



Agents for Social Media

Social media is changing the way we access information, share experiences, and – in general – interact with others. Recent statistics show that approximately 20 percent of time spent on the Web involves social media. While some of this time is well spent (enjoying all its benefits), some of the time is spent trying to overcome the challenges that social media has introduced, such as identifying credible information, searching for relevant content, ensuring that privacy constraints are met, sharing information appropriately, and overcoming security breaches.

A currently popular form of social media, *microblogging*, enables individuals to share small pieces of information with many others whom they might barely know. These individuals often have minimal credentials – sometimes not even a full name. It isn't clear whether they created their own credentials and, if not, what the origin of those credentials might be. Without knowing this, it's difficult to judge the credibility of information that microbloggers provide.¹ Currently, users deal

with this by searching through other media to check whether the content is actually true or try to identify ways to cross-check the information with other users. It would be tremendously beneficial if agents could help identify trustworthy users in the system, as well as provide ways to reason about the information's provenance. Even when the information's credibility is guaranteed, there's too much information to be processed manually. It would be helpful to have automated mechanisms that can mine social media, differentiate between information that is (or isn't) important, and communicate results clearly. Agents would be an ideal means for providing such mechanisms.

Another important area in which software agents can help users is information gathering and searching on social media.² The vast amount of information that's produced everyday makes it impossible for users and organizations to track and compile the necessary content on their own. Agents that can process the information, reason about it, and provide useful summaries to users are of utmost

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importance. Currently, these summaries mostly contain the sentiment of a concept, but in the near future they'll include full-fledged explanations covering what users think and how they relate to each other. Techniques from natural language processing, logic-based reasoning, community detection, and so on will serve as a backbone to enable effective information searching, while techniques from multiagent systems will enable information to be searched cooperatively.

A side effect of sharing information over social media is that users' privacy is violated easily, either because shared content reaches an unintended audience or other users share content about individuals without the individual's consent.³ Managing an individual's privacy in social media would be eased if personal agents could help maintain requirements, verify whether the system abides by the requirements, and cooperate with other agents as needed to ensure that the requirements are met. An interesting aspect of this problem is that social media enables users to share information about themselves as well as others. Hence, contrary to traditional information systems where the user is the main authority to manage her content, in social media information about the user is added to the system without her consent. Thus, in addition to well-known access control policies, cooperative techniques are needed to preserve users' privacy.

While there are many users of social media, some of these users are unaware of all the benefits and pitfalls of sharing information. Many users don't know how to set privacy settings for posts, others might not know how to tag individuals, and so on. Another area where agents can be of use is the teaching of social media usage to users. Agents can intervene at appropriate intervals to advise or recommend proper usage to social media users or warn them about the possible consequences of their actions. Such agents would benefit most from communicating with and learning from each other and sharing the common patterns of behavior they observe across users.

While most current social media is intended for sharing content, future social media applications could offer models for other forms of interactions, including business and government. Such models could make use of agents that form teams, partnerships, and communities,

foster communications, vote on behalf of users, and collaborate to formulate policies and reach decisions. To realize these new forms, underlying computational challenges must be addressed.

There are numerous challenges and opportunities that arise at the intersection of agents and social media. Here are some interesting directions for the near future:

- *Making decisions via social media.* Already social media is being used to influence public opinion. Can it be used to reach consensus on important public issues?
- *Mining social media.* What can be learned about a society or its members from its social media?
- *Personalizing social media.* Can social media experiences be improved through individualization?
- *Ensuring cybersecurity for social media.* Can the accuracy of social media information be assured?
- *Respecting privacy in social media.* Can privacy be guaranteed, while personal information is used for improved end-user experiences?
- *Engendering trust based on provenance for social media.* Can the provenance of derived information be tracked and conveyed accurately?
- *Conducting business over social media.* Will social media open up new avenues for commerce?

In This Issue

Agents appear destined to be a major approach to the implementation and use of social media. This special issue addresses several of the key aspects of an agent-based approach, but it doesn't exhaust all of the aspects. With the above directions in mind, in this special issue we present three articles that address different usages of agents for social media.

In the first article, "Reasoning about Sentiment and Knowledge Diffusion in Social Networks," Fabio Gallo and colleagues develop a network knowledge model for agents that can be used to study how information that flows from multiple social media sources can be combined to reason about agents' sentiments. They show how different agents can reason differently using Twitter data.

In the second article, “PACMAN: Personal Agent for Access Control in Social Media,” Gaurav Misra and Jose Such present an agent that recommends personal access control settings to the user for a given post. In doing so, the authors consider not only the post’s content, but also its social context, the user’s communities, and her profile information. They demonstrate that PACMAN can generate the access control recommendations accurately.

In the third article, “SoSharP: Recommending Sharing Policies in Multiuser Privacy Scenarios,” Ricard Fogues and colleagues develop an agent that recommends sharing policies to its user based on her previous posts as well as the posts of her friends. The agent learns the user’s privacy policies over time, so it consults with the user minimally. The authors show that with incremental improvement, SoSharP can recommend policies for multiuser scenarios successfully.

We hope that readers find these articles informative and inspiring. We sincerely thank the authors for their submissions and the reviewers for their insightful feedback. ☐

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