

Report on the Fifth International Workshop on Location and the Web (LocWeb 2015)

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Abstract

Location is a major feature for describing the real world, appearing in many Web applications and search systems as a cross-cutting issue. Envisioning the establishment of an adequate venue for the location topic, LocWeb 2015 continued a workshop series at the intersection of geospatial search, information management, and Web architecture, with a main focus on *location-aware information access*. Contributions to the workshop highlighted various fields that benefit from a tailored approach towards location features. LocWeb 2015 showed an interdisciplinary mix of contributions, featuring one keynote and three full papers. In this report, we provide a brief overview of the workshop and its contributions.

1 Introduction

Location has become a mainstream feature of the (mobile) Web and it continues to be a strong driver of research activities, related to a wide range of topics that include search, retrieval, mining, extraction, analytics, mobility, services, and systems. After the initial boost and consolidation of approaches based on the simple use of geospatial coordinates, we now see an increasing demand for more sophisticated systems, stronger retrieval, mining, and analytics solutions, and more powerful semantics. Location is playing a key role as a context factor for users, but also as the implicit or explicit place of resources and people. It also is an important factor in mobile and geo-social applications, and it is behind many geospatially-aware Web data mining developments.

LocWeb, the Workshop on Location and the Web, has taken up location as its main topic, understanding it as a cross-cutting issue. LocWeb has been a ‘traveling’ workshop, having been held before at venues as diverse as WWW, CHI, IoT, and CIKM. Following up on this background, the main objective of the workshop was to bring together a community of researchers at the intersection of location and location-aware services and the Web and Web architecture, for exchanging ideas and discussing and developing the role of location. LocWeb 2015 is the fifth in the series and took place on May 19th 2015 in Florence, Italy,

co-located with WWW 2015, the 24th International World Wide Web Conference (WWW 2015), which was held in the Fortezza da Basso (`geo:43.782, 11.249`).

The LocWeb workshop series envisions establishing an integrated venue where the location aspect can be discussed in depth within an interested community. Its focus lies in Web-scale systems and services facilitating location-aware information access. The location topic is seen as a cross-cutting issue, equally concerning Web information retrieval, semantics and standards, and Web-scale systems and services. New application areas for Web architecture, such as the Internet of Things (IoT) and the Web of Things (WoT) mean that there will be increasingly rich and large sets of resources for which location is highly relevant. In the long term, we expect LocWeb to further the integration of the geospatial dimension into the Web, and promote challenging research questions related to location-aware information access.

Further details, including most of the presentations made at the workshop and information about previous editions, can be found on the workshop homepage¹ and on the workshop series homepage². A report on LocWeb2014 has been previously published in SIGIR Forum [2].

2 Workshop Theme and Topics

LocWeb solicited submission under the main theme of Web-scale Location-Aware Information Access. Subtopics included geospatial semantics, systems, and standards; large-scale geospatial and geo-social ecosystems; mobility; location in the Web of Things; and mining and searching geospatial data on the Web. The workshop encouraged interdisciplinary perspectives and submissions describing Web-mediated or Web-scale approaches that build on reliable foundations, and that thoroughly understand and embrace the geospatial dimension. We were also interested in studies tying into ongoing W3C activities such as Web of Things, Social Web, Data Activity, and Geolocation WG.

The workshop's topics of interest were: Location-Aware Information Access, Location-Aware Web-Scale Systems and Services, Location in the Web of Things, Large-scale Geospatial Ecosystems, Standards for Location and Mobility Data, Location Semantics, Modeling Location and Location Interaction, Geo-Social Media and Systems, Location-Based Social Networks, Geospatial Web Search and Mining, Visual Analytics of Geospatial Data on the Web, Location-Based Recommendation, Geo-Crowdsourcing, and Mobile Search and Recommendation.

3 Workshop Contributions

LocWeb 2015 showed an interdisciplinary mix of contributions, featuring one keynote and three long papers. This section briefly overviews the different contributions.

3.1 Keynote

The workshop keynote was given by Daniele Quercia, titled *Chatty, Happy, and Smelly Maps* [6]. Daniele gave compelling insights into how people's experience of cities can be understood in great detail using today's vast range of available data. He described recent

¹<http://dhere.de/locweb2015/>

²<http://dhere.de/locweb/>

studies combining modern data analytics with classical methods and insights from the social sciences, from people such as Jane Jacobs, Stanley Milgram, or Kevin Lynch.

In his keynote, Daniele repeated a theme consistent with last year's keynote, stressing the idea that there is significant value in classic theories, especially when combining them with modern computational approaches and data availability. Nowadays, not only can experiments be scaled up, but they can also be conducted in a much higher spatial granularity, to find similarities and differences within cities.

Daniele drew a line from classic experiments to the availability of modern city maps and wayfinding applications. He then described his own research work, which aims to create new maps and wayfinding approaches based on emotional responses to the city. He described the use of crowdsourcing to analyse and categorise pictures of the city, to then provide navigation not along the shortest, but instead the happiest paths, in the sense that they would be more enjoyable. Envisioning extensions to his work, Daniele ventured into new territory based on sound (e.g., quiet paths) or smell, which needs new data collection methods. He showed interesting parallels to other fields, such as olfactory research or perfumery, from which to take hints to map smells and scale measurements up to a city level.

3.2 Paper Presentations

The workshop accepted 3 full papers. We had more than 5 reviews per paper and the overall acceptance rate was 50%. We had international author groups from Europe and Asia, but there were no cross-country authorships. Full papers had 20 minutes of presentation and 10 minutes of time for discussion.

