Designing Interfaces that Support Temporal Work Across Meetings with Generative AI

Rishi Vanukuru*†
ATLAS Institute
University of Colorado Boulder
Boulder, United States
rishi.vanukuru@colorado.edu

Payod Panda*
Microsoft Research
Cambridge, United Kingdom
panda@payodpanda.com

Xinyue Chen†
University of Michigan
Ann Arbor, United States
xinyuech@umich.edu

Ava Elizabeth Scott†
University College London
London, United Kingdom
ava.scott.20@ucl.ac.uk

Lev Tankelevitch
Microsoft Research
Cambridge, United Kingdom
levt@microsoft.com

Sean Rintel
Microsoft Research
Cambridge, United Kingdom
serintel@microsoft.com

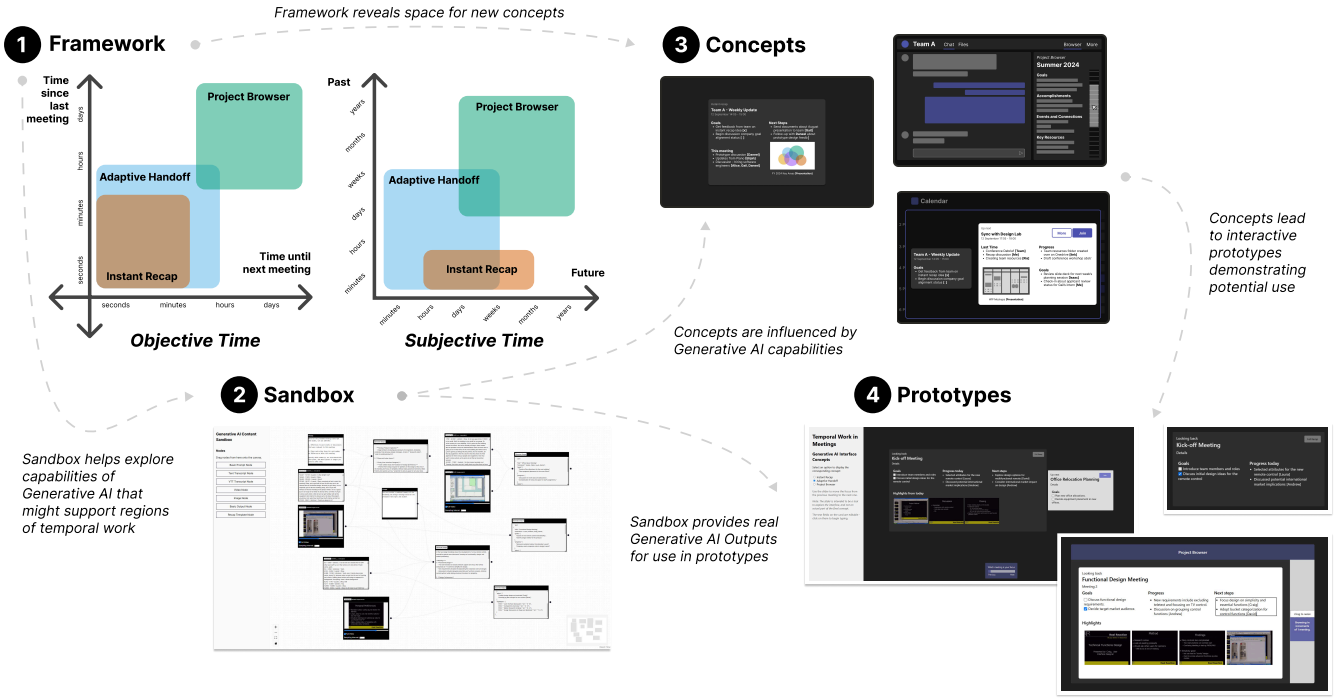

Figure 1: Designing Interfaces grounded in Temporal Work & Generative AI: (1) We can use the framework of temporal work to define regions in the spaces of objective and subjective time that require support for a given context. (2) The Generative AI Content Sandbox enables us to explore and understand how Generative AI might best support such forms of work. (3) Building on the framework and Sandbox, we can design interface concepts for different times and purposes. (4) These concepts can be operationalized as interactive prototypes, with real AI-generated content coming from the Sandbox.

ABSTRACT

Temporal work is an essential part of the modern knowledge workplace, where multiple threads of meetings and projects are connected across time by the acts of looking back (retrospection) and ahead (prospection). As we develop Generative AI interfaces to support knowledge work, this lens of temporality can help ground design in real workplace needs. Building upon research in routine dynamics and cognitive science, and an exploratory analysis of real recurring meetings, we develop a framework and a tool for the

*Both authors contributed equally to this research.
†The work was done when the co-author was employed at Microsoft.

DIS '25, July 5–9, 2025, Funchal, Portugal

ACM ISBN 979-8-4007-1485-6/2025/07
https://doi.org/10.1145/3715336.3735833

synergistic exploration of temporal work and the capabilities of Generative AI. We then use these to design a series of interface concepts and prototypes to better support work that spans multiple scales of time. Through this approach, we demonstrate how the design of new Generative AI tools can be guided by our understanding of how work really happens across meetings and projects.

CCS CONCEPTS

• **Human-centered computing → Interaction design theory, concepts and paradigms**; *Interactive systems and tools.*

KEYWORDS

meetings, goal, recurring, temporal work, videoconferencing, retrospection, prospection, intentionality, generative AI, support, tools

ACM Reference Format:
Rishi Vanukuru, Payod Panda, Xinyue Chen, Ava Elizabeth Scott, Lev Tankelevitch, and Sean Rintel. 2025. Designing Interfaces that Support Temporal Work Across Meetings with Generative AI. In *Designing Interactive Systems Conference (DIS '25), July 5–9, 2025, Funchal, Portugal.* ACM, New York, NY, USA, 21 pages. https://doi.org/10.1145/3715336.3735833

1 INTRODUCTION

The modern knowledge workplace is one characterised by fragmentation [2]. Navigating the timeline of everyday work usually involves frequent switching between project threads, and moving in and out of meetings. Meetings are highly visible and often scrutinized [23, 32, 35], with some individuals spending more time communicating about work than doing it [50].

As visible as they might be, the individual meeting is part of a larger sequence of interactions. Recent efforts to understand recurring meetings [52, 72] have begun to explore this with a focus on the subject matter of discussions, as opposed to their role in coordinating work. As a result, the temporal work [40] that people engage in goes unnoticed. Temporal work involves the acts of prospection (future-oriented cognition) and retrospection (past-oriented cognition). Prospection enables individuals to integrate future visions with present actions [75], while retrospection connects past interactions across projects [69]. Through in-depth longitudinal studies [7, 9, 37, 40], researchers have uncovered how meetings act as a site for organizational memory. Temporal work is therefore a key aspect, as *"human agency and experience is inherently temporal, and people frequently draw upon both the past and the future in order to ascribe meaning to their present activities, particularly during emergent events or disruptions to their everyday activities"* [9].

Meeting support tools have largely focused on enhancing efficiency, assisting in preparing for meetings [12], supporting in-meeting discussions [48, 58], and reflecting on them to extract insights [29, 77]. Many of these tools have even employed machine learning methods to draw meaning from the various media created around and during meetings. More recently, the rise of remote and hybrid meetings that generate consistent digital trails, as well as Generative AI systems that are able to operate on vast amounts of textual and visual information, together present a promising pathway for creating more effective tools to help teams be intentional about their work [51]. Much of current commercial and academic work, however, focuses on understanding how the emergent capabilities of Generative AI may be applied to the context of individual meetings (e.g., [5, 17, 56]).

In this paper, we explore the potential for mutual benefit that exists between the concepts of *temporal work*, and Generative AI's flexibility to harness natural language and multimodal content to produce customized outputs, and hence its ability to deal with the heterogeneity of meetings and work [68]. Using recurring team meetings as a lens, we seek to uncover how Generative AI tools can support temporal work, and how a focus on temporality can inform the design of better supports for knowledge work. While prior research acknowledging the temporality of knowledge work has focused on specific instances of recurring meetings [52], or meetings in a single series [72], we conduct an exploratory temporal analysis of eight meetings across two different recurring meeting series (Section 3), to understand their dynamics and patterns. We develop maps of temporal interactions that go beyond the individual meeting series, and highlight the central role that temporality plays in meetings, and by extension the continuous temporal nature of knowledge work.

Building upon these findings, we develop a framework for thinking about temporal work across meetings, where the spaces of objective time and subjective time can be used to visualize the moments and manner in which temporal work takes place (Section 4). Prior research occupies a few small regions within this framework, which we then use to guide the conceptualization of a portfolio of interfaces aimed at better supporting temporal work (Section 5). These concepts were derived from a prototyping exercise grounded in Generative AI as an enabling technology for engaging with the heterogeneity of meeting and work content. We developed a Sandbox tool[1] to explore the abilities of Generative AI when operating on multiple meetings with different sources of meeting information (transcripts, recordings, slides). We used content outputs from the Sandbox as inputs for interactive prototypes for each of the concepts, showcasing how the interfaces might work in practice.

Taken together, our contributions through this paper are:

- A conceptual framework for thinking about temporal work in terms of objective and subjective time, derived from prior work in routine dynamics and cognitive science, as well as an exploratory analysis of real recurring meetings, that can be used to situate existing meeting support tools and envision new ones,
- A process for designing meeting support interfaces grounded in this framework and the capabilities of Generative AI, demonstrated through the design of three novel interface concepts,
- Code for the Generative AI content sandbox, and the interface prototypes, enabling others to interact with their own meeting information in these prototypes, and conduct open-ended explorations on how Generative AI might further support temporal work.

[1]The source is available at rishivanukuru.com/temporal-work-dis-25

By synthesizing insight from recurring meetings, developing a framework for temporal work, creating tools to explore how Generative AI operates on multiple multimodal meetings, and demonstrating a process for designing interfaces grounded in our understanding of Temporal Work and Generative AI, we provide a pathway for future research that strengthens the chain of intentionality and reflection across meetings, teams, and projects.

2 PRIOR WORK

2.1 Designing support for better meetings

Questions about the effectiveness and value of meetings are long-standing, often surfacing in workplace polls as sources of frustration [25, 50]. The field of Meeting Science explores characteristics that shape perceptions of meeting effectiveness [3, 8, 21, 23, 28, 41, 53, 60, 61]. As Schwartzman writes, based on decades of studying meetings (and why they seem useless and ineffective [65]), researchers and teams have constantly tried *"... to change them, control them, order them, and make them predictable"* [66].

Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW) research has aimed to address common challenges in meetings through technology-mediated solutions. Significant research has focused on post-meeting recap tools to make information capture and retrieval more meaningful [29, 77], and on designing interfaces to support meeting recall [20, 22, 70]. For meeting preparation, prior work has focused on aiding teams in creating better agendas [12], schedules [34], and action plans [57]. Researchers have devised visualizations and interfaces for real-time reflection during meetings [1, 16, 17, 39], and methods to expand participation through various device modalities [15].

Recent advancements in Generative AI have led to significant improvements in automating the capture and articulation of meeting summaries, highlights, and action items [5]. It is not a surprise, then, that Generative AI capabilities are increasingly present in commercial offerings. Platforms like Google's Gemini in Meet[2], Zoom's Meeting AI Companion[3], and Microsoft Teams' Meeting Copilot [4] utilize Generative AI for real-time features such as note-taking and summarization to reduce additional workload during meetings. While the above offerings are bespoke to their platforms, other services like Otter.ai [5] operate as a plug-in to multiple platforms. Beyond nascent commercial offerings, the opportunities of Generative AI in collaborative work is a topic of active research. Indeed, Wang et al. [76] and Scott et al. [68] identify opportunities for Generative AI assistance in creating more effective and purposeful meetings. CrossTalk [81] and CoExplorer [56] use Large Language Models (LLMs) to identify intentions in meeting conversations, provide interface supports that recommend relevant content and actions, and adjust layouts to align with team goals. LLMs have begun being incorporated in research tools for reflective practice during [18] and before [67] meetings, exploring how they can shape collaborative outcomes. Generative AI is also being used in team collaboration for creativity [44, 73], ideation [82], decision-making [19], planning [64], and task engagement [4].

[2]Gemini for Google Workspace, from workspace.google.com
[3]Zoom's Meeting AI Companion, from zoom.com
[4]Team's Co-pilot, from copilot.cloud.microsoft
[5]Otter.ai, from otter.ai

Much of this work centers individual meetings as the unit of focus. Meetings however are but one part of the broader workplace timeline, even if this timeline is increasingly punctuated by them. In an ethnographic study of information workers, González and Mark [31] consider this temporal aspect of the daily timeline and uncover the concept of "working spheres" as the unit by which to measure workplace fragmentation. Much research has since studied the effects of task interruption and switching between different working spheres at the scale of individual tasks [24, 36, 45] and across workdays [79]. Niemantsverdriet and Erickson [52] focus on coherent threads amidst this fragmentation in their work on recurring meetings. They discuss how such meetings are a point of confluence for individual and team goals, and highlight the various activities that take place just before, during, and right after meetings. Similarly, Bedingfield and Clarkson [11] call for expanding the boundaries of meeting events to include pre- and post-meeting activities, individual and collective aims, and overall project implications. Early efforts towards "bridging" multiple meetings proposed integrated architectures for seamless interactions in mobile contexts [78]. In recent design-focused research, Wang et al. [76] analyzed how meeting information is used to support post-meeting activities and introduced "Meeting Bridges"—artifacts created during meetings to better support asynchronous collaboration.

In response to the growing discourse on the issues with technology mediated meetings, researchers have sought to understand the goals behind meetings, and develop supports with a focus on broader meeting purposes [68]. These efforts are encouraging steps toward more intentional meetings, however, there remains a need to consider interactions beyond single meetings. In this paper, we address this need by focusing on *temporal work* in the workplace.

2.2 Time and Temporal Work

The fields of Social Inquiry, Organizational Science, and Routine Dynamics have also explored the challenge of studying meetings and projects over time. Early research by Gherardi and Strati [30] on the types of organizational time, by McGrath [47] on the relationship between time, interaction, and performance in groups, and by Hassard [33] on the different metaphors of time, have engaged with the temporal dimension in theory. Boden [13] conceptualized "Temporal Frames" as a lens through which to view workplace conversations, understanding how work is situated across the past and the present. Through a long-term ethnographic study, Kaplan and Orlikowski [40] surfaced the importance of Temporal Work, a concept that *"... involves negotiating and resolving tensions among different understandings of what has happened in the past, what is at stake in the present, and what might emerge in the future"*. Drawing on Emirbayer and Mische [27]'s theory of human agency, they showed how teams navigate changes by engaging in temporal work to reach provisional settlements and make strategic decisions. More recently, Baralou and Dionysiou [9] investigated the routine dynamics of a virtual team, focusing on the role of Information and Communication Technologies (ICTs) in coordinating work. Temporality was again found to be a key factor, with team members emphasizing the importance of mobilizing both past and future to ascribe meaning to the present and direct future activities. Their

findings revealed how ICT affordances were crucial in supporting distributed temporal work.

These findings about temporal work are echoed by research into the role of meetings. Ballard and Gómez [7], in their account of meetings as sites for organizational memory, write that *"The instrumental function of meetings is explicitly about the business of time—e.g., drawing on collective memories to revisit past decisions, hash out future directions, or celebrate present achievements"*. This highlights a key distinction between "objective" time (the actual passage of time based on the clock and calendar) and "subjective" time (experiencing the past, present, and future within the current moment) [71]. This formulation draws upon prior discussions about these concepts, that highlight how both forms of time are *"inherently intertwined"*, and how *"the continuously present field of past–present–future...coexist in the interaction of memory, perception, desire, and anticipation."* [38]. Temporal work then becomes the act of traversing subjective time, both individually and as a team, in order to make sense of and act in the moment.

These discussions show how temporal work is intertwined with looking ahead to the future, reflecting on the past, and acting in the present. Researchers have highlighted the need for future work to develop theories of *"time and attention in organizations"*, and understand *"how individuals and groups navigate their way through the maze of meetings that every workday presents to them"* [66]. To deepen our understanding of temporal thought, we turn to research that studies its instantiation as the cognitive processes of prospection and retrospection.

2.3 Intentionality, Prospection, and Retrospection

Prospection is the general term for a wide range of future-oriented cognition, and Szpunar et al. [75] have synthesized a taxonomy to describe research in this space. They propose four key modes of prospection, namely, simulation, prediction, intention, and planning. These forms of future thinking have largely been studied separately, and the authors posit that *"they interact and build on one another at various levels of abstraction and complexity"*. While they present a few hypotheses about these interactions, they leave it to future work to confirm them in real-world settings.

Prospection concerns one of the three "time zones" of the past, present, and future. In investigating the reasons for prospection, Baumeister et al. [10] discover that looking ahead is part of a meaning-making process that also involves thinking about the present and the past. They discuss how *"meaning increased steadily as more time zones were invoked: The least meaningful thoughts were those that lacked any time frame, and the most meaningful were the ones that combined past, present, and future"*.

This connects to insight from neuroscience experiments revealing the links between prospection and retrospection, the cognitive act of looking to the past [62].

For a taxonomy of the forms of looking back, we turn to work that is closer to home. HCI research has long been concerned with how people capture, store, and consult information about the past, both in the workplace and in personal life. One of the outcomes of a long-term exploration on the effects of lifelogging on personal remembrance by Sellen and Whittaker [69], was the idea of "the five Rs": Recollecting (remembering past experiences), Reminiscing (nostalgic recollection), Retrieving (looking for specific facts), Reflection (framing the past to make meaning), and Remembering Intentions (drawing from prospective memory).

2.4 Synthesis

Our review shows that while HCI research has historically designed for individual meetings, there is a move to expand this temporal horizon, explore opportunities provided by Generative AI, and focus on intentionality. While both academic research and commercial offerings have begun building AI-assisted meeting supports, they have focused on the capabilities of generative AI systems, largely overlooking their use within the broader temporal frame in knowledge work (e.g., [18, 55, 56]). Research in organizational science and routine dynamics has uncovered the importance of temporal work, where individuals and teams traverse subjective time to act in the moment [13, 40]. However, a gap remains in understanding temporality in recurring meetings, where retrospection and prospection take on special relevance.

3 EXPLORING THE ROLE OF TEMPORAL WORK

As a first step towards designing supports for more purposeful work and meetings, we focus on understanding recurring group meetings due to their unique role as sites for broader organizational memory [7]. By analyzing such meetings, we can potentially understand both the temporal relationship between the specific meetings in hand, but also the wider temporal map of workplace interactions. Specifically, our analysis aims to:

(1) Understand how discussions about "subjective time" punctuate the "objective time" of recurring meetings.
(2) Uncover a map of workplace interactions that expands our understanding of the "objective time" experienced by teams over longer time horizons.

3.1 Recurring Meeting Series Corpus

To assemble a corpus of real recurring team meeting recordings, we recruited teams within a large technology company to share previously recorded meetings (after obtaining appropriate approvals[6]). This was done through a general call for participation on company mailing lists. The recruitment material informed teams that the meeting recordings would only be viewed by the researchers, and that no specific subject-matter information would be discussed beyond insights about the temporal aspects of work. Recordings were only shared if all participants in a meeting series provided consent. We only considered meetings that happened before our outreach to ensure discussions were not affected by the knowledge they would be analyzed. For each meeting, we collected the video file along with the transcripts generated by the meeting software.

While we obtained recordings from a diverse range of teams (spanning different work domains, sites, and time-frames), we focused on two similarly-sized research teams—A and B—as they were able to provide meeting recordings from consecutive weekly hybrid meetings that took place in the same four weeks. We analyzed

[6]Provided by Microsoft Research's Institutional Review Board (IRB00007920)

Table 1: Meeting Corpus Composition. The meetings are organized by week, with separate sections for teams A and B.

Week	Team A	Participants			Length (min)	Team B	Participants			Length (min)
		In-person	Remote	Total			In-person	Remote	Total	
1	A1	9	10	19	41	B1	10	6	16	59
2	A2	8	14	22	40	B2	12	7	19	60
3	A3	7	14	21	38	B3	7	9	16	51
4	A4	9	13	22	59	B4	12	7	19	57
Total	**A**	-	-	-	178	**B**	-	-	-	227

these eight recorded meetings, each lasting between 38 minutes and an hour, for a sum total of 6 hours and 45 minutes of meeting recordings. More information about their composition is provided in Table 1, with meetings named for their team and the week in which they took place.

