

Report on the 30th The Web Conference 2021 (TheWebConf2021)

Aljaž Košmerlj
Artificial Intelligence Laboratory
Jožef Stefan Institute
aljaz.kosmerlj@ijs.si

Marko Grobelnik
Artificial Intelligence Laboratory
Jožef Stefan Institute
marko.grobelnik@ijs.si

Jure Leskovec
Computer Science Department
Stanford University
jure@cs.stanford.edu

Abstract

The Web Conference (TheWebConf2021) is the premier computer science conference on the state of the Web and its related areas. It covers the Web from a wide spectrum of aspects, including technical areas of artificial intelligence, security, privacy, knowledge representation, mobile computing as well as social sciences, economics, policy, accessibility and others. The year 2021 marked the 30th edition that was organised in Ljubljana, Slovenia, but took place fully online due to the COVID-19 pandemic.

1 Introduction

The Web Conference is focused on understanding the current state and the evolution of the Web through the lens of computer science, computational social science, economics, policy, and many other disciplines. The year 2021 marks the 30th edition of the conference which was to take place in Ljubljana, Slovenia. Unfortunately, due to the COVID-19 pandemic, the conference had to be moved online.

The main conference took place from April 19th to 23rd and was preceded by a whole week of workshops and tutorials from April 12th to 16th. Additionally, this year was the first time a pre-conference event with five keynote talks was organised before the conference on April 1st and was open for free attendance.

The conference organising committee consisted of:

General Chairs:

- Jure Leskovec, Stanford University
- Marko Grobelnik, Jožef Stefan Institute

Program Committee:

- Leila Zia, Wikimedia Foundation
- Jie Tang, Tsinghua University
- Marc Najork, Google

Local Organizing Committee:

- Aljaž Košmerlj, Jožef Stefan Institute
- Marija Komatar, Pitea

Local Volunteers Chair:

- Lovro Šubelj, University of Ljubljana

Tutorials Track Chairs (hands-on):

- Bob West, EPFL
- Marinka Žitnik, Harvard

Tutorials Track Chairs (lecture):

- Smriti Bhagat, Facebook
- Paul Groth, University of Amsterdam

Workshop Track Chairs:

- Julian McAuley, UC San Diego
- Karthik Subbian, Amazon

Demos Track Chairs:

- James Hodson, AI for good
- Janez Brank, Jožef Stefan Institute

Panels Chairs:

- Ricardo Baeza Yates, NTENT & North-eastern University
- Emine Yilmaz, University College London

Developers Track Chairs:

- Andreas Harth, University of Erlangen-Nuremberg
- Dan Brickley, Google

Diversity & Inclusion Chair:

- MunMun De Choudhury, Georgia Tech

PhD Symposium Chairs:

- Gregoris Mentzas, National Technical University of Athens
- Dunja Mladenić, Jožef Stefan Institute
- Rudi Studer, Karlsruhe Institute of Technology

Student Scholarship Chairs:

- Srijan Kumar, GaTech
- Shobeir Fakhraei, Amazon
- Ben Steichen, Cal Poly Pomona

Sponsorship & Networking Chairs:

- Mark Minevich, Going Global Ventures
- Balaji Krishnapuram, Pinterest
- Yang Yang, Zhejiang University
- James Shanahan, UC Berkeley

Communications & Social Media Chairs:

- Peng Zhang, Zhipu.AI
- Rayid Ghani, Carnegie Mellon University

Proceedings Chairs:

- Luca Aiello, Nokia Bell labs
- Meeyoung Cha, KAIST

2 Papers

For its main research paper track The Web Conference seeks submissions that describe in-depth studies to improve our understanding of the Web and its impact, introduce technical and socio-technical advances that enhance and expand Web platforms and technologies, and make strides in democratizing access to Web information and knowledge.

In the 2021 conference the specific topics of interest were highlighted in 12 research tracks listed in Table 1 along with the number of accepted submissions per track. Each paper was limited to maximum 12 pages and if accepted had a 15-minute presentation.

Track Name	Nr. of Submissions
Crowdsourcing and Human Computation	43
Economics and Monetization	68
Search	120
Security, Privacy, and Trust	152
Semantics and Knowledge	144
Social Network Analysis and Graph Algorithms	305
Systems and Infrastructure	54
User experience and Accessibility	14
User Modeling and Personalization	259
Web and Society	161
Web Mining and Content Analysis	288
Web of Things, Ubiquitous, and Mobile Computing	93

Table 1: TheWebConf2021 research tracks and their respective numbers of submitted papers.

