

LREC-COLING 2024

**First Workshop on
Patient-Oriented Language Processing
@LREC-COLING-2024
(CL4Health)**

Workshop Proceedings

Editors

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Paul Thompson and Brian Ondov

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**Proceedings of the First Workshop on Patient-Oriented Language Processing
@LREC-COLING-2024 (CL4Health)**

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Preface

The First Workshop on Patient-Oriented Language Processing (CL4Health) aims to establish a general venue for presenting research and applications focused on patients' needs. These include summarizing health records for patients, answering consumer-health questions using reliable resources, detecting misinformation or potentially harmful information, and providing multi-modal information, such as video, if it better satisfies patients' needs. Such a venue is needed both to invigorate patient-oriented language processing research and to build a community of researchers interested in this area. The growing interest in this topic is fueled by several current trends, which include a proliferation of online services that target patients but do not always act in their best interests; policy changes that allow patients to access their health records written in the professional vernacular, which may confuse the patients or lead to misinterpretation; replacement of customer services with chat bots; and the increasing tendency of patients to consult online resources as a second or even first opinion on their health problems.

Broadly, CL4Health is concerned with the resources, computational approaches, and behavioral and socio-economic aspects of the public interactions with digital resources in search of health-related information that satisfies their information needs and guides their actions.

Invited Speakers

The invited speakers have devoted significant parts of their research to patient-centered language processing. We are grateful and excited to present the following talks:

Barbara Di Eugenio, University of Illinois Chicago, USA

Engaging the Patient in Healthcare: Summarization and Interaction

Effective and compassionate communication with patients is becoming central to healthcare. The talk discusses the results of and lessons learned from three ongoing projects in this space. The first, MyPHA, aims to provide patients with a clear and understandable summary of their hospital stay, which is informed by doctors' and nurses' perspectives, and by the strengths and concerns of the patients themselves. The second, VIRTUAL-COACH, models health coaching interactions via text exchanges that encourage patients to adopt specific and realistic physical activity goals. The third, HFChat, envisions an always-on-call conversational assistant for heart failure patients, that they can ask for information about lifestyle issues such as food and exercise.

Brief Biography

Dr. Di Eugenio's work is characterized by: large interdisciplinary groups of investigators who bring different perspectives to the research; grounding computational models in ecologically valid data, which is small by its own nature; and the need for culturally valid interventions, since the University of Illinois Health system predominantly serves underprivileged, minority populations.

Natalia Grabar, University of Lille, France

Linguistic Foundations of the Simplification and its Current State

The purpose of text simplification is to adapt the content of documents in order to make their reading and understanding easier for a given type of population. If the simplification usually aims specific language levels (lexical, morphological, syntactic, semantic...), the available data cannot always provide precise indications required for this process. The talk discusses some sources of such available data. Dr. Grabar also analyzes the current situation related to the exploitation of linguistic indicators during the definition of language complexity and the simplification.

Brief Biography

Dr. Grabar is a CNRS Researcher at the University of Lille. She studied philology at Lviv University, Ukraine and obtained her PhD in Medical Informatics from the Université Paris 6, France. She develops linguistic and statistical methods to access information and knowledge within scientific and technical texts and terminologies. The results are used in information retrieval, information extraction and text simplification. Dr. Grabar has co-authored over 200 publications.

Graciela Gonzalez-Hernandez, Cedars Sinai Medical Center, USA

Patients are speaking - are we listening? Incorporating patient perspectives posted online into clinical trials

Research that aims to be equitable and effective at treating chronic diseases and improving patient outcomes must incorporate a broad range of patient perspectives (health-related uncertainties, beliefs, and experiences). Setting research priorities and designing trials is complex since clinicians, researchers, and patients differ on what is considered important. Patients often prioritize outcomes that directly impact their quality of life, such as symptom relief, functional status, and treatment side effects, while clinicians prioritize outcomes related to survival, disease progression, and biomarker endpoints. Methods commonly used for gaining patient perspectives are often limited are subject to recall and other biases, are expensive and time-consuming, are limited in recruitment number and diversity, and may not comprehensively capture factors important for research design.