The proceedings [1] are available in the ACM Digital Library³ and also directly from the conference page⁴, as part of the WWW 2015 Companion. Slides for all papers are available from the workshop homepage.

The first paper, titled *Reconnecting Digital Publications to the Web Using Their Spatial Information* [4] by De Meester, De Nies, Verborgh, Mannens, and Van de Walle, discussed an interesting application scenario for location in ebooks. They use extracted concepts from the contents of ebooks to estimate a geospatial footprint, and thus are able to dynamically link from books to maps, to enrich the reading experience. They also propose a method to do this not only for location references, but for arbitrary concepts through the use of DBPedia. In these cases, a mix of related links and related geospatial concepts from the abstract can provide rough location estimates in the form of footprints.

In *Verification of POI and Location Pairs via Weakly Labeled Web Data* [3], Chuang and Chang take on the issue of the maintenance of POI (point of interest) databases, especially to determine whether a POI, or more formally, the relation of an entity to a location, is outdated. They propose to collect evidence via Web search engines, with queries based on names and locations. The collected information reflects a number of features, including number, freshness, and similarity of results. This can give hints towards some types of POI-location relationships that have changed. While the task still remains a hard challenge, the authors showed some promising results.

The paper *The Role of Geographic Information in News Consumption* [5] by Gebremeskel and de Vries looked at another type of location use. The authors investigated the behaviour of readers of online news articles based on log files from a number of portals. Their goal was

³<http://dl.acm.org/citation.cfm?id=2740908>

⁴<http://www.www2015.it/documents/proceedings/forms/companion.htm#12>



Figure 1: House numbers in Florence. Building (entrance) number 6 with signs denoting businesses 32 and 30, seen from left to right.

to investigate the influence of the spatial distance of readers to the spatial focus of different news outlets on reading behaviour. Their analysis allowed them to see which news portals are more focused to certain regions compared to a more broad readership.

4 Discussion Session

The discussion session, at the end of the workshop, started with an introduction from the organizers into how location, and location use, can be highly local and context-dependent. An interesting example, based on the city of Florence and illustrating how local knowledge is needed to understand the city and its locations, was initially discussed.

The house numbering scheme in Florence, especially its medieval old city, is particular; it uses two sets of house numbers denoted by suffixes.⁵ Houses are given numbers with an *N*, which denotes *nero* = black, and individual businesses are given numbers with an *R*, which means *rosso* = red. The red numbers are not always actually coloured, and they may also appear implicitly as businesses by their sequence and the way they are attached to buildings. Because businesses and homes are mixed, this leads to two distinct sequences of numbering within a street.

While it is rather simple to extend address parsers to include and understand the separation, geocoding and mapping needs more work. A building may have the same number twice, both as 2 (or $2n$) and as $2r$. Multiple entrances can occur as well, leading to common numberings such as 1 and $1A$ (which can be written as $1/A$), even on the same building. On the other hand, business numbers are assigned consecutively, with multiple ones for one building as in some cases, each arched door of a building could house a small shop.

⁵http://wiki.openstreetmap.org/wiki/Florence_house_numbers_import,
<http://www.yourwaytoflorence.com/tourism/info/street.htm>

A possible sequence of numbers running a street may be⁶: *4 24 26 28 30 32 6 34 36 38 40 42 8*. These are all even, and odd numbers are on the other side of the street. 4, 6, 8 are house entrances, the others are businesses. Fig. 1 shows the highlighted sequence of 30 32 6. Here 6 denotes the left entrance to the house, and 30 and 32 (set higher and in a different plaque style) denote the individual arches on the ground floor housing one or multiple shops. Because the home and business density can vary (as business house numbers may also run high quickly), an error in address parsing (for example not identifying an *R*) could put a place quite far away up to hundreds of meters from its actual position.

Such errors are present at the time of writing in some mapping services for parts of the city, often induced by Web pages that do not write their addresses in the expected style but also strongly for roads where the two sequences are only captured as one in the underlying street database and subsequently both distinct numberings are matched to only one sequence.

Starting from this example, the discussion continued along the lines of local peculiarities, addressing location references that are not used as would be expected, and also general issues of extracting or parsing locations. Open issues were also identified in different fields. These include how to integrate geospatial relevance or features into larger feature sets and how to fine-tune their impact together with temporal or topical features, how to verify places mentioned on the Web in general, and how to include social networks and social indicators.

The issue of varying levels of granularity was also discussed, as well as difficulties in dealing with derived locations of non-spatial concepts, or in dealing with non-point-based locations is an intuitive and computationally simple way.

Further issues were scope detection for geospatial data and the use and impact of distance metrics in different applications. All these aspects tie with and extend the discussion of open issues at last year's workshop [2].

5 Conclusion and Future Directions

The 2015 Workshop on Location and the Web had its main focus on location-aware information access. The workshop featured an interesting variety of contributions, with one keynote, three full papers, and a final discussion session. Presenters and attendees, both from industry and academia, debated current important aspects in the field, as well as open issues and future research directions. Location continues to be an important issue in IR, mostly due to its multifaceted potential. However, unified approaches are rare and researchers often have to build very tailored systems to support their specific use case. On the other hand, more and more complex issues are being approached, showing a definite improvement towards more complex and more realistic uses of location.

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⁶This example is from Via de' Tornabuoni which can be examined in, e.g., OpenStreetMaps (which has very highly detailed house numbers available) or Google StreetView.

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