

Automatic Information Management for Collaborative Spaces

Duration 3 years
Level Ph.D.
Team Loki (Inria, France), HCC (Aalborg University CPH, Denmark)
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This Ph.D. is targeted at the PEPR eSEMBLE program, and falls within the scope of the targeted project PC3: MATCHING - Collaboration with Intelligent Systems. You can find more information at <https://pepr-ensemble.fr/>

Direction

This Ph.D. project will take place at the Inria center of the University of Lille (France) in the **Loki team**. It will be directed by **Sylvain Malacria** (Inria), and co-supervised by **Bruno Fruchard** (Inria), and **Carla Griggio** (Aalborg University CPH).

Summary

We often discuss and share data collaboratively regarding websites, tools, or information that are relevant to a given topic. Knowledge shared that way might be scattered over a multitude of applications and bound to them, without means to easily retrieve it beyond opening the applications and extracting it. Collaborative systems such as Google Drive or Microsoft Teams enable clustering and sharing such knowledge, but require to agree on structures such as folder hierarchies to store and efficiently retrieve pieces of information. Mental models of users may differ in how data should be structured in this case, and single solutions applied to everyone might be strongly limited.

In this Ph.D. thesis, we want to explore the use of an intelligent collaborative system that assists users to store, access, process and present data, with a vocabulary of interactions that enables simply defining constraints such as where to store information and with whom. The primary goals are to identify efficient interactive means of communications between users and intelligent systems, and ways to adapt the structure of shared information spaces to accommodate all collaborators.

Context

Collaborative work is increasingly mediated by multiple systems and devices. For example, a team of software engineers may access and generate diverse types of data across Slack, Github, Google Docs, Figma, Calendars, Email, etc. for design, development and management activities. Teams may collaborate on multiple platforms for a project to benefit from diverse functionality and switching between personal and shared spaces [3], and communication can start and end on different platforms based on the way we split information across them [2]. While collaborating on multiple platforms expands the range of tools available to the team, it also scatters their resources and information across "information silos", therefore creating boundaries that pose challenges when trying to retrieve and make sense of information shared with others over time [1].

Currently, preserving information over time requires users to manually store it in dedicated places that are organized with a structure they decided to use. This can clash when mental models of users are different and rely on constraints that are incompatible. Similarly, relying on indexing systems such as Apple Spotlight to retrieve information using queries requires comprehending its model to be efficient. Furthermore, not all information might be worth keeping over time (e.g, casual discussions of how a meeting went might not be significant when exploring information related to a project) as it might clutter the informational space and create noise that could be captured when searching for information or using queries.

Goal

The primary goal of this Ph.D. is to explore interactive solutions leveraging intelligent collaborative systems that support users in registering, accessing, processing and presenting data generated across a team's software ecology. We want to study mixed-initiative approaches for which the system can proactively store and structure data relevant to the team and their goals but also allow users to intervene and explicitly ask for help in managing

their data. We are particularly interested in studying how such systems can support long-term collaborations mediated by complex collections of software. The intelligent system would help structure the team's information space by taking into account constraints and goals from each user and help them retrieve information efficiently and across platforms, as opposed to navigating through traditional folder hierarchies and "apps" designed as information silos.

We identify several challenges the candidate will face:

- explore the design space of techniques for interacting with an intelligent system to register, access, process and present data in diverse collaborative activities, for instance, combining direct manipulations of media with natural-language processing and/or large language models
- implement interoperable methods to fetch any kind of media across a team's complex ecologies of software
- investigate methods to let multiple users structure their shared informational spaces collaboratively, negotiating the balance between automatic and user-controlled approaches to shape their data to fit their mental models and goals
- evaluate how efficiently users and systems can communicate with each other to achieve their goals while the system remains as transparent as possible in the collaborative process

Candidate

The candidate must have (or be about to obtain) a Master's degree or equivalent in Computer Science or Human-Computer Interaction, and demonstrate a strong interest in research. They should have experience and a strong interest in software development, machine learning and strong programming skills. Creativity, independence, team spirit and communication skills are valuable assets. A good level of technical and scientific English is also required.

To apply, send your resume and a cover letter by email to Bruno Fruchard (bruno.fruchard@inria.fr), Carla Griggio (cfg@cs.aau.dk), and Sylvain Malacria (sylvain.malacria@inria.fr) with [Application: Automatic Information Management for Collaborative Spaces] as object of the e-mail. In addition to what is generally expected, the cover letter should highlight what you find particularly interesting in this topic, why current solutions are limited, as well as describe your overall vision for this project. Ideally, it should also elaborate on why you are interested in working in academic research. All applications are welcome, regardless of age, gender, social or ethnic origin, sexual orientation, or disability. For the integration of people with disabilities, we are working on possible adaptations of the positions to be filled - within the limits of the applicable rules for the safety of people: do not hesitate to contact us to tell us about your situation.

References

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