A vast amount of data from the patient's perspective is already publicly available: patients openly share useful perspectives on different social media platforms. Despite its potential, approaches for the systematic integration of such data to inform the prioritization and design of health research are still to be developed and validated.

In this talk, Prof. Gonzalez-Hernandez discusses her ongoing efforts to enable the extraction of relevant patient perspectives posted online using state-of-the-art natural language processing (NLP) methods, and the promise of their integration into clinical trial design.

Brief Biography

Dr. Gonzalez-Hernandez has over 23 years of experience and more than 200 publications in health AI and NLP, funded by multiple NIH grants. She is currently a Professor and Vice Chair for Research and Education in the Cedars-Sinai Department of Computational Biomedicine. She launched the #SMM4H (Social Media Mining for Health) Workshop and Shared Tasks, which has run annually for the last 8 years.

Abeed Sarker, Emory School of Medicine, USA

Learning and Educating via NLP of Social Media: the Use Case for Substance Use and Overdose in the United States

Substance use and overdose is an ongoing crisis in the United States and growing globally. The sphere of substance-related overdose also evolves continuously as novel psychoactive substances enter the supply. Nonmedical substance use surveillance via social media has the potential to provide low-cost and more timely insights than traditional approaches. In our research, we leverage natural language processing (NLP) and machine learning to obtain insights from targeted cohorts of people who use substances about emerging patterns and problems in substance use disorder and treatment. This talk outlines our NLP pipeline for analyzing substance use-related chatter from Twitter (X) and Reddit, and how insights derived from these sources may be used to educate medical practitioners at the forefront of the opioid crisis in the United States, facilitating more patient-centered care.

Brief Biography

Dr. Sarker is an Associate Professor and the Vice Chair for Research at the Department of Biomedical Informatics, School of Medicine, Emory University. He leads several large-scale projects focusing on the application of NLP for health-related tasks, particularly those involving vulnerable populations such as people with substance use disorders, victims of intimate partner violence, and people at risk of self-harm and suicide. His research is primarily funded by the National Institutes of Health (NIH) and Centers for Disease Control and Prevention (CDC). Dr. Sarker's research has been covered by various national and international media outlets such as the Wall Street Journal, Forbes, and Scripps National News.

Submissions

CL4Health received 40 valid submissions, of which 8 were accepted as oral presentations and 25 as posters. The work covers a wide range of topics focusing on patients' well-being and proper care. The topics include retrieval augmented generation, communications (including plain language, sign language, and dialog), mental health issues, and patients' sentiment.

As always, we are deeply grateful to the authors of the submitted papers and to the reviewers (listed elsewhere in this volume) who produced thorough and thoughtful reviews for each paper in a fairly short review period. The Organizers are truly grateful to our amazing Program Committee, whose members helped us determine which studies are ready to be presented

and those which would benefit from additional experiments and analysis, as suggested by the reviewers. We hope that this workshop will inspire new collaborations and research into patient-centered language technologies, in order to continue the valuable contributions made by our community towards public health and well-being.

Dina Demner-Fushman, Sophia Ananiadou, Paul Thompson and Brian Oudov (Organizers)

Organizing Committee

Dina Demner-Fushman, National Library of Medicine, USA
Sophia Ananiadou, National Centre for Text Mining and University of Manchester, UK
Paul Thompson, National Centre for Text Mining and University of Manchester, UK
Brian Ondov, National Library of Medicine, USA

Program Committee

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Dina Demner-Fushman, National Library of Medicine, USA
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Abeed Sarker, Emory School of Medicine, USA
Sarvesh Soni, National Library of Medicine, USA
Paul Thompson, National Centre for Text Mining and University of Manchester, UK
Grigorios Tsoumakas, Aristotle University of Thessaloniki, Greece
Aswathy Velutharambath, University of Stuttgart, Germany
Amelie Wüthrl, University of Stuttgart, Germany
Pierre Zweigenbaum, Université de Paris-Saclay, CNRS, LISN, Orsay, France

