

Report on the Tenth International Workshop on Location and the Web (LocWeb 2020)

Workshop held at The Web Conference, WWW2020

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Abstract

LocWeb 2020 was the tenth workshop in the LocWeb workshop series at the intersection of location-based analytics and Web architecture and was held at The Web Conference, WWW 2020, on 21st April 2020. The focus was on Web-scale services and systems facilitating location-aware information access as well as on Spatial Social Computing on the Web. The LocWeb 2019 workshop had contributions ranging from urban location data analysis over geospatial open data access to worldwide media consumption patterns.

The workshop and conference was intended to be held in Taipei, Taiwan, but was instead held as a virtual workshop since also The Web Conference itself moved to be an online-only event, due to the current pandemic. That also gave rise to a number of discussions around spatial models, online work modes, and current mitigation efforts.

This report presents an overview of these discussions, after an introduction to the workshop theme and the individual contributions.

1 Introduction

Location and geospatial analytics are important aspects in a wide range of Web research and systems. LocWeb 2020 continues a successful workshop series at the intersection of location-based analytics and Web architecture. It focuses on Web-scale services and systems facilitating location-aware information access as well as spatial social behavior analytics as part of social computing.

The location topic is seen as a cross-cutting issue equally concerning information access, semantics and standards, social analysis and mining, and Web-scale systems and services. It explores the connection of the Web to the real physical and spatial world.

New application areas for Web architecture, such as the Internet of Things (IoT) and the Web of Things (WoT), will lead to increasingly rich and large sets of applications for which location is highly relevant as the connection to the physical world. Location has high importance in Web-based designs, and it continues to provide challenging research questions.

It plays important roles in large systems of social and societal importance, and we aim to explore this connection further under the topics of data science for social good and through ways to improve people's lives.

Following the LocWeb workshops held in 2008, 2009, 2010, 2014, 2015, 2016, 2017, 2018, 2019, LocWeb 2020 continued the workshop series, addressing issues at the intersection of location-based services and Web architecture.

LocWeb 2020 was the tenth event in the workshop series and took place on April 21st, 2020 co-located with The Web Conference WWW2020¹. It was intended to be held in Taipei, Taiwan. Due to the current COVID-19 pandemic, the workshop and the whole conference was instead held as an online event. This caused LocWeb for the first time to not have a physical location. We discuss implications and experiences in more detail later.

Workshop details, including most presentations, can be found on the workshop homepage² and on the workshop series homepage³.

The previous LocWeb report for 2019 has been published in SIGIR Forum as Ahlers et al. [2019] as well as those for previous years.

2 Workshop Theme and Topics

LocWeb continues the main theme of Web-scale Location-Aware Information Access and spatial social computing. Subtopics include (i) geospatial semantics, systems, and standards; (ii) large-scale geospatial and geo-social ecosystems; (iii) mobility; (iv) location in the Web of Things; and (v) mining and searching geospatial data on the Web. The workshop encourages work describing Web-mediated or Web-scale approaches that build on reliable foundations, and that thoroughly understand and embrace the geospatial dimension through interdisciplinary perspectives.

The workshop's topics of interest were: Location-Aware Information Access Spatial Social Behavior Location-Aware Web-Scale Systems and Services Location in the Internet/Web of Things Geospatial Data Science for Social Good Open Geospatial Web Data Geospatial aspects of Smart Cities Urban Planning and Citizen Engagement Location prediction in social media and the Web Influence modeling and processing in static and dynamic spatio-social graphs Evaluation of frameworks, metrics and algorithms Large-scale Geospatial Ecosystems Standards for Location and Mobility Data Modeling Location and Location Interaction Location-Based Social Networks Geospatial Web Search and Mining Mobile Search and Location-Based Recommendation

¹www2020.thewebconf.org/

²<https://dhere.de/locweb/locweb2020/>

³<https://dhere.de/locweb/>

3 Workshop Contributions

The workshop had an interdisciplinary combination of contributions, with one short and two full papers. Our PC members provided over 4 reviews per paper on average. With 4 papers submitted, we had a 75% acceptance rate. We had international author groups from Europe, South and North America, with some cross-country and cross-continent authorships of papers.