Both teams consisted of a mix of managers and researchers operating in the space of engineering and design for new technologies. There was no participant overlap between Teams A and B, but both teams operate under the same higher-level organizational unit. Both teams provided meeting recordings from the same four weeks following an internal conference. We were interested to see if this unique context enabled us to reach further into the past and future of each teams' temporal work, as discussions at the conference would have likely spanned longer time-frames. As the teams returned to their normal rhythm of work in the following weeks, we could potentially observe behaviors more characteristic of their everyday activities and practices. By analysing these meetings together, we hoped to better determine if patterns of temporal work were unique to one team, or linked to the overall work context.

3.2 Method

For each meeting series, we analyzed meeting recordings and transcripts looking for instances of temporal work in natural conversations. The research team performed a tagging exercise, where instances of temporal work were identified, and assigned specific tags based on the nature of retrospection and prospection, and the time horizon of temporal thought. While this approach does not capture the subjective experiences of team members (as in [52]), it provides a more complete picture of in-meeting interactions—knowledge of which is instrumental for our goals.

3.2.1 Identifying temporal work. To identify instances of temporal work, we watched each meeting recording in entirety, noting points in the transcript where any form of future- or past-oriented conversation took place. We considered the broadest possible definition of temporal work, similar to how Szpunar et al. [75] aim for the broadest possible definitions for each element of their taxonomy. We considered both specific mentions of tasks, meetings, and conversations, as well as abstract discussions on past ways of working or potential changes in the distant future.

We operationalize temporal work as references to the various forms of prospection and retrospection discussed in Section 2.3. We consider all four types of future-oriented cognition—*Intention*, *Planning*, *Prediction*, and *Simulation* [75]. Of "the 5 R's" [69], we focus on the acts of *Recollecting* and *Reflecting*. Sellen and Whittaker classify the pair of *Retrieving* and *Reminiscing* as special forms of Recollecting, which also applies to *Remembering Intentions* to an extent. We therefore use *Recollecting* to refer to thinking about the past as it happened, and *Reflecting* to refer to the past being reframed in the present.

After an initial step of tagging, we returned to the transcripts to assess each point of temporal interest, determining: (1) the form of prospection or retrospection occurring, and (2) the timescale of this thinking, ranging from interactions on the same day to those in the distant past or future. We recorded specific mentions of timescales (e.g., "tomorrow," "next week," "last year") when available. If explicit context for timescales was unavailable directly in conversation, we tagged points as relating to the near or distant past and future. For example, intentions to follow-up on recent conversations with external collaborators were tagged as pertaining to the near future, while references to previous ways of working in the organization were tagged as relating to the distant past. In some cases, we revisited the recording around these points for additional context not captured in the transcripts, such as the slides being shared on a screen, or the arrangement of participants in a meeting room.

Once both passes were complete, we created a table for all mentions of temporal work in the meeting, noting the time at which they took place, a generalized description of the conversation point, the form of prospection or retrospection, and the time horizon involved. The full table for each meeting is included in the supplementary materials[7], and an excerpt from the table of Meeting A2 is included in Table 3 in the appendices.

3.2.2 Mapping workplace interaction over time. To construct a broader picture of links between meetings in the series and outside it, we returned to the videos and transcripts. We identified conversation topics revisited across meetings and references to specific meetings and events outside the current series. These included follow-up meetings from ongoing discussions, key events and conferences, and relevant conversations outside the project team. We noted these points of interest, cross-referenced them across meetings, and visualized them as a temporal map (Figure 3), discussed further in Section 3.3.2.

3.3 Findings

While the meetings across teams A and B are concerned with entirely different members, projects, and subject matter, there are some similarities in the way the meetings are structured, and the broader organizational context in which they took place. Meetings for both teams were structured with an agenda that the meeting leader used to guide discussions. This agenda was in the form of

[7] Supplementary materials are available at: rishivanukuru.com/temporal-work-dis-25

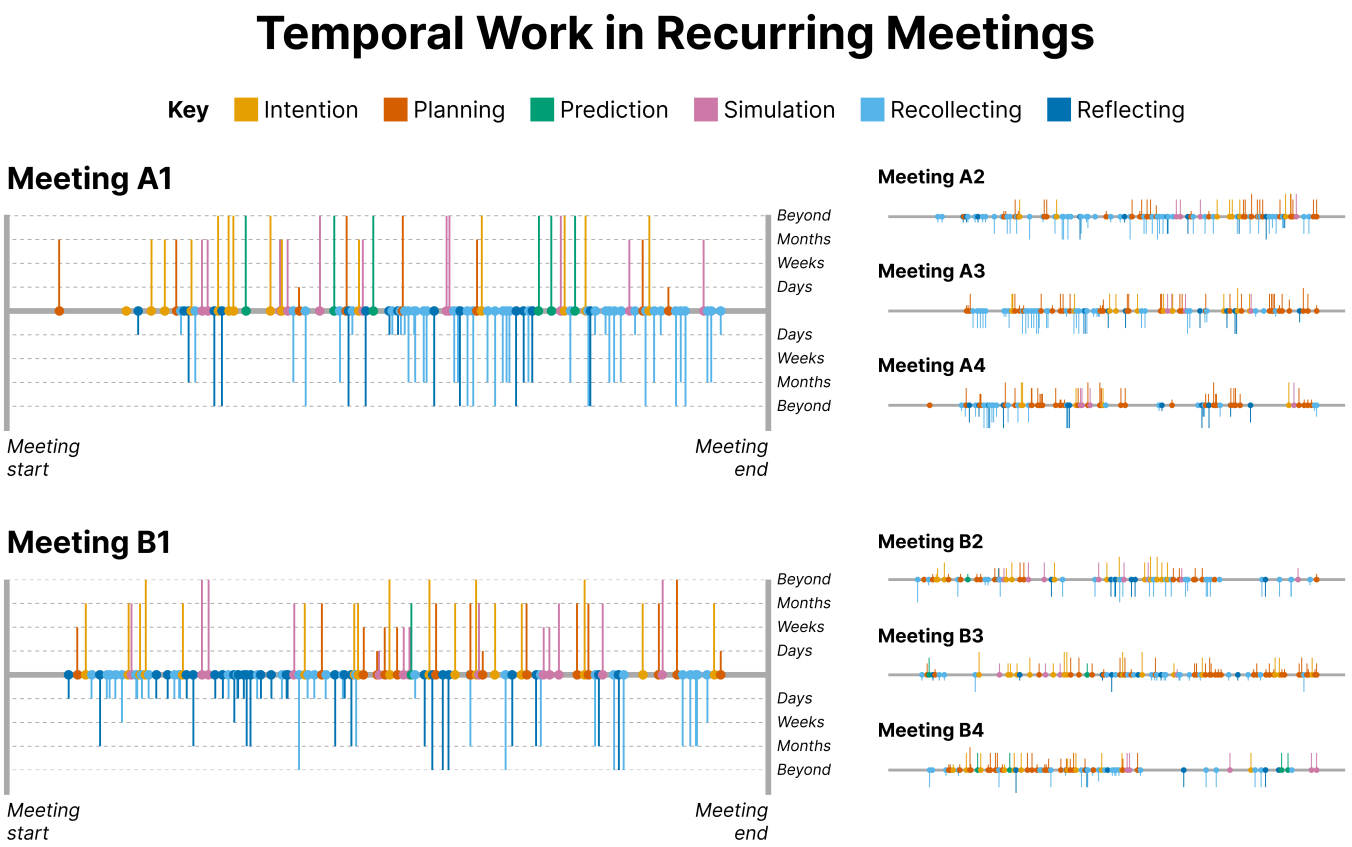

Figure 2: Temporal Work in Recurring Meetings. The timeline visualizations for Meeting A1 and B1 span the duration of the meeting. Each instance of prospection and retrospection is marked on this timeline, with vertical lines emerging upward and downward respectively to indicate the time horizon of thought (ranging from the present day, to weeks, months, and beyond). Smaller visualizations for the other meetings in the series are included to the right. These figures showcase the extent and diversity of temporal work in team meetings.

a collaborative presentation (Team A) or document (Team B), and members were free to add topics to the agenda before the meeting. In the case of Team A, members also added slides with relevant content into the shared presentation, while in Team B, members often shared their screen via the video call application. As mentioned earlier, both teams had recently participated in an internal conference to differing extents. Consequently, the first meeting we analyzed in each series focused on discussions about the conference experience and long-term concerns. Subsequent meetings returned to focusing on ongoing projects.

3.3.1 Temporal work in recurring team meetings. What was most striking from our characterization of temporal work in meetings, is the extent to which temporal work takes place. A detailed breakdown of the number of instances of temporal conversation across all meetings is provided in Table 2 in the appendices. We visualize these occurrences for each meeting in Figure 2[8]. Each meeting is represented on a horizontal timeline, scaled from the start to the end of the meeting. Points of temporal conversation are marked on the timeline, and colored according to the key. For each instance of prospective talk, a vertical line extends upward from the timeline, with its length roughly corresponding to the timescale of prospection. Points with no vertical line indicate references to moments on the same day. Similarly, instances of retrospection are marked by lines extending downward. We focus on Meetings A1 and B1 in Figure 2 for clarity. An interactive visualization of this figure is included in the supplementary materials webpage.

A high-level analysis of the occurrences of temporal work across these recurring meetings reveals many useful aspects about these discussions. While the first meeting in each series (reflecting on a recent conference) might have lent itself to more temporal conversations, we observe that time is of essence to discussions across all 8 meetings, even as matters return to everyday activities. As hypothesized by Szpunar et al. [75], forms of prospection were indeed seen to be interlinked, not only among themselves, but also with acts of retrospection. Team members verbally recollected prior experiences to reflect on implications, set future intentions, or plan next steps. Predictions and simulations were often coupled with statements of intent and used to justify emergent plans. Members drew from various threads of work to make sense of ongoing activity, including small-group conversations, larger planning meetings, and daily tasks. When looking back and ahead, focus shifted across

[8]High resolution versions of the paper figures are included in the supplementary materials: rishivanukuru.com/temporal-work-dis-25

a wide range of timescales in the past and future, from specific points in time (meetings, events) to periods ("last month," "next year") to broader ways of functioning (how things were, or will be).

A more detailed analysis of these temporal interactions would be very useful towards understanding the finer rhythm of team dynamics [46] and meeting efficacy. Our goal was to gauge the extent to which temporal work features in modern knowledge workplace interactions. Even from this initial analysis, we see that recurring team meetings are key sites for temporal work, with teams engaging in retrospection and prospection across different timescales to make sense of present actions. This analysis also helps uncover connections between meetings in a series and various other interactions over time in the workplace.

