Searchbots: Using Chatbots in Collaborative Information-seeking Tasks

Sandeep Avula

University of North Carolina at Chapel Hill
asandeep@unc.edu

ABSTRACT

The popularity of messaging platforms such as Slack has given rise to thousands of different chatbots that users can engage with individually or as a group. The proposed dissertation research will investigate the use of searchbots (i.e., chatbots that perform specific search operations) during collaborative information-seeking tasks. Specifically, we will address the following research goals.

RG1: Our first research goal will be to investigate the use of searchbots in a collaborative search scenario. The goal of *collaborative search* is to develop systems that help two or more people collaborate synchronously or asynchronously on information-seeking tasks. Collaborative search systems such as SearchTogether [6], Coagmento [7], CollabSearch [8], and ResultsSpace [2] allow users to share information, communicate asynchronously or in real-time, and provide interactive visualizations that raise awareness of each user's search activities, allowing users to learn from each other's search strategies and avoid duplicating work. Prior research shows that while people often search in pairs and in larger groups, they do so without the use of specialized search tools and instead coordinate via "out-of-channel" communication tools such as email, text messaging, phone, and social media [4, 5].

Our first goal will be to investigate the use of searchbots during real-time collaborative search tasks. Our interest in the use of searchbots for collaborative search echoes a suggestion made by Morris [5] to develop *lightweight* collaborative search tools over existing communication platforms.

RG2: Our second research goal will investigate how users perceive and engage with searchbots that intervene without an explicit request. To this end, we will consider several research questions. First, we will investigate the different factors that influence users' decisions to engage or *not engage* with a searchbot that intervenes dynamically. As an example, prior research on dynamic help systems found that users often avoid assistance tools due to the cost of cognitively disengaging with the task at hand [3]. In this respect, users may avoid engaging with a searchbot if they are already searching on their own. Second, we will investigate whether the manner of intervention influences users' perceptions and actions. Searchbots typically require specific bits of contextual information in order to produce useful search results. Searchbots that require multiple bits of information explicitly request this information from users before producing the search results. We will investigate the

possible differences between users' engagement with searchbots that intervene and explicitly request the necessary information in a scripted dialogue versus searchbots that intervene only after extracting/inferring the necessary information from the conversation.

RG3: Our third and final research goal will be to develop and evaluate an end-to-end brokered system. We envision a system that monitors a conversation between two or more users and performs several predictive tasks. The first task will be to predict *which* searchbot (if any) would be useful for the current task. Predicting a relevant searchbot is related to the task of vertical selection in aggregated search [1]. To this end, we will build on prior work to develop algorithms that predict searchbot relevance for a given conversation between users. The second task will be to predict *when* to intervene. The third task will be to predict *how* to intervene. We will develop techniques that can analyze the conversation and extract or infer the bits of information needed by a searchbot to produce contextually relevant results.

The proposed dissertation research will proceed in two phases. For Phase 1, we have conducted a Wizard of Oz study to investigate the questions in research goals RG1 and RG2. In Phase 2, we will use the insights gained in Phase 1 to develop and evaluate models for the predictive tasks outlined in RG3.

KEYWORDS

Chatbots; Collaborative Search; Intelligent Agents

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