Profiled Use of Space Map*

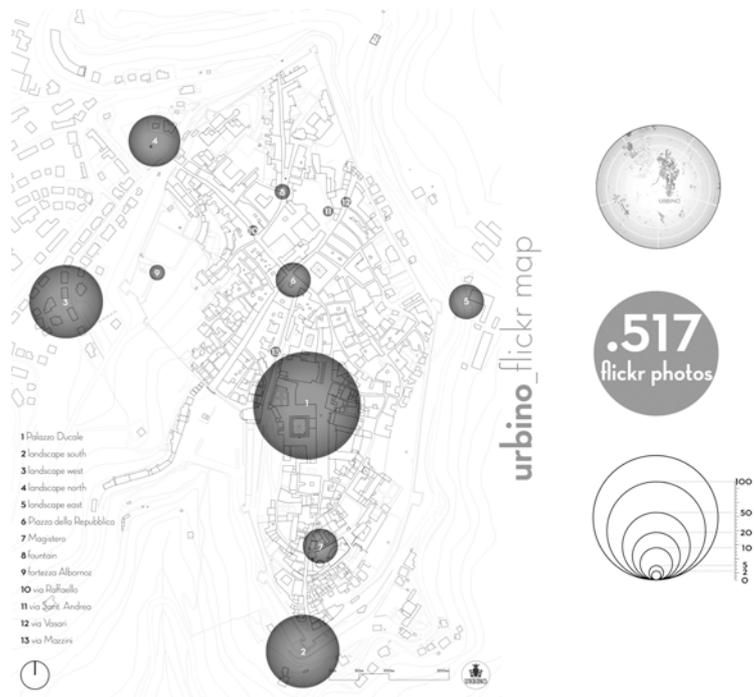


Figure 4. *Touristic Representative Poles Map*

### Touristic representative poles map (Figure 4)

*Flickr* is a virtual gallery that let users share pictures.

The pictures are usually taken with a camera, and the uploading moment to the virtual gallery is different from the moment the picture is taken.

Users come back home, select the pictures they find more significant and upload them, geo-referenced.

It is a more reflexive moment compared to *Instagram*. The former, in fact requires the camera and the selection. *Instagram* on the contrary let users crystalize a moment they were living in urban life: it is a more compulsive action.

This type of features of *Flickr* frames the analysis of data considering them referred to particular users and leading to a particular interpretation of the results.

The users having camera are usually tourists and visitors. The moment of selection induce to understand the results in order of representative poles, the places that are considered as the hotspots to see when visiting Urbino, or beautiful places scattered in the main touristic paths.

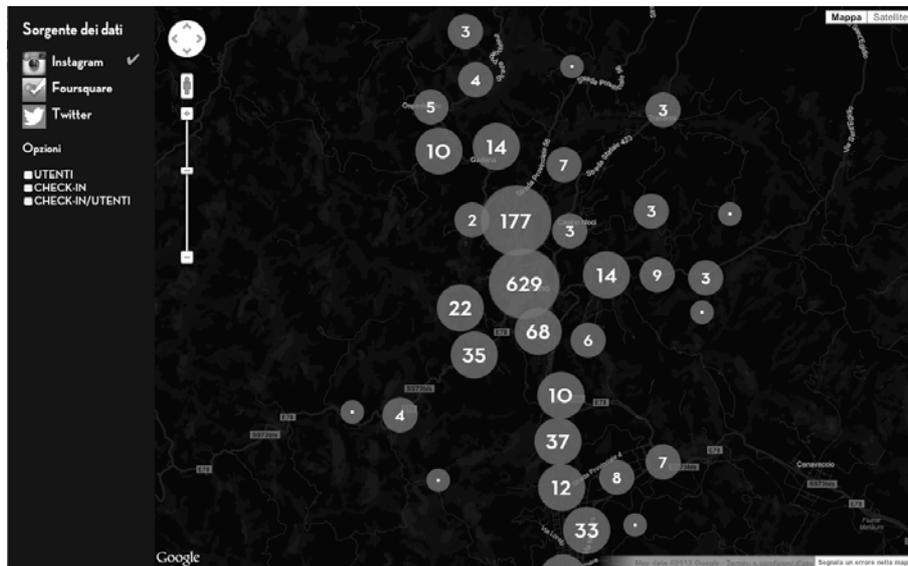


Figure 5. Screen Shot of the web-based instant map

## 5. Conclusion

It has been shown how social networks analysis could help in the understanding of the public realm, in particular in small historic centres. It has been studied what kind of information is extracted from each social network. It is important now to focus the attention on what to do with the results.

The aim of this social media-based researches could be the recollection of data to be visualized in a map, the finality of which is to make evident invisible social dynamics or poorly perceived information at a traditional analysis. In this sense, the invasion of privacy may make sense, as the goal lies in providing an *open-data* tool, therefore accessible to all citizens, which raises awareness towards the issue of citizenship and that makes the inhabitant closer to the spaces of the city, enhancing the liveability of these latter.

Moreover the displaying of the results of the individual action activates in the dweller a raising mindfulness towards the common destiny of the city. Maps thus created have the capability to influence the behaviour of users once they are published and as a consequence the work, travel and social patterns of the urban people could gradually change. This process is called feedback loop, according to what has been studied by many urban sociologists and already experienced in similar projects of instant mapping.

Thus the maps here explained have been programmed in a real time web-based application (Figure 5) in order to provide free to access spatial information within the historic centre of Urbino.

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