3.3.2 Temporal maps of workplace interaction. While Figure 2 showcases the extent of temporal work, we noted many mentions of the same set of "temporal entities" across meetings. These entities could be classified as meetings, topics, and milestones. An upcoming conversation would be discussed in the moment (a different *meeting*) and then referenced again a meeting or two later. Themes of discussion would emerge across meetings (*topics*), and teams would call back and ahead to events at more distant horizons (*milestones*). Considering a subset of all the meetings, topics, and milestones, we visualize these relationships for each series in Figure 3. Links emerge from a timeline of four meetings for each series, connecting to various other meetings, topics, and milestones. Persistent meetings and topics are connected by dashed lines. The position of meetings and topics corresponds to their occurrence relative to the weekly schedule, while milestones are represented with a further separation in time.

From the visualization, it becomes apparent how interlinked the meeting series are to other threads of work. These links are not uniformly present—agendas and conversations change each time, leading to more complex forms of topic continuity. The relevance of meetings, topics, and milestones changes based on the meeting and external factors. For instance, when team members ask for updates on a specific topic, the pattern of temporal interaction is often one of retrieving and reflection. Members ask the topic leads for updates, which are then discussed, but the leads may or may not make predictions about the topic's future state.

As with the timeline visualization of temporal work, we could derive more insights specific to this configuration of meetings. For our initial goals, this exercise highlights the numerous interdependent touch-points of work across project threads. Even by expanding focus from one meeting to a few consecutive ones, we must consider the broader context of work, or rather, the trajectory of objective time in its full detail as experienced by the individual and the team.

3.3.3 Synthesis. From this analysis, we see that temporal work is central to recurring team meetings and, by extension, the workplace at large. Recurring meetings, besides being sites for organizational memory, serve as concentrated points for temporal work. The acts of retrospection and prospection (Figure 2) extend beyond individual meetings, and serve as connecting links between distributed temporal work across other workplace interactions. Building upon these insights, we now move towards a framework for thinking about these ideas to inform design efforts with Generative AI.

4 A FRAMEWORK FOR TEMPORAL WORK

From our exploration of recurring meetings, we recognize the importance of temporal work in meaningful workplace interactions. We see how people and teams move between thinking about events and actions at different timescales, and at different moments in the workplace timeline. One way of understanding and framing the acts of temporal work is through visualizations such as Figure 2 and Figure 3, which illustrate the complexity of temporal work and its connections across threads of work. These webs of retrospection and prospection are often unnoticed during meetings, and collapse soon after, only to be replaced by new traversals of subjective time. Traditional visual metaphors like lines and cycles [33] fail to capture the complexity of modern workplace temporal interactions. For example, a simplified temporal map of Team A's interactions incorporates prospection and retrospection as colored links between meetings, topics, and milestones (Figure 4.1). Visualizing this on a canonical timeline results in a convoluted image (Figure 4.2), and this complexity increases when considering multiple work threads. In seeking a better way to visualize and frame the role of temporal work, we draw inspiration from other efforts to visualize complex constructs of time.

Drawing from classical field theory, Kurt Lewin [43] proposed a graphical method to represent the current moment within the context of the "psychological past" and "psychological future". Similarly, Shipp and Jansen [71] accompany their discussion of objective and subjective time with a visualization where objective time is a canonical timeline, and subjective time is a cone emanating from the present moment. Building upon this, we visualize subjective time as an axis orthogonal to the objective, intersecting at the present moment (Figure 5). Thus, while the objective timeline exists in its full complexity, the subjective timeline is constructed through the acts of retrospection and prospection, the arcs of which can be represented as projections from one axis to another. This representation draws upon both the linear and cyclical nature of time and thought. As we move along the objective timeline, the subjective timeline constantly shifts based on our projections upon it. George H. Mead writes: *"Given an emergent event, its relations to antecedent processes become conditions or causes. Such a situation is a present. It marks out and in a sense selects what has made its peculiarity possible. It creates with its uniqueness a past and a future. As soon as we view it, it becomes a history and a prophecy. Its own temporal diameter varies with the extent of the event"* [49]. The chapter this quote is taken from is titled *"The present as the locus of reality"*, and together, this provides us with useful vocabulary to describe the function of the resulting visualization—the present is the locus from which the axis of subjective time emerges, and the projections of retrospection and prospection mark out the diameter of the extent of temporal work (Figure 5).

Our framework builds upon this representation of objective and subjective time as independent axes. If we consider them separately, and bend each axis about the present moment, we create two "fields" or spaces of the objective and subjective. Starting with the space of subjective time (Figure 6.2), individual points on the vertical axis (the past) and horizontal axis (the future) represent relevant moments in time for temporal work in the present. The lines connecting these points represent linked acts of looking back

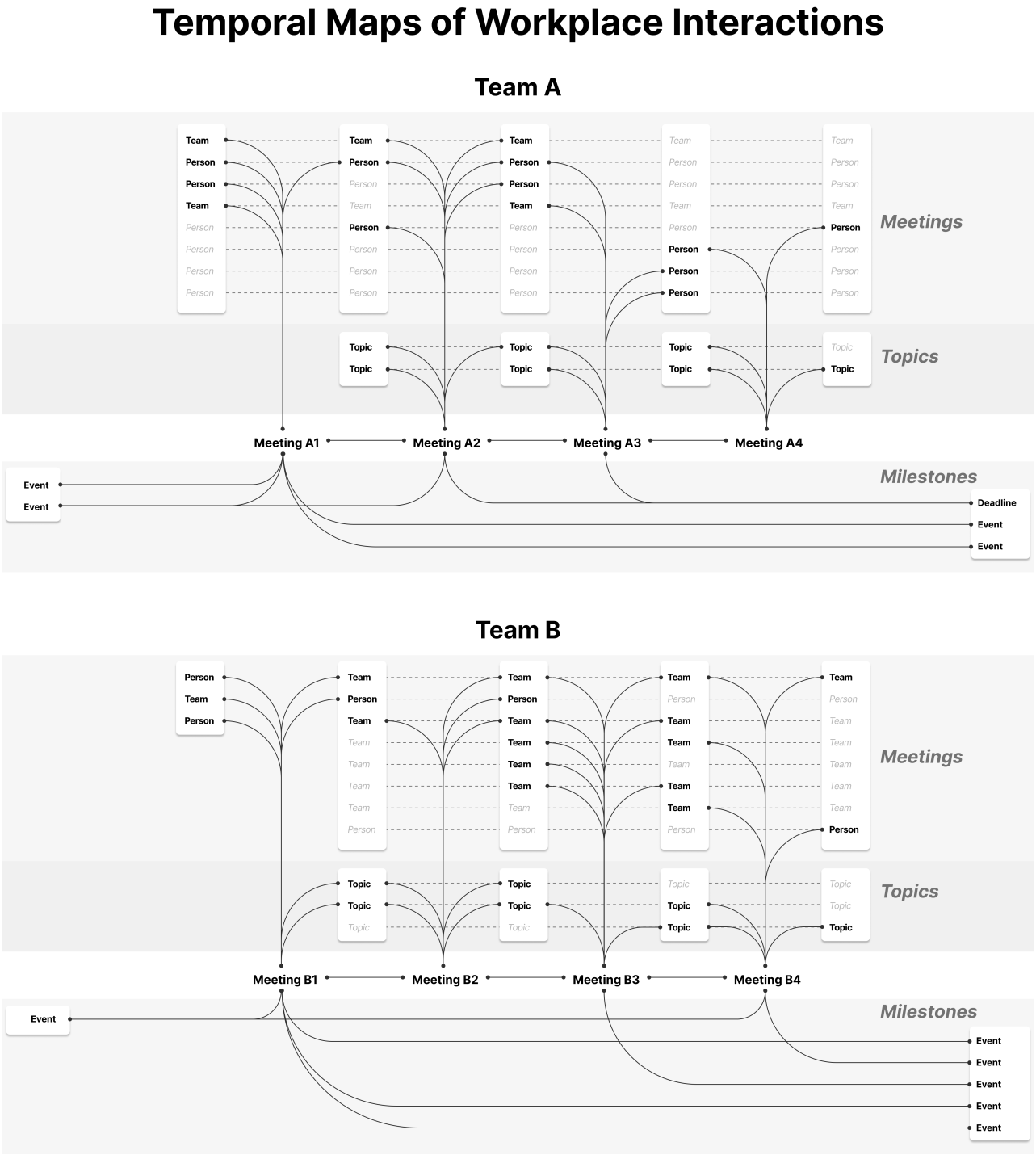

Figure 3: Temporal Maps of Workplace Interactions. Across both maps, the main meetings are depicted in the center. Links to other meetings and persistent topics of discussion emerge upward, while links to milestones emerge downward from each team meeting. The dashed lines connect instances of the same meeting or topic. Through this figure, we see how team meetings are a confluence for multiple threads of work. There are complex patterns of looking back and ahead that support coordination in these contexts.

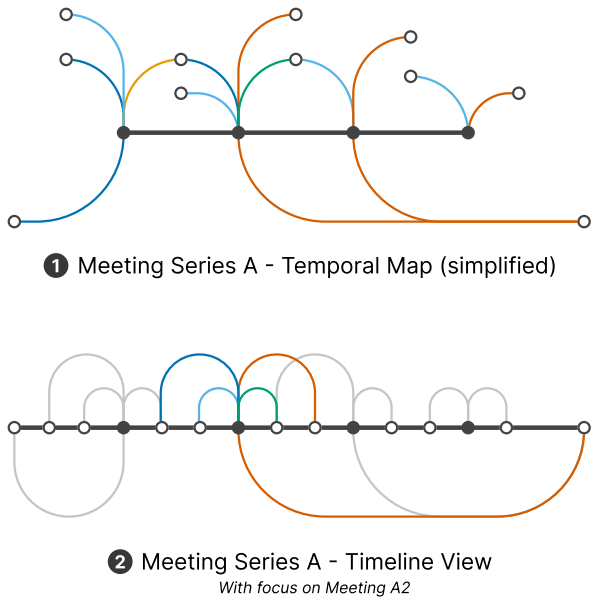

Figure 4: Visualizing the temporal map along a timeline. (1) A simplified temporal map for Team A, with arc colors indicating forms of prospection and retrospection based on the key from Figure 2. (2) A timeline visualization of the same relationships, showcasing the complexity of thinking about the interconnections of temporal work along a single timeline, with a focus on Meeting A2.