In total, the program committee (PC) received 1,736 submissions of which 355 (20.5%) were accepted. The papers review process was coordinated and performed by 3 PC heads, 28 track chairs, 171 senior PC members, 1000 PC members and 743 additional reviewers.

Proceedings The conference proceedings have been published by ACM. Their release has been delayed due to additional organisational strain because of the COVID-19 pandemic and the publication was finalized in early June 2021. The proceedings are split into the main volume [pro, 2021], containing the word from the organisers and the papers from the main track, and the companion proceedings [com, 2021], containing the contributions from workshops, tutorials and other tracks.

3 Tutorials and Workshops

A broad program of tutorials and workshops was a priority for the organising committee and a whole week before the main conference (April 12-16) was dedicated to them. A special emphasis was given on making a portion of the tutorials hands-on, with the attendees actively participating and gaining practical experience. Overall, there were 23 tutorials (Table 2) and 25 workshops (Table 3)¹.

¹For full descriptions and authors see: <https://www2021.thewebconf.org/program/workshops/> and <https://www2021.thewebconf.org/program/tutorials/>

#	Tutorial Title
1	SWApi: SPARQL Endpoints and Web API
2	Information extraction from social media: A hands-on tutorial on tasks, data, & open source tools
3	Neural Structured Learning: Training Neural Networks with Structured Signals
4	Recommender Systems through the Lens of Decision Theory
5	Building an Efficient Text Classifier from the Ground Up
6	Introduction to Deep Learning with PyTorch
7	Deep Recommender System: Fundamentals and Advances
8	Scaling out NLP Applications to 100+ Languages
9	Learning from Comparisons
10	Bias Issues and Solutions in Recommender System
11	Uplift Modeling: from Causal Inference to Personalization
12	Advanced Deep Graph Learning: Deeper, Faster, Robuster, Unsupervised
13	Graph Mining and Multi-Relational Learning: Tools and Applications
14	Going for Speed: Full-Stack Performance Engineering in Modern Web-Based Applications
15	Responsible AI in Industry: Practical Challenges and Lessons Learned
16	Exploring Biomedical Web Resources Using Shell Scripting
17	Large Scale Graph Mining: Visualization, Exploration, and Analysis
18	PyNetworkshop: Analyzing the Structure of Networks in Python - The Essentials, Signed Networks, and Network Optimization
19	Improving Web Ranking with Human-in-the-Loop: Methodology, Scalability, Evaluation
20	Flatland: Multi-Agent Reinforcement Learning on Trains
21	Conversational Artificial Intelligence: Can Your AI Beat the Turing Test?
22	Machine Learning-Driven Ad Blocking: From Data Collection to Deployment
23	Learning from Graphs: From Mathematical Principles to Practical Tools

Table 2: The list of tutorials.

#	Workshop Title
1	11th Temporal Web Analytics Workshop (TempWeb)
2	7th WebAndTheCity – Web Intelligence and Resilience in Smart Cities
3	Third Workshop on Fairness, Accountability, Transparency, Ethics and Society on the Web (FATES 2021)
4	CLEOPATRA’2021: The 2nd International Workshop on Cross-lingual Event-centric Open Analytics
5	Data-efficient Machine Learning for Web Applications (DeMaL)
6	1st International Workshop on Scientific Knowledge Representation, Discovery, and Assessment (Sci-K)
7	The 1st International Workshop on Deep Learning for the Web of Things
8	First International Workshop on the Efficiency of Modern Datacenters (EMDC)
9	The 9th International Workshop on Natural Language Processing for Social Media (SocialNLP 2021)
10	2nd Workshop on Deep Reinforcement Learning for Knowledge Discovery
11	The International Workshop on Semantics-enabled Biomedical Literature Analytics (SeBiLAn)
12	8th Wiki Workshop
13	The First Workshop on Financial Technology on the Web
14	Beyond Facts: 1st International Workshop on Knowledge Graphs for Online Discourse Analysis
15	Workshop Data Science for Social Good
16	First International Workshop on News Recommendation and Intelligence
17	NLP Beyond Text - 2nd Edition Workshop Proposal
18	Workshop on Misinformation Integrity in Social Networks
19	LocWeb 2021 at The Web Conference 2021
20	Workshop on Multilingual Search
21	International Workshop on AI in Health: Transferring and Integrating Knowledge for Better Health
22	KMEcommerce: Knowledge Management in E-Commerce Workshop 2020
23	Workshop Proposal: Graph Learning Benchmarks (GLB 2021)
24	The International Workshop on Self-Supervised Learning for the Web (S2L@WWW 2021)
25	The 3rd Innovation Workshop on Transforming Big Data into Actionable Knowledge (BiDAW)