The proceedings [Ahlers et al., 2020] are available in the ACM Digital Library⁴ under a CC-BY4.0 license as part of the WWW 2020 Companion. Slides are available from the workshop homepage.

The first paper was on *Open Geodata Reuse: Towards Natural Language Interfaces to Web API* [Degbelo and Sherpa, 2020] by Auriol Degbelo and Ang Sherpa. Its aim is to improve service development on open datasets (Open Government Data and Open GeoData) by improving the use and learnability of APIs. The idea is to expose standard functionality in a more interoperable manner and through a more natural language oriented interface, while the adaptation to the specific API dialect runs in the background. While learnability benchmarks are yet scarce, they evaluate the interface use to contribute to this topic. So far, the supported queries follow a thematic-spatial-time schema, which can be used to extract datasets from open data portals that fulfill the criteria.

In *Leveraging Behavioral Heterogeneity Across Markets for Cross-Market Training of Recommender Systems* [Roitero et al., 2020], Kevin Rotiero, Ben Carterette, Rishabh Mehrotra, and Mounia Lalmas aim to understand the difference in user behavior over different geographical regions for a music recommender system at Spotify. The question is whether they need different recommender models per market or can use a single global model. It turns out that global models are not specific enough, but that it is not necessarily efficient from an operational perspective to maintain full models per country. They test different training approaches within these extremes on data of 100M users in 21 different markets. Apart from a market, user language affinity also is valuable and markets can be approximated by language apart from user registration country. Finding the right target training market appears to be a hard problem.

Finally, *Toward Characterizing Cities with Social Media Images using Activity Recognition, Topic Modeling and Visualization* [Opitz et al., 2020] by Daniela Opitz, Eduardo Graells-Garrido, and Ignacio Pérez-Messina investigate new models of extracting information about cities from social media photographs, namely Flickr images for Santiago, Chile. This allows to partition a city by image analysis at different spatial granularities. The approach performs activity recognition in a spatial distribution leading to an activities-districts-matrix used for topic modeling to extract relevant activities, and visualization to understand the distribution.

4 Discussion Session

Usually the discussion session is started by talking about some specific or unusual local characteristics of the conference venue and location use in the city or country of the workshop. This serves to check our assumptions of how location “works” and how we could we understand the city.

However, with the Web Conference moving online, rather this mode and the larger impact

⁴<https://dl.acm.org/doi/proceedings/10.1145/3366424#heading15>

of the pandemic and mitigation efforts were discussed instead of specific locations of interest for Taipei, Taiwan.

The discussion started around questions of: Where are we? Is it Taipei, online, worldwide, or anything in between? How do we get together? What do we learn from this situation? How does COVID-19 and the caused lockdowns and limitations challenge our assumptions and perception of location?

One initial point was how to represent such a move:

Taipei (25°02'07"N 121°33'46"E) → Online/Worldwide (null?)

Many formats exist for location annotations, but such a move would be difficult to represent. Just “null” is too general, “online” may not be specific or cannot be handled by systems expecting a location. This may also mean that event systems need to better deal with online events. Another question then becomes, what is a “virtual” event? Is it completely online and non-spatial, or is it in some way spatially grounded or has a spatial footprint?

In our case, the conference was still run from Taipei as a location of the organizing and support team, while participants came from all over the world. For our workshop, we had participants from the UK, Chile, Norway, Germany, France, Taiwan; and a few other countries that we did not catch. We had around 12 people at a time, but a much higher session hopping, and we estimate around 20–25 participants overall.

Another observation was that, as a result of lockdowns and travel restrictions, usage modes shift massively. For example, wayfinding for new areas becomes practically obsolete for most people. For the conference itself, it means no need for understanding the conference locations, and a different way of switching sessions.

It is not easy to gather accurate data on the reduction in use of mapping and location services. On the other hand, there is more evidence for a general shift in behavior of overall mobility and some hints to changes location search behavior.

