Coagmento - A Collaborative Information Seeking, Synthesis, and Sense-making Framework

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ABSTRACT
We present *Coagmento* - a framework for supporting collaborative information seeking, synthesis, and sense-making. As a system, *Coagmento* is a combination of browser plug-in, which includes a toolbar and a sidebar, and *CSpace*, an online collaborative space.

ACM Classification Keywords
H.5.3 Information Interfaces and Presentation: Group and Organization Interfaces—*Collaborative computing, Computer-supported cooperative work*; H.3.3 Information Search and Retrieval: Search Process

General Terms
Design, Human Factors

Author Keywords
Collaborative information seeking, information synthesis, sense-making, interactive search, exploratory search, CSCW

INTRODUCTION
In the recent years there has been an inclining interest in providing support for collaborative information seeking. Different groups have tried to study the instances, motivations, and methods for collaboration using surveys, interviews, and empirical observations. A number of setups and systems have resulted from such studies, including Ariadne [7], Search-Together [4], and Cerchiamo [1]. While these systems have provided support for multiple people looking for information together, they have failed to acknowledge (and provide explicit support) that finding information is only a small part of a big problem of people collaborating for information seeking, synthesis, and sense-making. As we demonstrated with interviews and cognitive walkthroughs [6], looking for information happens in a wider context, which includes interpersonal relationships, social dynamics, and the expectations and limitations of a collaborative project. A true collaborative system should consider and facilitate such aspects of collaboration. With *Coagmento*,[1] we show how these aspects could be streamlined in a single system that supports collaborative information seeking, synthesis, and sense-making.

DESIGN
The design of *Coagmento* is based on good practices learned from collaboration (e.g., [2]), and groupware systems (e.g., [3]). We enhanced our understanding obtained from such literature with several personal interviews, cognitive walkthroughs, personal and participatory design sessions, and lab and field studies.[2] As a result, we put the following considerations while designing *Coagmento*.

- *Simplicity*. Keep the system easy to learn and use. Often people discontinue using a new system because of the steep learning curve or the system's ability to offer good benefit-to-cost ratio. Since the majority of the users could be considered to be already familiar with a web browser, we decided to design *Coagmento* as a combination of browser add-on and a web-based service.

- *Integration*. As many of CSCW works have shown, a collaborative system requires support for many interconnected elements, including control, communication, and awareness (e.g., [5]). From our interviews and other studies, we learned that people use a number of tools to support these functionalities. We wanted to provide them a solution that integrated all of these in a single interface.

- *Flexibility*. One of the ways various CSCW systems are differentiated is by the means of dimensions such as synchronous and asynchronous, and remote and co-located. However, we did not want to make any assumptions about how *Coagmento* should be used. We, therefore, designed it such that it could be used in any of these modes. *Coagmento* was also designed to support system-mediated as well as user or UI-mediated collaboration, thus giving it a lot more flexibility than many other systems.

IMPLEMENTATION
Coagmento has two core components: a plug-in for Firefox browser, and a web-based collaborative space, called *CSpace* (see Figure 1). The plug-in includes a toolbar and a sidebar. Following is a brief description of how differ-