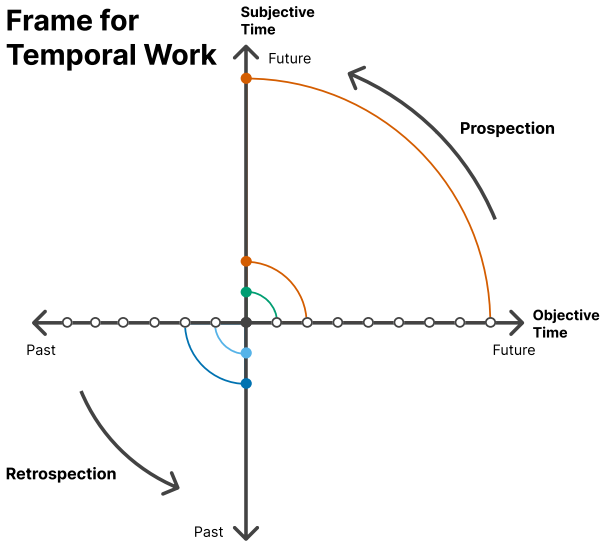

Figure 5: Frame for Temporal Work. By visualizing temporal work along the axes of objective time (horizontal) and subjective time (vertical), the acts of prospection and retrospection become projections from the former to the latter. The colors correspond to the various forms of retrospection and prospection defined in Figure 2.

and ahead, such as recollecting a past event to plan for the future. The space enclosed by relevant lines corresponds to the scope of temporal work that the current discussion requires.

Turning to the space of objective time, the points on the axes of the past and future represent actions and events as they have happened, or might take place (Figure 6.1). Given how the density, duration, and nature of events is likely to change across projects, we consider a simplified framing of objective time, that charts the time since the last meeting on the vertical axis, and the time until the next meeting on the horizontal. This representation also captures the time spent in meetings along the negative directions of both axes (if the time since the last meeting is less than zero, one is still in the meeting, for example). Various regions in this space represent different configurations of objective time pressures that an individual might face during a workday.

The descriptive capability of this framework is demonstrated by mapping existing tools and research projects onto the spaces of objective and subjective time. In the space of objective time (Figure 6.1), in-meeting support tools [16, 17, 56] occupy the bottom-right (and upper-left) quadrant, representing the duration of meetings lasting up to an hour. Meeting browsers and recaps [5, 29, 77] occupy the upper-right quadrant, where people are sufficiently distanced from meetings to engage with recaps. In the space of subjective time (Figure 6.2), most recap tools occupy the central region, supporting retrospection and prospection within a narrow time range of a few days to weeks. In-meeting support tools are situated around the present moment, corresponding to the meeting duration.

Through this process of mapping prior work onto these spaces, we can see that there are some regions across both objective and subjective time that remain unexplored. Our analysis of recurring meetings shows that temporal work spans wider timescales, and is spread across a larger space of both objective and subjective time. From the point of view of design, some of these spaces might potentially be unlocked by emerging capabilities of Generative AI tools to process meeting information across different time scales.

5 DESIGN

Generative AI has already found its way into everyday meeting interfaces as discussed in Section 2, but research has largely focused on the individual meeting, and on explorations that center the emergent capabilities of Generative AI. In contrast, our journey from the meeting analysis to the framework enables us to think about design that centers the complex needs of temporal work around meetings, and uncover capabilities of Generative AI that best support it. Figure 6 highlights how prior research occupies small regions of the spaces of objective and subjective time, revealing opportunities to explore interfaces that have a different, broader temporal influence. Crucially, expanding this influence relies heavily on understanding Generative AI's capability to work with multimodal information about the many meetings people find themselves in. For example, the speed with which Generative AI models can provide outputs from meeting information can lend itself to interfaces that occupy the region closer to the origin in the space of objective time (Figure 6.1), while its ability to operate on many meetings simultaneously can help people engage with temporal work spanning longer subjective time scales (Figure 6.2).

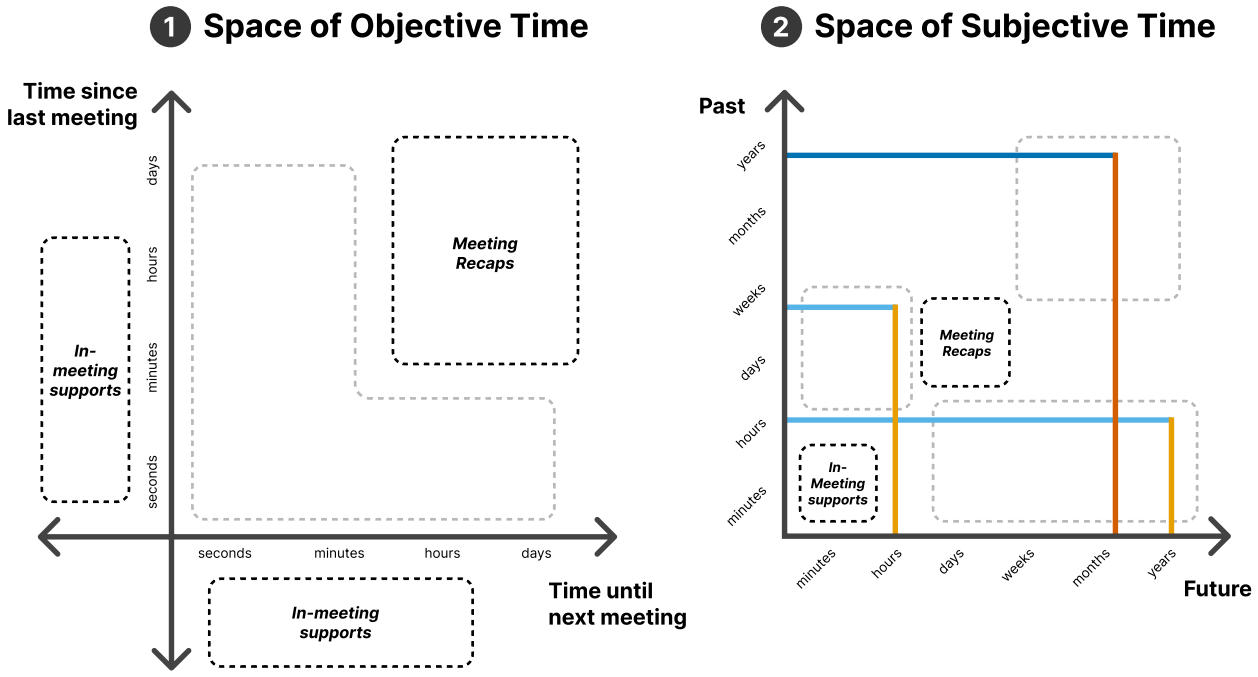

Figure 6: Spaces of the framework. (1) The space of objective time, defined by one's temporal position between meetings. Across both spaces, boxes indicate temporal regions currently occupied by meeting support tools, and lighter boxes indicate as-yet unexplored spaces. (2) The space of subjective time, formed by bending the axis about the origin. The figure shows different points relating to different scales of looking back and ahead. The colors correspond to the various forms of retrospection and prospection in Figure 2.

To do this effectively, we developed a research tool called the *Generative AI Content Sandbox* (Sandbox hereafter). We used this tool along with the meeting data from Teams A and B to help shape the design of three new interface concepts for Generative AI-enabled meeting support tools. We then developed interactive prototypes of the concepts that can use real Generative AI output emerging from the Sandbox tool. Through this process, we develop concepts that are grounded in both our understanding of temporal work (via the framework) and of Generative AI (via the Sandbox), and are operationalized as interactive prototypes to demonstrate their practical use. In the rest of this section, we first discuss the design of the Sandbox tool, and then illustrate our process for each of the three interface concepts.

5.1 The Generative AI Content Sandbox

Understanding Generative AI's capabilities in the context of temporal work requires us to experiment with prompting strategies involving different types of meeting-related information, while also operating on multiple meetings in different combinations, as indicated by the temporal maps of workplace interaction (Figure 3). The dominant paradigm of linear conversational interaction with Generative AI is not conducive for such parallel explorations. Researchers have explored more visual and spatial forms of prompting and interaction [74, 80], and inspired by these efforts, we developed a node-based web interface that enabled us to work with a canvas of multimodal meeting information, experimenting with different combinations and forms of prompts to obtain insight from Generative AI. The Generative AI Content Sandbox allows the creation of six primary types of nodes:

- **Transcript nodes** for uploading meeting transcripts in .txt or .vtt formats.
- **Video nodes** for processing meeting recordings converted into text files containing base64-encoded frames (converted via a Python script).
- **Image nodes** for uploading slides that might have been shared during the meeting.
- **Prompt nodes** for writing text prompts.
- **Output nodes** for generating outputs.
- **Template Recap nodes** for creating JSON-format summaries for use in the interface prototypes (discussed later in this section).

The Sandbox was developed using React Flow[9], and supports dragging and dropping nodes into a zoomable canvas. Nodes can be connected in different combinations, and output nodes can also serve as inputs for further processing—for example, combining summaries from different meetings. Some of these features are demonstrated in video form with the supplementary materials. Our explorations involved operating on both text and visual media, and we used the OpenAI GPT-4o[10] model (version gpt-4o-2024-05-13).

