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CollEagle; Tangible Human-AI Interaction for Collocated Collaboration

Olaf ADAN and Steven HOUBEN
Eindhoven University of Technology
ORCiD ID: Olaf Adan https://orcid.org/0000-0002-2133-2288

Abstract. The way we collaborate and work together is subject to constant change. While AI-enabled tools are emerging rapidly and impacting how we work individually, most are not designed to support collocated collaboration. This demonstrator showcases *CollEagle*: an interactive interface that leverages NLP to enable tangible human-AI interaction. As the access point for AI-enabled technologies is signposted by lexical input, the *CollEagle* system provides an example of how we might design tangible human-AI interactions and support the collaborative use of AI in collocated environments.

Keywords. human-AI interaction, tangible interaction, collocated collaboration, natural language processing

1. Introduction

The way we collaborate and work together is subject to constant change. While AI-enabled tools are emerging rapidly and impacting how we work individually, most are not designed to support collocated collaboration. Collocated environments enable thought processes to be externalized through the feats of physical space, which mediate behaviors and dialogue, allowing collaborators to reach common ground in ways that remain out of the scope of most digital environments [2]. On the other hand, AI-enabled tools are embedded in the digital. The driving factor behind many human-AI interactions resides in Natural Language Processing (NLP), for which advances in topic modeling have led to the development of Large Language Models (LLM). These have since revamped conversational agents as systems that challenge commonly used search engines and are increasingly integrated into other existing technologies.

Consequently, human-AI interaction remains signposted by a form of dialogue typical to conversational agents, which does not fit the multimodal interactions encompassing collocated collaboration. Recent works leveraged NLP to support collocated collaboration by continuously extracting content from conversations to produce images that stimulate creativity [3] and to reveal how themes emerge across meetings[1]. While these support collocated collaboration as passive interfaces that enable reflective action, they are not situated to foster the interactive context inherent to collocated environments.

This demonstrator showcases *CollEagle*[1]: an interactive interface that leverages NLP to enable tangible human-AI interaction (Fig. 1). *CollEagle* enables users to interact

[1] Demo video available at: https://youtu.be/dMND-1d3UTM

with real-time conversational data and create an overview of their discussion, for which it transcribes ongoing dialogue, extracts key phrases and displays these as post-it notes. Placing an opaque item onto a post-it makes it represent the key phrase it contains, resulting in a tangible annotation. As the access point for AI-enabled technologies is signposted by lexical input, the *CollEagle* system provides an example of how we might design tangible human-AI interactions and support the collaborative use of AI in collocated environments.

2. Interacting with Tangible Annotations

Once established, the content of tangible annotations is augmented around the related item and rotates around it to be viewed from all angles. Items can be reused to collect a range of post-its, enhancing the meaning it represents. Lines are drawn between items to indicate that their key phrases have been extracted within the same utterance. Placing an item onto a previously used item removes these; adding a third item reveals the utterances from which the content surrounding an object had been extracted.

3. Demonstrator Setup

At the conference, visitors will fully experience the working system that is CollEagle. To ensure a successful experience, we will need a table about the size of a 42" flat-screen TV and a power outlet. While the authors can provide all other equipment, we would greatly appreciate it if available means are provided to attach an Azure Kinect depth-sensing camera about 1 meter above the table (see Fig. 1).

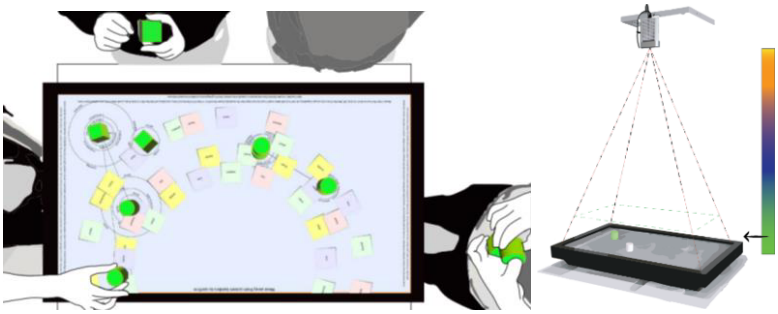

Figure 1. CollEagle interface (left) and setup (right)

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