Table 3: The list of workshops.

4 Special Tracks and Panels

The conference hosted three special tracks covering specialized topics:

Web of Health: Organised by Tim Althoff (University of Washington) and Emre Kiciman (Microsoft Research), it covered topics in health and medicine which are increasingly searched for and tracked online, and their relevant content is often delivered via digital means. The track explored new opportunities to improve our health and the delivery of medicine and strengthen the connection between healthcare and web research communities.

Future of the Web: Organised by Evgeniy Gabrilovich (Google), this track hosted a series of keynote talks regarding the trends and technologies that will mark the future development of the web. It explored both the look forward with respect to the technical and conceptual progress of the web as well as the societal impacts of web technologies.

Web4All: Organised by Silvia Rodríguez (University of Geneva) and Ted Drake (Intuit), this special track deals with all aspects of web accessibility. Exploring factors such as health, disability, culture, age, income, language and many others. This edition focused on the impacts of extreme events, such as the recent COVID-19, which can drastically change the way we interact with each other and with everything that surrounds us and web technology can play a crucial role in such circumstances.

The conference also hosted two panels:

Ethics & Fairness on the Web: Moderated by Ricardo Baeza-Yates (Institute for Experiential AI, Northeastern University) and including:

- Jeanna Matthews - Professor, Department of Computer Science, Clarkson University
- Gregor Strojín - Chair of Ad Hoc Committee on Artificial Intelligence at Council of Europe
- Nisha Talagala - CEO and Founder at AIClub World

Conversational Systems on the Web: Moderated by Emine Yilmaz (University College London & Amazon) and including:

- Eugene Agichtein - Professor, Emory University and Amazon Scholar, Amazon
- Julia Kiseleva - Senior Researcher, Microsoft
- Mark Sanderson - Professor, RMIT University
- Idan Szpektor - Staff Research Scientist and Manager, Google

5 Keynotes

The conference held a broad program of keynotes starting with the pre-conference event on April 1st, 2021, which served as a warm-up for the main conference. The pre-conference talks were:

- Evelyne Viegas (Microsoft Research): Challenges in Machine Learning – Designing high impact competitions for the benefit of society
- Denny Vrandečić (Wikimedia Foundation): Towards knowledge equity: A world where everyone can share in the sum of all knowledge
- Marko Grobelnik (Jožef Stefan Institute): Cross-lingual Global Media Monitoring
- Stan Matwin (Dalhousie University): Artificial Intelligence for People Emotion Detection During COVID-19 Social Isolation
- Jure Leskovec (Stanford University): Mobility network models of COVID-19 explain inequities and inform reopening

During the main conference the keynotes (split between morning and afternoon sessions were):

- Verica Trstenjak (University of Ljubljana & SFU Vienna): Human rights in the Digital Era
- Fausto Giunchiglia (University of Trento): Diversity, Bias, Online Social Relations and Related Issues
- Anju Kambadur (Bloomberg LP): Knowledge Graphs & Natural Language in Finance
- Lada Adamic (Facebook): The Geography of Social Ties
- Yejin Choi (University of Washington): Commonsense Intelligence: Cracking the Longstanding Challenge in AI
- Estevam Hruschka (Megagon Labs): Implications and Explanations in User-Generated Data
- Elena Simperl (King’s College London): The Web of Data: How are we Doing so Far?
- Krysta Svore (Microsoft Research): Enabling the Quantum Revolution — Pioneering Advances to Achieve Quantum Computing and Impact at Scale
- Ganesh Mani (Carnegie Mellon): AI Grand Challenges: Past, Present and Future (See Keynote section of this journal issue)