[9]React Flow, from reactflow.dev
[10]GPT-4o, from openai.com

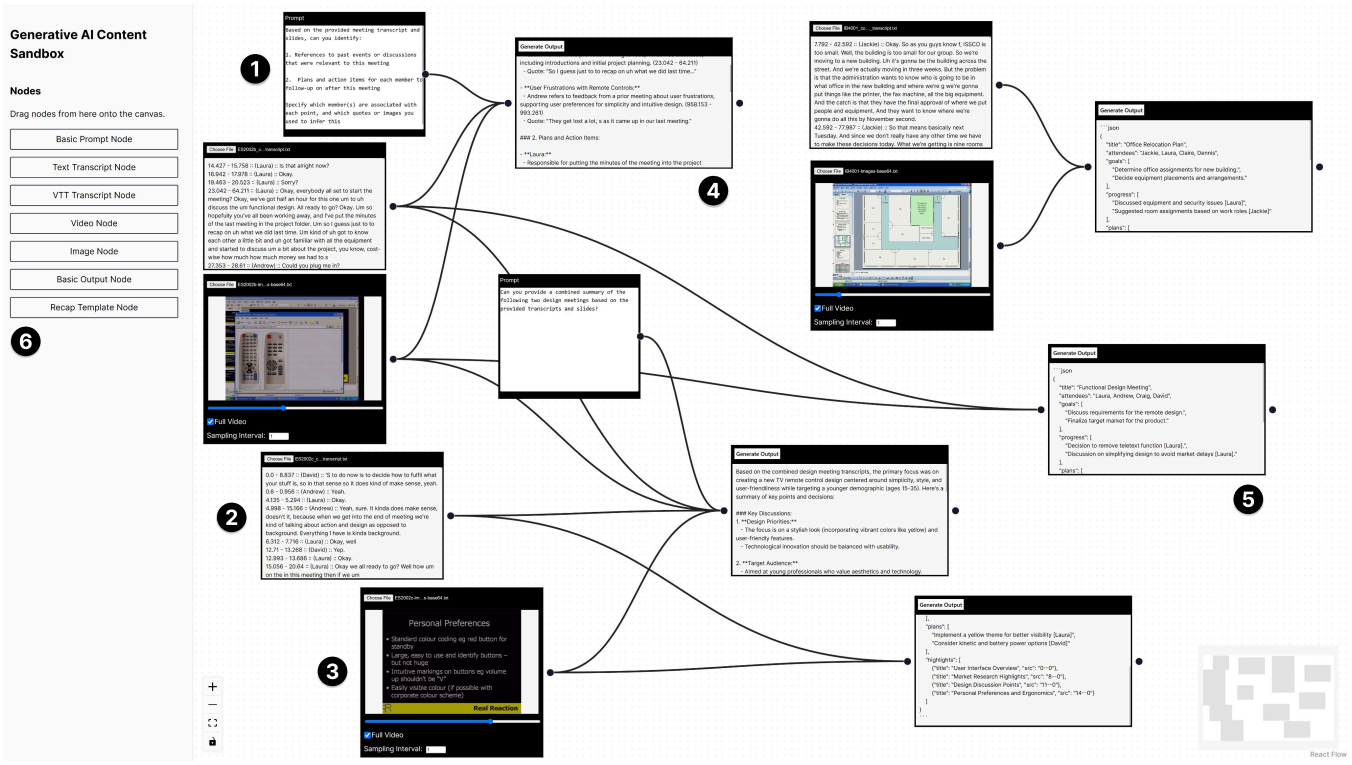

Figure 7: Generative AI Content Sandbox. This screenshot from the interface depicts (1) prompt nodes, (2) transcript nodes, (3) video/image nodes, (4) output nodes, (5) template recap nodes, and (6) the drag-and-drop sidebar for various nodes. The nodes are being used to explore how Generative AI makes sense of a series of meeting transcripts and shared slides.

5.2 Concepts and Prototypes

Equipped with the framework and the Sandbox, we conducted a design and prototyping exercise to envision new interfaces that support temporal work. While the Sandbox itself does not contain features that are directly linked to the spaces of objective and subjective time, it surfaces capabilities of Generative AI whose exploration can then be guided by framework's encapsulation of temporal work. Each of the three concepts discussed here were born out of different unexplored regions in the framework. As a result, they help widen the temporal coverage of meeting support tools, and this is illustrated directly in the spaces of objective and subjective time in Figure 8, Figure 9, and Figure 10.

To further strengthen this exploration, we developed interactive, web-based prototypes that used real outputs from the Sandbox to demonstrate the functioning of each concept. While we used the collected internal meeting corpus (Section 3) during the concept-generation process, we are unable to share those outputs directly in the prototypes. Instead, we selected meetings from the widely-used AMI corpus of audio-visual meeting data [14] to illustrate the use of the concepts. The AMI corpus is still an important benchmark for machine learning research around meetings. In the brief examples provided alongside the concept figures, we use transcripts and meeting slides from a series of meetings involving a team designing a new remote control (ES2002) and one series about a rearrangement of office spaces (IB4001)[11]. The transcript and image information for each of these meetings is included in the supplementary materials, and the prototypes in the supplementary materials showcase information that are real outputs from Generative AI operating on real meetings. Screenshots from these prototypes are included in figures corresponding to the three concepts discussed in the next few sections. We used the Template Recap nodes in the Sandbox (containing a basic prompt to summarize the provided meeting information into a list of goals, progress, plans, and image highlights) to operate on the transcript and presentations from these meetings. The JSON-format output from these nodes was used as the content for the interactive prototypes. A similar approach can be applied on any meeting transcript and recording, in order to experience how the concepts would function in different contexts.

5.2.1 Concept 1: Instant Recaps. One promising design direction is to use Generative AI to expand the temporal influence of meeting recaps, which currently exist as isolated points in both objective and subjective time.

As noted in Section 2, Generative AI models are capable of processing text and images at much higher speeds than previous machine-learning methods, to the extent that many commercial video meeting systems and plug-ins have begun to use them for real-time meeting minutes. Full meeting recaps, however, with details of speaking proportions, chapters, summaries, etc., take a few

[11] AMI Corpus: List of meetings from groups.inf.ed.ac.uk/ami/corpus

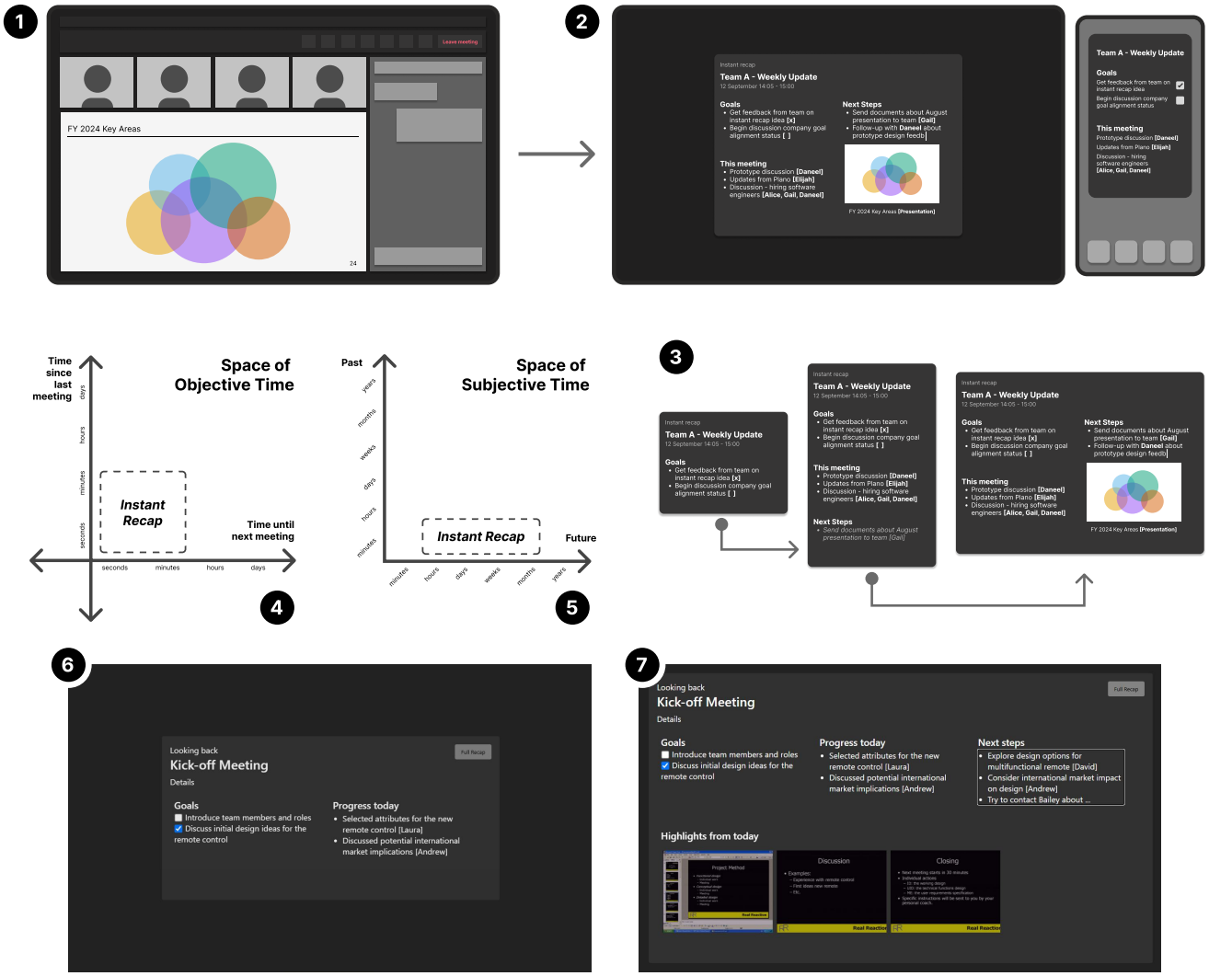

Figure 8: Concept 1 - Instant Recap. (1) An example of a meeting interface, with multiple people, a chat window, and a presentation being shared. (2) The instant recap interface, visualized on a desktop and mobile device. Upon exiting a meeting, users can be presented with such an interface to support reflection and planning. (3) Examples of how the instant recap interface can have different levels of detail based on available time. (4) & (5) The positioning of this concept in the space of Objective and Subjective time. (6) & (7) Screenshots from the interface prototypes, showcasing two different levels of detail of the Instant Recaps which a user might interact with (by checking the goal boxes, or typing more information directly into the recap card).

minutes to generate. They are then usually displayed in a new window or panel interface from the meeting itself, creating a separation from the meeting flow. This does not by itself constitute a problem, as people typically engage with recaps at times quite distant from meetings. Recaps enable temporal work in the form of recollecting and reflecting on interactions from a few hours to weeks in the past, for purposes including immediate future actions, checking for mentions of relevant people or projects, or getting a broad overview of the meeting's content or sentiment. People also return to recaps when they miss a meeting or need a refresher before the next one [76], but extracting higher-level insights from them can be difficult.

Instant Recaps combine the benefits of automation and manual record creation by making the most of the moments right after meetings, when memories are freshest and plans are forming. These moments are often under the most time pressure, with subsequent meetings for different work streams sometimes beginning soon after. Currently, when a person leaves a meeting on their computer, they see whatever windows they were working on right before the meeting began, or very quick surveys about quality of service or meeting effectiveness (Figure 8.1).

