

Report on the 8th International Workshop on Mining Actionable Insights from Social Networks (MAISoN'22) - Special Edition on Mental Health and Social Media at TheWebConf 2022

Ebrahim Bagheri
Toronto Metropolitan University
Canada
bagheri@ryerson.ca

Diana Inkpen
University of Ottawa
Canada
diana.inkpen@uottawa.ca

Christopher C. Yang
Drexel University
Pennsylvania
chris.yang@drexel.edu

Fattane Zarrinkalam
University of Guelph
Canada
fzarrink@uoguelph.ca

Abstract

The eighth edition of the workshop on Mining Actionable Insights from Social Networks (MAISoN 2022) took place virtually on April 26th, 2022, co-located with the ACM Web Conference 2022 (TheWebConf 2022). This year, we organized a special edition with focus on mental health and social media. The aim of this edition was to bring together researchers from different disciplines to discuss research that goes beyond descriptive analysis of social media data and instead investigate different techniques that use social media data for building diagnostic, predictive and prescriptive analysis models for mental health applications. This topic attracted a lot of interest from the community especially because of all the considerations surrounding the impact of social media during the COVID-19 pandemic which has impacted on people's mental health issues.

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1 Introduction

With the emergence and growing popularity of social media such as blogging systems, wikis, social bookmarking, social networks and microblogging services, many users are extensively engaged in at least some of these applications to express their feelings and views about a wide variety of social topics as they happen in real time by commenting, tagging, joining, sharing, liking, and publishing

posts. According to Statista, there are over 3.6 billion people were using social media worldwide in 2020, a number projected to increase to almost 4.41 billion in 2025.¹ This has resulted in an ocean of data which presents an interesting opportunity for performing data mining and knowledge discovery in many domains including mental health. The recent highly impressive advances in machine learning and natural language processing present exciting opportunities for developing automatic methods for the collection, extraction, representation, analysis, and validation of social media data for health applications. These methods should be able to simultaneously address the unique challenges of processing social media data and timely discover meaningful patterns identifying emerging mental health threats.

2 Workshop Theme and Topics

Traditional research on healthcare social analytics mainly focuses on descriptive methods such as tracking health trends on social media and tracking infectious disease spread. The main distinguishing focus of this workshop will be the use of social media data for building diagnostic, predictive and prescriptive analysis models for mental health analysis and applications such as analysing how social media can impact on people’s mental issue, and predicting users’ mental health status form social media data and recommending solutions to prevent the risk of committing unfortunate actions such as suicide.

The topics of interest of this workshop included but were not limited to the following:

- Social media mining for automatic mental health monitoring and surveillance.
- Predicting user’s mental health status on social media.
- Association of social media Use with mental health
- User behavior analysis and susceptibility prediction with regard to health-related data on social media.
- Predictive models for early detection of future mental illness from social media.
- Explainable AI for healthcare social media analytics.
- Ethics, bias, and fairness in analyzing social media for mental health analysis.
- New datasets and evaluation methodologies to help mental health analysis on social media.

3 Workshop Contributions

3.1 Keynotes

The workshop had two invited keynote speakers who shared their perspectives on social media mining for mental health research and applications.

The first keynote speaker, Dr. Mummun De Choudhury is an Associate Professor in the School of Interactive Computing at Georgia Tech. She presented her talk on “Employing Social Media to Improve Mental Health: Pitfalls, Lessons Learned, and the Next Frontier” to highlight a critical analytic perspective on the pitfalls of social media signals of mental health, especially when they

¹<https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>

are derived from “proxy” diagnostic indicators, often removed from the real-world context in which they are likely to be used. Then, to overcome these pitfalls, her talk presented results from two case studies, where machine learning algorithms to glean mental health insights from social media were developed in a context-sensitive and human-centered way, in collaboration with domain experts and stakeholders. The first of these case studies, a collaboration with a health provider, focuses on the individual-perspective, and reveals the ability and implications of using social media data of consented schizophrenia patients to forecast relapse and support clinical decision-making. Scaling up to populations, in collaboration with a federal organization and towards influencing public health policy, the second case study seeks to forecast nationwide rates of suicide fatalities using social media signals, in conjunction with health services data. Her talk concluded with discussions of the path forward, emphasizing the need for a collaborative, multi-disciplinary research agenda while realizing the potential of social media data and machine learning in mental health – one that incorporates methodological rigor, ethics, and accountability, all at once.

Our second keynote speaker, Dr. Nazli Goharian, is Clinical Professor of Computer Science and Associate Director of the Information Retrieval Lab at Georgetown University. In her talk entitled “NLP Applications in Mental Health”, she shared her collaborative work done at the Information Retrieval Lab at Georgetown University on detecting mental health concerns in social media posts. The first application was on a dedicated mental health forum where the users who register to share and communicate their thoughts and feelings were suffering from some sort of mental distress (sadness, depression, and potential of self-harm). The task was to triage the severity of users’ posts to detect early the potential of self-harm as well as to evaluate the impact of forum activities and conversations on the users during a period of time. In the second type of platform, i.e., non-dedicated, she focused on the question of whether we could detect if a user was suffering from any one or more of nine mental health conditions, only using the *general language* of the user; that is, the posts are not in mental health [sub]forums nor have any mental health related words. She also explained how they have identified the diagnosed users, and how carefully selected the controls. Further she showed the results of several baselines to detect the conditions. Finally, to address information reduction for a faster read and processing of users’ posts by moderators/counselors, she talked about her effort to summarize the posts to their short forms.

