The 2nd Workshop on Mixed-Initiative ConveRsatiOnal Systems (MICROS)

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ABSTRACT

The *Mixed-Initiative ConveRsatiOnal Systems* workshop (MICROS) aims at bringing novel ideas and investigating new solutions on conversational assistant systems. The increasing popularity of personal assistant systems, as well as smartphones, has changed the way users access online information, posing new challenges for information seeking and filtering. MICROS will have a particular focus on *mixed-initiative conversational systems*, namely, systems that can provide answers in a proactive way (e.g., asking for clarification or proposing possible interpretations for ambiguous and vague requests). We will invite people working on conversational systems or interested in the workshop topics to send us their position and research manuscripts.

1 WORKSHOP THEME AND TOPICS

Thanks to the recent advances in automatic speech recognition and voice generation, conversational assistant systems are widely used in chatbots and smart home devices (e.g., Google Home, Amazon Alexa) as well as in wearable devices and smartphones (e.g., Apple Siri, Google Now, Microsoft Cortana). This intensive use of vocal interactions has drawn attention to conversational systems with many application scenarios ranging from simple tasks, such as checking the weather forecast, to more complex ones such as information seeking.

Users employ conversational systems to seek information in an interactive way, often through voice interfaces. Information-seeking conversations can be categorized into two main classes:

(i) search and (ii) filtering. In a typical *conversational search* scenario, the users fulfill their information needs by conversing with the system as in a single- or multi-turn conversation. The user requests are expressed in the form of natural language questions (a.k.a. utterances) that can be vague, ambiguous, or misleading. In particular, the subjects can be pronouns referring to topics previously mentioned in the conversation [6, 9]. In addition, there might be slight or significant topic changes that need to be detected by the system [5]. Conversational search focuses on user interactions that have information seeking goals, and Information Retrieval (IR) empowers dialogue systems to get context and answer user questions properly. On the other hand, information filtering is represented mostly by *interactive recommendations* which result in more structured conversations where the system solicits user's preferences and opinions [7].

Challenges in mixed-initiative systems. Mixed-initiative interactions have been studied since early research on dialogue systems mainly for assisting the users in problem planning and solving [3]. Recently, mixed-initiative interactions have witnessed novel interest from researchers as they are very helpful in conversational settings [2, 11]. As an example, a user is searching for specific information but her request is ambiguous or too vague, so the system can ask for clarification. This is also known as sub-dialogue initiation as the system temporarily takes the initiative and asks a question with the purpose of eliciting clarification from the user. Such interaction can be repeated for multiple turns until the original request is clarified and the system can answer it properly. Asking clarification in information-seeking systems is a timely topic that has been studied by several authors. Zamani et al. [10] proposed both a taxonomy of open-domain information-seeking queries as well as an approach for clarifying-question generation based on sequence-to-sequence models. Other authors relied on simple question templates [4] or on clarification maximization models [8].

Another type of mixed-initiative interaction is represented by preference elicitation in the context of information filtering. Traditional systems profile the users leveraging past interactions, while conversational systems can elicit the users' opinions and preferences to create better profiles. Most of the effort in this domain focuses on asking questions to users with the purpose of eliciting preferences [7]. The main challenges are selecting the questions that optimize the information gain and modeling users' preference upon receiving their feedback avoiding any bias.

We envision that mixed-initiative interactions of conversational systems may represent an important development in conversational search.

Topics. The main topics of the workshop include:

(1) Applications of conversational search and recommendation systems
(2) Mixed-initiative interaction systems, such as clarification and preference elicitation in conversational systems
(3) Deep learning and reinforcement learning for conversational search
(4) Multi-modal interactions for conversational interfaces (e.g., speech-only and small-screen interfaces)
(5) Specialized applications and use cases for conversational search (e.g., health, finance, travel)
(6) Knowledge graph presentation in conversational search
(7) Data creation and curation for conversational search
(8) Evaluation metrics for effectiveness, engagement, satisfaction of conversational systems

2 WORKSHOP OBJECTIVES AND GOALS

MICROS workshop is going to focus on conversational information seeking systems and conversational recommendation systems with a particular attention towards mixed-initiative interactions. This is the second edition of the workshop. Last year, we organized the first edition of MICROS[1] co-located with *ECIR 2021*.

Advanced, flexible, and mixed-initiative interactions are very important in conversational systems as they help to identify the correct intent behind the user's requests. Especially in cases where the system lacks enough confidence in understanding the requests or in identifying the topic of interest, a better option would be to take the initiative by asking users to provide more information about their needs. This could be through transferring the domain knowledge and informing the user about possible misinterpretations of their queries. Moreover, such forms of interactions could be adopted to improve user experience in exploratory search. As a matter of fact, the interactions between users and conversational systems should go beyond the usual *"user asks, system responds"* paradigm since conversational systems may need to interact with the users (e.g., clarifying the request and proposing interpretations, or eliciting user's interests). Moreover, in information filtering and recommendation systems, mixed-initiative interactions are important as they can be used for eliciting users' preference and opinions on the recommended items with a consequent improvement of the users' satisfaction.

MICROS aims at bringing together academic and industrial researchers to create a forum for research on conversational approaches and on mixed-initiative interactions.

3 ORGANIZERS' BACKGROUND

Ida Mele is currently a researcher at IASI-CNR in Rome (Italy). Previously, she was a postdoctoral researcher at ISTI-CNR in Pisa (Italy), the University of Lugano (Switzerland), and MPII in Saarbruecken (Germany). She got her Ph.D. in Computer Engineering from Sapienza University of Rome with a Thesis on Web Usage Mining with applications to Web search and recommendation. Part

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her Ph.D. research was carried out during internships at Yahoo Research (Spain) and MPII (Germany). She has co-authored papers in peer-reviewed conferences, including CIKM, WSDM, SIGIR, ECIR and in top-tier journals such as TOIS and IPM. She has also served as a PC member and reviewer for international conferences and journals. Her research interests are: Web Mining, Information Retrieval, and Conversational Assistant Systems.

Cristina Ioana Muntean is a researcher at ISTI-CNR, Pisa (Italy). Her main research interests are in Information Retrieval and Machine Learning with applications to web search and social media. She is particularly interested in passage retrieval and conversational search using neural and classic IR models. She is an active member in the SIGIR, ECIR, CIKM, and The Web Conference communities, as paper author and as part of the program committees.

Mohammad Aliannejadi is an assistant professor at the University of Amsterdam (The Netherlands). His research interests include ranking, single- and mixed-initiative conversational information access, recommender systems, and metasearch. Previously, he spent two years as a postdoctoral researcher in the same group. He completed his Ph.D. at the University of Lugano (Switzerland), where he worked on novel approaches of information access in conversations. He has been an active member of the community, publishing and serving as a PC member in major venues and journals such as SIGIR, CIKM, WSDM, ECIR, ACM TOIS, and IEEE TKDE. Mohammad has recently chaired the ClariQ data challenge at the SCAI workshop [1], focusing on asking clarifying questions in information-seeking conversations.

Nikos Voskarides is an applied scientist at Amazon (Spain). He obtained his PhD from the University of Amsterdam. His research interests include information retrieval, knowledge graphs, and conversational search. He is an active member of the community, publishing and serving as a PC member at major conferences such as SIGIR, ACL, EMNLP, ECIR, ACM TOIS and AKBC.

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