With Instant Recaps, people are instead presented with a short summary card containing the most important information about a

meeting—such as the goals that were or were not accomplished—right as the meeting ends (Figure 8.2). The level of content in this card can grow or shrink based on the time available for reflection, including high-level summaries of discussion points, key action items, and visual highlights (Figure 8.3). Further, instead of merely being a site to display summarized information, the design of the interface could enable people to engage with this information almost like a notebook, by editing content and adding thoughts directly into the interface. For example, if a person recollects other key action items they would like to follow up on, they could click on the card, and directly add some text below the "next steps" inferred by an LLM. By providing a lightweight form of interacting with and adding to this model-generated content about the meeting, instant recaps can blend model-generated summaries with personal notes. Instant recaps scaffold prospective temporal work in the moments right after a meeting, by making it easier for people to recollect and reflect on the discussion that just took place. This form of lightweight interaction lends itself to mobile interfaces, and a similar instant recap card could be presented as a calendar notification.

As depicted in Figure 8, such an interface occupies new regions of both objective and subjective time spaces, enabling reflection on the immediate past while setting intentions for the near future.

5.2.2 Concept 2: Adaptive Meeting Handoff. A single thread of meetings forms only a small part of the modern knowledge work timeline. People frequently transition between meetings of different projects, leaving little time to reflect on recent interactions. Within the same moments of objective time, people rapidly switch from thinking about the subjective time-space of one project to another. While Instant Recaps may suit time-pressured situations, a similar principle can help people navigate meetings over longer periods.

With Adaptive Meeting Handoff interfaces (Figure 9), people are presented with the most relevant information for both the meeting that just happened, and the one that is to come. For the upcoming meeting, the information shown can be influenced by the previous meeting in the series, as well as the notes people might have made within the Instant Recap for that meeting. By displaying key information that a person found most relevant at the end of the previous meeting in the series, such an interface can potentially help people be more aware of their intentions across time. For the meeting that just took place, we can display a more comprehensive recap. Depending on the objective time available between meetings, and the relative needs of reflection over preparation, the interface could visually adapt to show more or less information about each meeting, while still enabling similar forms of lightweight interaction (Figure 9.3). Generative AI is capable of compositing different sources of information, thereby creating "blended summaries". By providing it with information about the meetings and their intervening context (either explicitly through the interface, or implicitly based on a person's schedule), the adaptive handoff can be tailored to suit the needs of the moment. Such an interface could again be presented right after people leave a meeting, or via other relevant applications like calendars (Figure 9.1). When a calendar is focused on the present day or week, there is a marker that depicts the present moment in the flow of work. Pressing that marker could lead to a handoff interface (Figure 9.2), consciously linking past interactions with future ones. Returning to the objective/subjective time-space (Figure 9.4 & 9.5), we see how the adaptive handoff interface occupies an expanded region in both. Its objective influence increases to contain different points in time between two consecutive meetings, while its subjective influence grows to think about the more immediate future and more distant past.

5.2.3 Concept 3: Project Browsers. Both concepts so far have focused on work and meetings within the same few days and weeks. When thinking about reflection and setting intentions across longer time spans (months to years), we could use different levels of summaries and visualizations to make the space of time more salient. Workplace communication tools are integrating multiple interaction channels; group chats may include meeting recordings and shared documents, becoming sites for overall project history. While generating a single summary of an entire project might be useful, our framework highlights that different ranges of subjective time are relevant at different moments.

By enabling people to specify these ranges, and using this as a scoping parameter for model output, we can create interfaces that surface the details required for broader recollection and reflection. Generative AI models are capable of drawing out the most salient information in summaries of large amounts of content, while also identifying outliers and other unique points of interest. For example, one tab in a project chat could serve as a "Project Browser" (Figure 10.2). A custom scroll bar could be used to specify the range of focus of the browsing session. By changing the length of the scroll bar, a longer section of the project is brought into focus through summaries, and moving the scroll bar visualizes changes across the specified unit of time (Figure 10.3).

Besides periods of independent reflection focused on a single project, a similar form of interaction applied to the calendar interface enables us to scale to multiple projects. By selecting different regions of the calendar when in month or year view, a model could dynamically generate summaries with key accomplishments, future tasks, and the current status of multiple work streams (Figure 10.1). These project browsers occupy a region of influence further away from the present moment in the space of subjective time. They also expand the region of influence in the space of objective time to be further away from immediate meetings.

5.3 Reflecting on the process

The concepts in this section represent the first set of outcomes from the process outlined in Figure 1, where the framework and Sandbox were used to envision ideas, and implement basic prototypes. The prototype examples discussed in this paper use content generated from simple prompts over open-source meeting data. We consider this to be a first step in a cyclical process of refining prompting strategies and interface design. To enable other researchers to build upon this, we provide the code for both the Sandbox, and our interface prototypes[12], along with instructions on how to work with them. The interface prototypes already include outputs based on the AMI corpus meetings, but it is possible to use the Sandbox (and two included python scripts for video/image processing) to create Generative AI outputs for any set of recorded meetings, which can then be visualized directly in the prototypes. The Sandbox can also

[12]Source available at rishivanukuru.com/temporal-work-dis-25

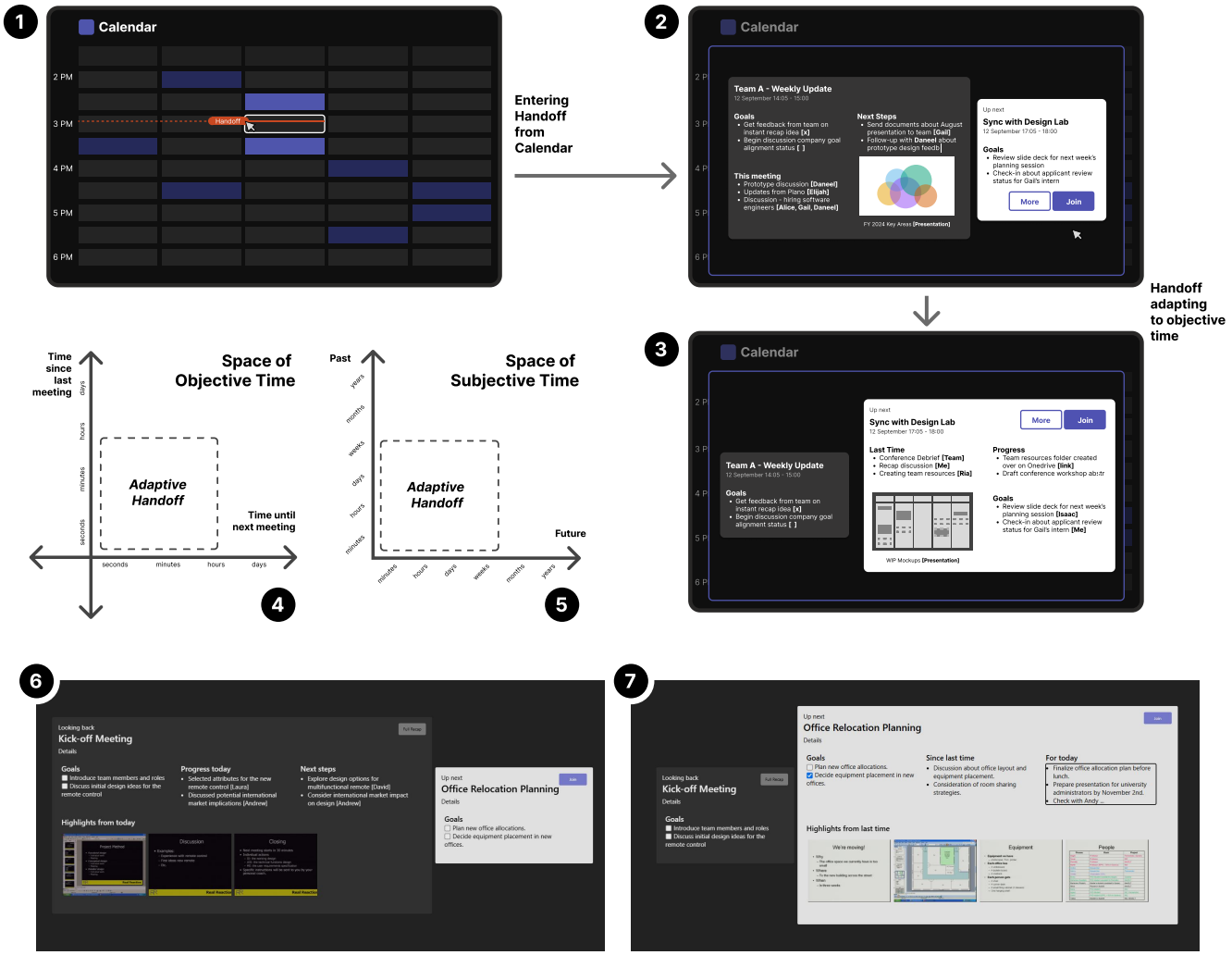

Figure 9: Concept 2 - Adaptive Meeting Handoff. (1) A calendar interface in week view. On clicking the current time marker, one can access the handoff interface. (2) An example of the handoff interface, showing relevant information from the meeting that just happened, and a glimpse of what is to come. (3) Based on the current time, the handoff interface can adapt to show more detail about the upcoming meeting, including options to directly join it. (4) & (5) The positioning of this concept in the space of Objective and Subjective time. (6) & (7) Screenshots from the interface prototypes of the Adaptive Handoff, showing the two ends of focusing on the previous (6) or next (7) meeting. Users can interact with the cards by checking boxes and typing additional notes to themselves.

be used for more free-form exploration of how Generative AI can operate on multiple sources of meeting information simultaneously.

6 DISCUSSION

6.1 Strengthening the Chain of Intentionality

While the design concepts discussed in Section 5—Instant Recaps, Adaptive Meeting Handoff, and Project Browsers—are valuable as standalone tools, their true potential emerges when they are integrated to *chain* together, supporting temporal work across different timescales and contexts.

Instant recaps occupy the critical moments right after a meeting, and have the potential to support temporal work at a time that is often written-off in terms of design. The utility of a single instant recap is quite minimal. Its value increases when the content in the recap is used to connect multiple instances of the meeting series, by including it in interfaces like the adaptive handoff. At the conclusion of one meeting, the Instant Recap summarizes key points and actions, supporting retrospection and immediate planning. Before the next meeting, the Adaptive Meeting Handoff reconnects users with these summaries, reinforcing continuity and preparing participants for upcoming discussions. This creates a chain of reflection and setting intentions that persists along a project.

