Task Intelligence Workshop @ WSDM 2019

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ABSTRACT

The task intelligence workshop at the 2019 ACM Web Search and Data Mining (WSDM) conference comprised a mixture of research paper presentations, reports from data challenge participants, invited keynote(s) on broad topics related to tasks, and a workshop-wide discussion about task intelligence and its implications for system development.

CCS CONCEPTS

• Human-centered computing; • Information systems → Information retrieval; • Data mining; • Computing methodologies → Machine learning;

KEYWORDS

Tasks; Task intelligence; Workshops

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1 INTRODUCTION

Tasks (i.e., defined pieces of work, ranging in scope from specific (e.g., sending an email) to broad (e.g., planning a wedding)) are central to all aspects of information access and use. Task intelligence spans technologies and experiences to extract, understand, and support the completion of short- and long-term tasks. Helping users complete tasks is a key capability of search systems, digital assistants, and productivity applications. Extracting tasks from data is a core challenge in data mining and knowledge representation and draws on additional research from areas such as machine learning and natural language processing. Task can be mined from sources such as email corpora (e.g., commitments and requests [1]) and search engine log data [4]. Attributes of tasks, such as priority, duration, and progress toward completion, can also be inferred from data (e.g., [5]) and deployed in a broad range of application scenarios in software and services we use every day.

The workshop brings together researchers from academia, industry, and beyond for a half-day meeting on task intelligence at WSDM 2019. The event comprises a mixture of:

• Invited keynote(s) on broad topics related to tasks (e.g., supporting tasks in productivity applications or learning about tasks in search engines)
• Research paper presentations
• Reports from data challenge participants, including system demonstrations if available

Task completion drives much of our engagement with computer systems. Tasks are therefore central to search and data mining research and applications. Imbuing machines with the ability to mine, model, and support tasks, i.e., possess task intelligence, is increasingly important. The workshop theme covers variety of research topics ranging from task understanding and support for retrieval systems to contextual recommendations and new interfaces to support task completion. This makes it relevant to both the web search and data mining communities at WSDM 2019. The anticipated outcomes from the workshop include:

• Insights from accepted research papers
• Findings from a data challenge on a publicly available dataset
• A prioritized list of research challenges emerging from discussions during the event
• Idea sharing and connections between participants

2 WORKSHOP CONTENT AND DATA CHALLENGE

2.1 Keynote Speakers

We invited speakers from across industry and academia. We are honored to have an impressive lineup of three fabulous keynotes:

• Ed H. Chi (Google AI) – Ed is a Principal Scientist at Google, leading a machine learning research team focused on recommendation systems and social computing research. He has launched significant improvements of recommenders for YouTube, Google Play Store, and Google+. Ed is known for research on web and online social systems, and the effects of social signals on user behavior.
We sought submission of papers describing early-stage research on task intelligence. Associated with the Task Intelligence workshop was a data challenge, for which interested participants could download a rich personal data archive of lifelog data annotated with real-world tasks/activities. For the data challenge, the dataset employed for the Lifelog Search Challenge (LSC) [2], a participating workshop at the 2018 ACM International Conference on Multimedia Retrieval (ICMR) was used. The dataset consisted of 27 days of rich multimodal lifelog data from one lifelgger organized into units of a minute duration. Specifically, the dataset included:

- Multimedia Content. Anonymized wearable camera images gathered using a Narrative Clip 2 at a frequency of about two images per minute and worn from breakfast to sleep. Associated with each image were a set of visual concepts (e.g., computer, car, glass) generated by the Microsoft Cognitive Services (computer vision API) [3].
- Biometric Data. 24 × 7 heart rate, galvanic skin response, calorie burn and steps, on a per-minute basis. In addition, daily blood pressure and blood glucose levels and weekly cholesterol and uric acid levels were recorded.
- Human Activity Data. The daily activity of the individual in terms of the semantic locations visited, physical activities (e.g., walking, running, standing) along with a time-stamped diet-log of all food consumed drinks taken, and a location record for every minute.
- Information Activities Data. Using the Loggerman app, the information creation and consumption activities were provided, which were organized into blacklist-filtered, sorted, document vectors representing every minute.
- Tasks. Each minute of the dataset was annotated with a single dominant activity label (e.g., washing clothes, preparing meals, shopping), which were analogous to real-world task annotations.

In all, five participants sought access to the dataset. At the time of writing, we were unsure of the nature of their dataset exploration. The results of the task challenge will be presented at the workshop.

3 CONCLUSIONS

Task intelligence is an important research area with broad practical implications: tasks are central to all aspects of our lives. The workshop presents an opportunity to bring together researchers with diverse interests and backgrounds for discussions on how technology can help with task completion. We hope that the event highlights the wealth of opportunity for impactful work on task intelligence and fosters future research collaborations between workshop attendees.

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1https://azure.microsoft.com/en-us/services/cognitive-services/computer-vision/