We see online search services putting warnings on the extracted opening hours of locations for the possibly reduced accuracy. Business listings are encouraging their owners to update information. This links back to an older issue that is harder to estimate whether places are still open than it is to discover newly opened ones; so this seems to be still a hard problem in search. Delivery options are becoming a more important feature for business listings.

The massive reduction in mobility has already led to a high number of reports, systems, and articles. Work on analysis of mobility reduction per country, city, or neighborhood is already too numerous to just point to here. The terms “covid-19 mobility” in an academic search engine produce a large number of results, often of work basing results on cell tower or direct phone tracking. As a large-scale example, Google is now publishing coronavirus mobility reports, showing mobility changes and destination changes.⁵

General search patterns also appear to be shifting. Some anecdotal evidence exists, with the usual caveat that trend patterns are not very reliable. A shift for example between terms of “yoga near me” shrinking while “online yoga” is growing,⁶ similar for “restaurant” and “delivery” and other cases. It will be interesting to see actual thorough analysis to understand the impact on search.

The discussion then moved to the larger implications of COVID-19 and different mitigation

⁵<https://www.google.com/covid19/mobility/>

⁶<https://twitter.com/SearchItSocial/status/1243339761080619008>

efforts, mainly around case mapping and proposed contact tracing (or exposure tracing) apps. One interesting aspect was how to build privacy-aware contact trackers. A more thorough discussion including risk analysis, societal implications, privacy-by-design, decentralisation, and other considerations has been published just before the workshop by a large international group of researchers.⁷

Assuming a decentral model which does not share location data with a central server, but rather keeps a contact list on a phone through for example Bluetooth beacon use,⁸ the location model can change away from a detailed model of location, but rather to one of (personal) proximity. Such a location model would have location privacy inherently built in, and could also help in building trust and building a sufficiently large user base.

These topics are part of an ongoing challenge, of how to get access to actual large-scale mobility traces for research, without affiliation to a large tech or telecoms company. As discussed above, actual location-based contact tracing apps need to be extremely careful about their data use and purpose limitation of collection; also any current location traces would – for the moment – not be representative of usual mobility patterns.

This brought us to the topic of resilience, which we talked about as a combination of information, preparedness, emergency response, (natural) disaster response, health, and community. We thought about a stronger focus on resilience than on specific emergencies. From here it was a quick detour towards public society, open data, data sharing, and putting data in hands of users, towards larger integration of location systems that can help with societal issues. We ended with an open question on how we could change the current situation into actions towards sustainable solutions and a more sustainable and liveable future.

5 Reflections on the online workshop mode

The worldwide lockdowns and travel restrictions had a direct impact on the conference and workshop in forms of location, timing, and work mode.

Overall, we can draw a positive conclusion, under the circumstances. We managed to hold a good online workshop as the main concern to aim to keep the live workshop experience, with engaging live presentations by the authors, enough time for Q&A after each presentation, an informal coffee break, and a discussion session, and no organisational or technical issues. Here, we want to share some observations about the running of the workshop itself apart from the discussion during the workshop; and from the overall conference participation.

Offering to stay online during the breaks turned out to be a great idea in our case, so that people could stay and do something mimicking going up to the speakers after the sessions. The discussion had much less participants, but we could have it much more in detail than usual; however this part went rather informal. Overall, online mediated participation seems less energetic than a live workshop, and we have to make more effort to keep engagement up. This may also reflect back to improve future live workshops.

⁷Joint Statement on Contact Tracing: Date 19th April 2020

<https://drive.google.com/file/d/10Qg2dxPu-x-RZzETlpV3lFa259Nrpk1J/view>

⁸There is a different discussion on how well the radio functionality can actually measure actual contact through derived distance as a proxy.

The impact on travel seems to have made participation easier, but on the other hand, without the actual conference experience, less participants may actually join, or only visit specific sessions. We had a slightly lower number of participants than usual, which was a surprise to us, as we expected more people to make use of the online participation who would normally not travel. We saw this pattern also in other workshops and in main conference sessions, for example the developer track. We also saw more session hopping in and out right during the workshop sessions and presentations than usual, when it happens in the breaks or is due to people joining late.