6 Awards

The program committee selected the best paper and the best student paper amongst all the published submissions. The selection process was led by the best paper award chairs, Kira Radinsky (Technion & Diagnostic Robotics) and Ahmed H. Awadallah (Microsoft Research), and chose the following papers:

-
- **Best Paper Award:** Towards Facilitating Empathic Conversations in Online Mental Health Support: A Reinforcement Learning Approach [Sharma et al., 2021], by authors: Ashish Sharma, Inna Lin, Adam Miner, David Atkins and Tim Althoff.
 - **Best Student Paper Award:** ConceptGuide: Supporting Online Video Learning with Concept Map-based Recommendation of Learning Path [Tang et al., 2021], by authors: Chien-Lin Tang, Jingxian Liao, Hao-Chuan Wang, Ching-Ying Sung and Wen-Chieh Lin.

In the scope of The Web Conference IW3C2 also awards the **Seoul Test of Time Award**. This year, the 7th award was given to a paper from the 2011 edition of the conference titled: Information Credibility on Twitter [Castillo et al., 2011], by authors: Carlos Castillo, Marcelo Mendoza and Barbara Poblete.

The organising committee takes this opportunity to congratulate all the authors of the winning papers again on their excellent work.

7 Organisation

The conference took place fully online due to the restrictions and circumstances arising from the COVID-19 pandemic. The MiTeam platform² was used for all the sessions including the tutorials, workshops and panels. Selected keynotes were also streamed publicly via Youtube. All the conference activity was recorded totalling at over 550 hours of program. The recordings will be made available on the Videlectures.net platform³ except in rare cases where author consent was not given.

Over all the events the conference was attended by 2,843 participants (this includes the free pre-conference event) with over 2,400 more viewing the public Youtube streams. There were 918 registered participants from 62 countries of which 37% were students. With the kind support of our sponsors, especially Web4Good and NSF, we were able to cover registration costs with student scholarships for 188 students.

The conference would not be possible without the kind support of our sponsors: Microsoft research, Huawei, Amazon Science, Facebook, Pinterest, Finvolution, Megagon Labs, Google, Bloomberg Yahoo Research, Pošta Slovenije, Qlector, EventRegistry, NSF, The Web Conference, and Outbrain. Key support was also extended by our participating institutions: IW3C2, Jožef Stefan Institute, Stanford University, IRCAl, and Videlectures.net.

Lastly, the conference chairs would like to thank the local and global community as well as our families and friends for all the support given during organisation. Though your contributions may not be explicitly mentioned in the document, we could not have done it without you.

²<https://mitem.eu/>

³http://videlectures.net/www2021_Ljubljana/

References

- WWW '21: Companion Proceedings of the Web Conference 2021*, New York, NY, USA, 2021. Association for Computing Machinery. ISBN 9781450383134.
- WWW '21: Proceedings of the Web Conference 2021*, New York, NY, USA, 2021. Association for Computing Machinery. ISBN 9781450383127.
- Carlos Castillo, Marcelo Mendoza, and Barbara Poblete. Information credibility on twitter. In *Proceedings of the 20th International Conference on World Wide Web, WWW '11*, page 675–684, New York, USA, 2011. ACM. ISBN 9781450306324. doi: 10.1145/1963405.1963500. URL <https://doi.org/10.1145/1963405.1963500>.
- Ashish Sharma, Inna W. Lin, Adam S. Miner, David C. Atkins, and Tim Althoff. Towards facilitating empathic conversations in online mental health support: A reinforcement learning approach. In *Proceedings of the Web Conference 2021, WWW '21*, page 194–205, New York, NY, USA, 2021. Association for Computing Machinery. ISBN 9781450383127. doi: 10.1145/3442381.3450097. URL <https://doi.org/10.1145/3442381.3450097>.
- Chien-Lin Tang, Jingxian Liao, Hao-Chuan Wang, Ching-Ying Sung, and Wen-Chieh Lin. Conceptguide: Supporting online video learning with concept map-based recommendation of learning path. In *Proceedings of the Web Conference 2021, WWW '21*, page 2757–2768, New York, NY, USA, 2021. Association for Computing Machinery. ISBN 9781450383127. doi: 10.1145/3442381.3449808. URL <https://doi.org/10.1145/3442381.3449808>.