Invited Speakers

Barbara Di Eugenio, University of Illinois Chicago, USA
Graciela Gonzalez-Hernandez, Cedars Sinai Medical Center, USA
Natalia Grabar, Université de Lille, France
Abeed Sarker, Emory School of Medicine, USA

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Workshop Program

Monday May 20, 2024

09:00–09:05 **Opening remarks**

09:05–10:30 **Session 1: Communicating with patients**

09:05–09:35 ***Invited talk – Barbara Di Eugenio: Engaging the Patient in Healthcare: Summarization and Interaction***

09:35–09:55 *Improving Sign Language Production in the Healthcare Domain Using UMLS and Multi-task Learning*

Jonathan David Mutal, Raphael Rubino, Pierrette Bouillon, Bastien David, Johanna Gerlach and Irene Strasly

09:55–10:15 *It's Difficult to Be Neutral – Human and LLM-based Sentiment Annotation of Patient Comments*

Petter Mæhlum, David Samuel, Rebecka Maria Norman, Elma Jelin, Øyvind Andresen Bjertnæs, Lilja Øvrelid and Erik Velldal

10:15–10:30 ***Poster boosters***

10:30–11:00 ***Coffee break***

11:00–13:00 **Session 2: Patients' language and care**

11:00–11:30 ***Invited talk – Natalia Grabar: Linguistic Foundations of the Simplification and its Current State***

11:30–11:50 *Simulating Diverse Patient Populations Using Patient Vignettes and Large Language Models*

Daniel Reichenpfader and Kerstin Denecke

11:50–12:10 *Annotating Emotions in Acquired Brain Injury Patients' Narratives*

Salomé Klein, Amalia Todirascu, Hélène Vassiliadou, Marie Kuppelin, Joffrey Becart, Thalassio Briand, Clara Coridon, Francine Gerhard-Krait, Joé Laroche, Jean Ulrich and Agata Krasny-Pacini

Monday May 20, 2024 (continued)

12:10–12:30 *Structuring Clinical Notes of Italian ST-elevation Myocardial Infarction Patients*
Vittorio Torri, Sara Mazzucato, Stefano Dalmiani, Umberto Paradossi, Claudio Passino, Sara Moccia, Silvestro Micera and Francesca Ieva

12:30–13:00 **Poster boosters**

13:00–14:30 **Lunch**

14:30–16:30 **Poster session (parallel)**

Towards AI-supported Health Communication in Plain Language: Evaluating Intralingual Machine Translation of Medical Texts

Silvana Deilen, Ekaterina Lapshinova-Koltunski, Sergio Hernández Garrido, Christiane Maaß, Julian Hörner, Vanessa Theel and Sophie Ziemer

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Matthew Coole, Paul Rayson, Zoe Glossop, Fiona Lobban, Paul Marshall and John Vidler

Monday May 20, 2024 (continued)

14:30–16:30 Virtual poster session (parallel)

Revisiting the MIMIC-IV Benchmark: Experiments Using Language Models for Electronic Health Records

Jesus Lovon-Melgarejo, Thouria Ben-Haddi, Jules Di Scala, Jose G. Moreno and Lynda Tamine Lechani

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Susmitha Wunnava, David A. Harris, Florence T. Bourgeois and Timothy A. Miller

16:00–16:30 Coffee break

Monday May 20, 2024 (continued)

16:30–18:00 Session 3: Social media and literature

16:30–17:00 *Invited talk – Abeed Sarker: Learning and Educating via NLP of Social Media: the Use Case for Substance Use and Overdose in the United States*

17:00–17:20 *Biomedical Entity Linking for Dutch: Fine-tuning a Self-alignment BERT Model on an Automatically Generated Wikipedia Corpus*
Fons Hartendorp, Tom Seinen, Erik van Mulligen and Suzan Verberne

17:20–17:40 *Unveiling Voices: Identification of Concerns in a Social Media Breast Cancer Cohort via Natural Language Processing*
Swati Rajwal, Avinash Kumar Pandey, Zhishuo Han and Abeed Sarker

17:40–18:00 *Intent Detection and Entity Extraction from Biomedical Literature*
Ankan Mullick, Mukur Gupta and Pawan Goyal

18:00–18:05 Closing remarks