Another thing we observe is that the non-presence at the physical location makes conference participation harder, due to the time differences. We set a slot in the afternoon, which translated to a start at 14:00 in Taiwan (GMT+8), 8:00 in central Europe (GMT+2) and 2:00 in EDT (GMT-4). This means that a full participation will incur a kind of daily jetlag for conference participants.

The videoconferencing worked well without any hiccups, and was well set up with the WWW volunteers. WWW used Zoom, which works quite okay and actually manages to show quite a lot of parallel video streams and has a few participant interaction features. The ongoing discussions about the platform itself are out of scope here, but we hope that more options will become available soon.

However, you do not have a general conference environment. Each session or workshop is its own mini-videoconference or webinar. There is no common space of the actual conference. To even switch sessions, you have to close the client and start it with a different URL and reconfirm with name and password. This adds to the feeling of disconnect.

Ideally, and hopefully for future conferences, an online system would at least have an overview of sessions to directly jump in, or in some way a stronger integration of the programme, ones own schedule, and the actual sessions. A shared lobby or some other way to replicate social spaces would be very welcome. It may even be possible to replicate in some way a 2D map of a virtual conference venue.

So an important question is, how do we replicate the personal serendipitous interactions and meetings with other participants in an online setting?

Experiences on participant behavior are starting to be shared. In one example,⁹ it is noted that a majority only watched 1-5 presentations and only 14% watching more than 11. They hypothesize that “it appears that attendees this year focused on a small number of topics close to their research interests” and that the lack of travel may mean that participation may not be taken full-time and also easier collides with other activities. We share these observations; and would add that many people may also come specifically for the networking and meeting, not just for the paper sessions, reducing engagement.

The EDBT/ICDT conference organisers have shared their experience from the organiser view of having to move a conference online on short notice: [Bonifati et al. \[2020\]](#). They give detailed considerations and advice on decisions, considerations and experiences, covering such topics of timezones, synchronous vs. asynchronous, lengths, interaction modes, technical issues, and also provide results of a participant survey.

⁹The ASPLOS 2020 Online Conference Experience. James Larus, Luis Ceze, Karin Strauss. BLOG@CACM, March 31, 2020
<https://cacm.acm.org/blogs/blog-cacm/243882-the-asplos-2020-online-conference-experience/>

We also found an extensive report on the ICLR online experience from a participant,¹⁰ which discusses impacts on the interaction mode. We want to highlight it as it talks about the ICLRTown virtual 2D platform that allowed a sort of situated place-based virtual experience. Details and screenshots of this are in the lessons and experiences from the ICLR2020 organising committee, including other interesting ways to rethink interaction as well.¹¹

For now, we would much rather meet in person and “on location”, but we are glad that we do have the online facilities available at scale for this phase, which will certainly result in better tools, which may lead us to more sustainable ways of traveling and interacting at conferences.

Ultimately, this will also mean that we have to rethink workshop formats and look at additional ways to maintain interactivity, apart from mere paper presentations.

We close with a remark we made right after the workshop: “It was an interesting experience to have our whole workshop online-only and location-less. Direct contact and discussions are really missing; but we had some informal chats in a virtual coffee break. How do we improve that social interaction part? #locweb #thewebconf @TheWebConf”¹²

6 Conclusion and Future Directions

LocWeb 2020 had good contributions from many domains, such as access to open geodata, country-specific music preferences, and segmentation of cities by activity clusters. We had inspiring discussions on the papers and more general topics, as discussed in this report.

The full online mode for the workshop was a new experience, where the paper presentation sessions worked well and even further discussions were possible. Some issues may be ironed out in the near future, which we would hope for physical workshops again. We are looking forward to more inspiring location research arising from the current situation, and encourage a move towards more sustainability and resilience in the work we do.

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¹⁰<https://www.theexclusive.org/2020/05/virtual-iclr.html>

¹¹https://medium.com/@iclr_conf/gone-virtual-lessons-from-iclr2020-1743ce6164a3

¹²<https://twitter.com/dirkahlers/status/1252565222516195333>

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