3.2 Panel

Our workshop also hosted a panel discussion on “Mental Health and Social media” with 3 panelists, namely Dr. Ugur Kursuncu from Georgia State University, Dr. Koustuv Saha from Microsoft and Dr. Joshua Skorbarg from University of Guelph.

The panelists shared their perspectives mainly on two themes:

The first theme was about the societal impact of COVID19 on health, economy and well-being. For this topic, they argued that among the factors that influence the well-being of individuals, the indirect external factors have been critical drivers. Further, they discussed about their findings on the likely factors that impact the well-being of the populations with different circumstantial characteristics during the pandemic.

As the second theme, the panelists talked about a number of epistemological and ethical issues that must be addressed while mining social media data for the detection and treatment of mental

illness. They highlighted some of these ethical issues including safety/efficacy, informed consent, respect for persons, inequality, and the gap between predictions and interventions.

3.3 Paper Session

All paper submissions were reviewed by at least two members of the program committee, which consisted of experts from academia and industry alike. In the reviewing process, we ensured that we maintain high quality standards, while at the same time making sure that less-mature yet interesting work was also given a chance to be present and discussed at the workshop. Four full papers were accepted based on the quality of the rigor of analysis, results and presentation, and we provide a brief description for each contribution below:

I'm always in so much pain and no one will understand" - Detecting Patterns in Suicidal Ideation on Reddit [Monselise and Yang, 2022]. In this study, the authors have investigated the patterns in the behaviors of the users struggling with thoughts of suicide particularly on the social media platform Reddit. More specifically, they explored how Reddit users move or progress between subreddits until they express active suicidal ideation. They have also looked at these users' posting pattern in the time leading up to expressing suicidal ideation and the time after.

A large-scale temporal analysis of user lifespan durability on the Reddit social media platform [Nadiri and Takes, 2022]. In this study, the authors aimed to understand what early user activity patterns fuel an ultimately durable user lifespan. To do so, they have analyzed what behavior causes potentially durable contributors to abandon their *social career* at an early stage, despite their strong start based on a uniquely processed temporal dataset of over 6 billion user interactions on Reddit covering more than 14 years. They have assessed both user content creation activity and the way in which this content is perceived based on three dimensions, dealing with a user's content a) engagement and perception, b) diversification, and c) contribution.

Supporting People Receiving Substance Use Treatment During COVID-19 Through A Professional Moderated Online Peer Support Group [Liang et al., 2022]. In this study, the authors have presented a private, professional-moderated OPSC using the Facebook Group platform launched in September 2020, to study its effects on the mental health wellness of women undergoing substance use treatment. This study was particularly meaningful as the participants were not able to join in-person treatment sessions due to the COVID-19 pandemic. Their preliminary findings indicated that study participants reported decreased loneliness and increased online social support three months after initiating the OPSC. They tended to interact with content initiated by a clinical professional more than those generated by peers.

Utilizing Pattern Mining and Classification Algorithms to Identify Risk for Anxiety and Depression in the LGBTQ+ Community During the COVID-19 Pandemic [Bierbaum et al., 2022]. In this study, the authors have examined the results of pattern mining and decision trees applied to a dataset of survey responses about life for individuals in the LGBTQ+ community during COVID, which have the potential to be used as a tool to identify those at risk for anxiety and depression. Their study have used the data during pandemic in 2020 through 2022, to analyze the impact on anxiety and depression. They have first used the FP-growth algorithm for frequent pattern mining, which finds groups of items that frequently occur together, and utilized the resulting patterns and measures to determine which features were significant when inspecting anxiety

and depression. Then, they have trained a decision tree with the selected features to classify if a person has anxiety or depression.

4 Conclusion, and Future Directions

In this special edition, we gathered researchers and practitioners from across the world and, in particular, from different disciplines, such as information retrieval, data mining and machine learning as well as social network analysis, healthcare informatics, network science and complex networks. As in previous years, the MAISoN 2022 was highly interactive. Many discussions emerged from the keynotes, panels, and presented papers about delivering technology and solutions for mining actionable insight from social media data for mental health analysis and applications. In the meanwhile, the proposal for MAISoN 2023 on Deep Learning Methods for Social Media Mining has been accepted in 32nd International Joint Conference on Artificial Intelligence (IJCAI 2023) which is scheduled to take place as an in-person event on August 21, 2023.

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Steering Committee

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- Ebrahim Bagheri (Toronto Metropolitan University)
- Frank W. Takes (University of Amsterdam)

Program Committee

- Michal Monselise (Drexel University)
- Ali Jazayeri (Washington University)
- Elad Yom-Tov (Microsoft)
- Yelena Mejova (ISI Foundation)
- Arkaitz Zubiaga (Queen Mary University of London)
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