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[1]Latin for "working together". *Coagmento* is available from http://www.coagmento.org/ for free.
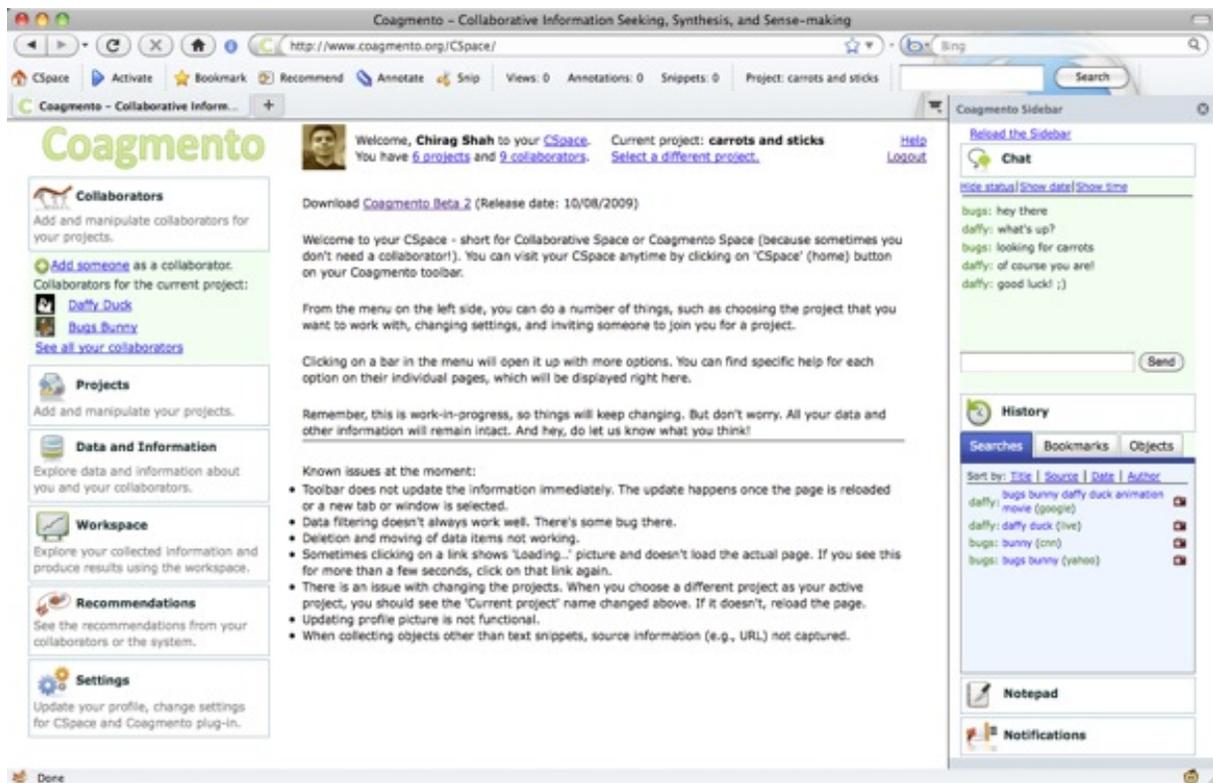[2]Some of these works are under review at this time.

Figure 1. *Coagmento*, with its toolbar, sidebar, and *CSpace* to support different collaborative activities.

ent components of *Coagmento* support collaborative information seeking, synthesis, and sense-making.

Using *Coagmento*, one could do the following activities related to information seeking: collect, share, and recommend webpages using the toolbar, refind and reuse information using the sidebar, and add value (tags, notes, etc.) to found information. *Coagmento* supports information synthesis by the way of providing a workspace in *CSpace*, where an individual or group could organize the collected information and compile a report. *Cogmento* also includes support for alerts or notifications, ability to make recommendations to an individual or the whole group, and a function to monitor and relate information as the group works through their information seeking process. Such support could help one in their sense-making processes. In addition, *Coagmento* provides integrated support for communication, note-taking, and collecting text snippets or other objects from webpages.

IMPLICATIONS AND FUTURE WORK

Cogmento is not simply a system; it is a way to think about providing support for collaborative information seeking, synthesis, and sense-making. The existing system demonstrated here is simply a way to implement the framework, but there is much to be done in this direction. We believe with the framework that *Coagmento* demonstrates, one could start designing and evaluating one's own system that addresses synchronous or asynchronous, remote or co-located, system-mediated or user-mediated, and active or passive collaborations.

We are currently working on evaluating our system at different venues to study the implications of its different parts. Given the same framework, we could now easily change any of the components or add more as the situations demand.

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