As people become more familiar with these interconnected interfaces, the interactive elements gain significance. By engaging with the instant recap through writing notes and reminders to oneself, we enable people to actively create seeds for memory. This

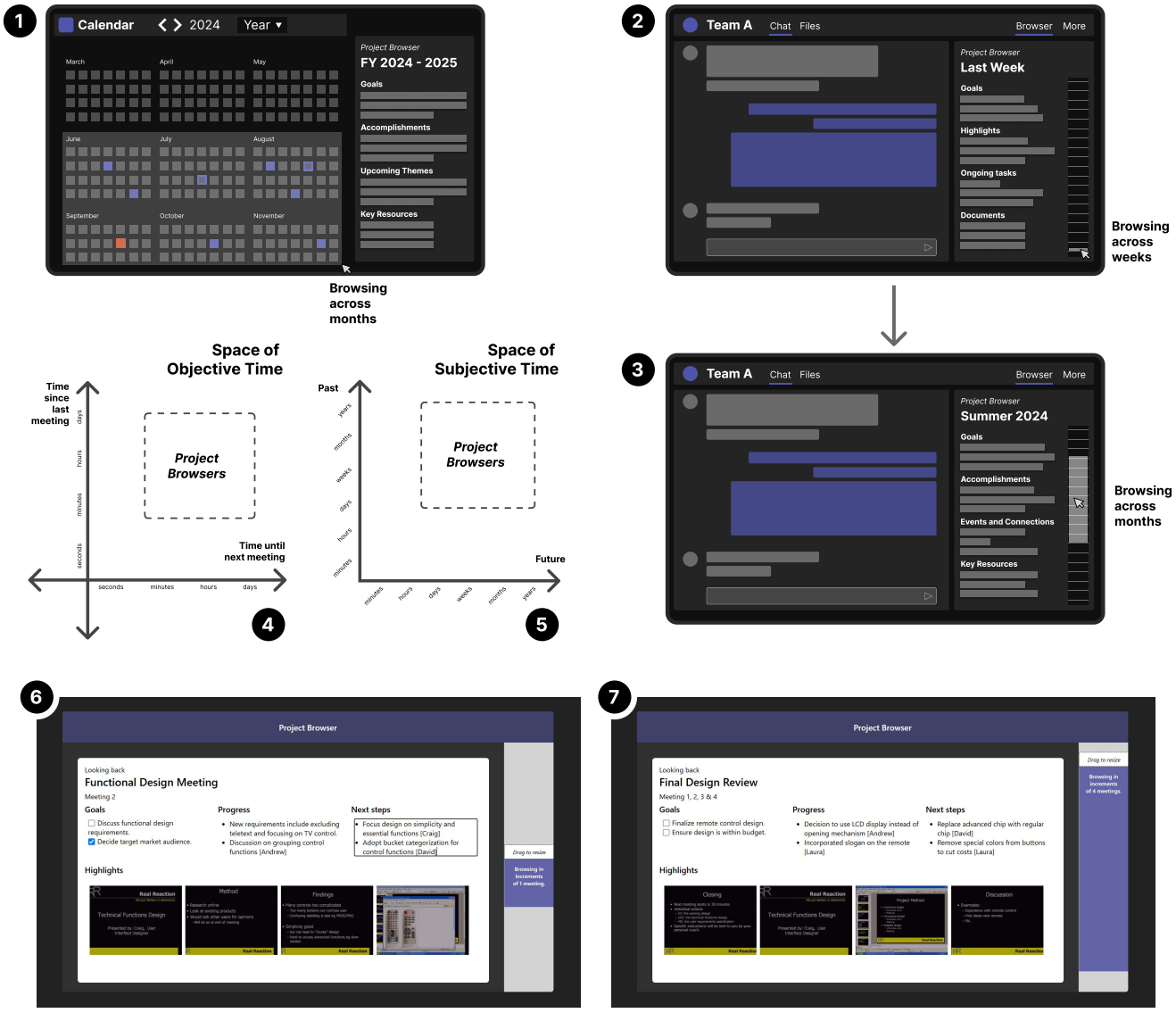

Figure 10: Concept 3 - Project Browser. (1) A calendar interface in year view. By selecting an area of time (that could span the past and future), the project browser surfaces insight about goals, progress, and upcoming activities. (2) A team chat interface, with the option to access the project browser. With a small scrolling window, one can view summaries of information at weekly intervals. (3) Expanding the scrolling window results in long-term summaries, that are readily accessible from the point of action. (4) & (5) The positioning of this concept in the space of Objective and Subjective time. (6) & (7) Screenshots of interface prototypes of the project browser, showcasing how scrolling over different time-windows (by increasing or decreasing the scroll-handle length) results in summaries over different time-spans.

active engagement not only supports individual recall but also prepares users for future interactions. Prior to subsequent meetings, users can revisit their notes and agendas via the Adaptive Meeting Handoff, fostering a proactive approach to meeting participation.

While Instant Recaps strengthen the chain within individual projects, Adaptive Meeting Handoff interfaces and Project Browsers extend this chain across multiple projects and timelines. Adaptive Meeting Handoffs transform transitions between meetings from disruptive context switches into more seamless experiences. By providing interfaces that bridge the recent past and the immediate future, users can engage in temporal work across various project threads, building and maintaining momentum throughout their workday. Project Browsers further support individual reflection by offering grounded insights from prior interactions and a broader perspective on future goals, enabling users to navigate long-term objectives alongside daily tasks.

These three concepts represent initial steps in a broader creative process grounded in temporal work and augmented by Generative AI. While our focus has been on interfaces for individual use, the framework we propose holds potential for designing collaborative

tools. Such tools could serve as anchoring points for teams, facilitating group reflection and reinforcing collective intentionality across team activities.

The final layer of chaining emerges when each individual intervention cumulatively enhances the experience of engaging in temporal work across multiple touchpoints in the workplace. As depicted in Figure 11, individual interactions with these interfaces along the objective timeline help form links of retrospection and prospection across the subjective timeline. We do not expect that these specific concepts will form the ideal chain for every scenario. Individuals are bound to have their own preferences of when and how to engage with retrospection or prospection. Our hope is that the process we have outlined enables further research into a wide range of supports for temporal work. This integrated approach can strengthen the chain of intentionality and reflection across meetings, projects, and teams, ultimately enhancing the continuity and coherence of knowledge work.

6.2 The Challenges of Supporting Real Temporal Work

Despite extensive research in organizational science uncovering how individuals engage in temporal work [40] and recognizing the critical role of tool affordances [9], a significant divide remains between projects that deeply understand workplace activities, and those that design practical supports. Avital [6] highlighted pragmatic, normative, and methodological reasons for this gap, challenges that persist even today. In HCI, researchers have studied existing meeting practices across time [52, 72, 76], and highlighted opportunities for design. However, system design efforts often remain focused on individual meetings, lacking integration across the broader temporal landscape of knowledge work. Through our analysis of real recurring meetings, we highlight the importance of temporal work in the modern workplace, offering evidence and initial directions for further research about Meeting Science and CSCW.

The processes of understanding workplace interactions, creating design frameworks, and developing supportive tools are deeply intertwined. In this paper, we adopt a hybrid approach encompassing all these aspects, aiming to provide a roadmap for future in-depth explorations. By integrating theoretical insights with practical design considerations, we bridge the gap between conceptual understanding and actionable solutions, contributing to ongoing discussions about how to best design interfaces that use Generative AI [83]. This integrative approach not only justifies the design of long-term system interventions but also facilitates their adoption in real-world contexts.

Each concept and prototype presented in Section 5 could have been developed as a full-fledged, standalone interface and evaluated in isolation. However, situating them within a cohesive framework grounded in temporal work theory enhances their collective impact and relevance. This comprehensive perspective allows us to engage with real teams more effectively, designing supports for intentionality that align with their specific contexts and needs. The exploratory work on recurring meeting analysis and framework development is thus a crucial step towards moving beyond isolated probe studies, and fostering trust among those who will ultimately make use of these tools.

A significant barrier to supporting temporal work has been the challenge of managing vast records of organizational knowledge together with everyday interactions. Generative AI technologies offer promising solutions for this. By leveraging Generative AI's capabilities to process and interpret large volumes of multimodal data, we can explore wider regions within the spaces of objective and subjective time. Our framework provides a structured approach to guide the design of Generative AI interfaces, ensuring they address the complexities of temporal knowledge work effectively. We believe this synergistic relationship between theoretical frameworks and advanced technologies can substantially enhance support for temporal work in real-world settings.

6.3 Limitations and Future Work

While our analysis of recurring meetings offers valuable insights into the nature of temporal work within team settings, several limitations warrant discussion. We discuss "knowledge work" broadly, however our study is situated within a specific context—engineering and design research meetings occurring within the same company, in a similar timeframe, and both following a major internal event. This specificity allowed for meaningful comparisons but limits the generalizability of our findings to other types of knowledge work or organizational settings. Future studies should consider a more diverse range of meeting types, industries, and organizational cultures to validate and extend our framework across different contexts.

Although we observed significant temporal discourse within meetings, our explorations primarily focus on strengthening the chain of intentionality at the individual level. By our choice of method of analysis, however, we have not considered the nuances of individual identities and contributions within the collective meeting context. This focus was partly due to pragmatic considerations; tracking and analyzing the intricate behaviors and interactions of individual participants across multiple meetings in large teams is a complex endeavor. Future research could go deeper into individual-level analyses, exploring how personal temporal work interacts with collective team dynamics.

Our analysis spans a relatively short period of four weeks. While this timeframe provided initial insights into temporal talk and work, understanding temporal dynamics over longer periods is crucial. Projects and team dynamics often evolve significantly over months or years, and temporal work may manifest differently over extended durations. We plan to expand our meeting corpus, collecting and analyzing meetings over longer time frames to conduct a more in-depth longitudinal analysis from a temporal perspective. Such research could uncover patterns and shifts in temporal work practices, informing the development of tools that adapt to changing needs over time.

The three interface concepts were born out of—and situated in—relatively underexplored regions of the spaces of objective and subjective time. While this might cause the framework to be interpreted as a "design space", we acknowledge that potential design ideas might not be immediately apparent from the uncovered gaps, unlike other, more generative design space efforts (e.g., [54]). Rather, we see the framework as a useful encapsulation of the richness of

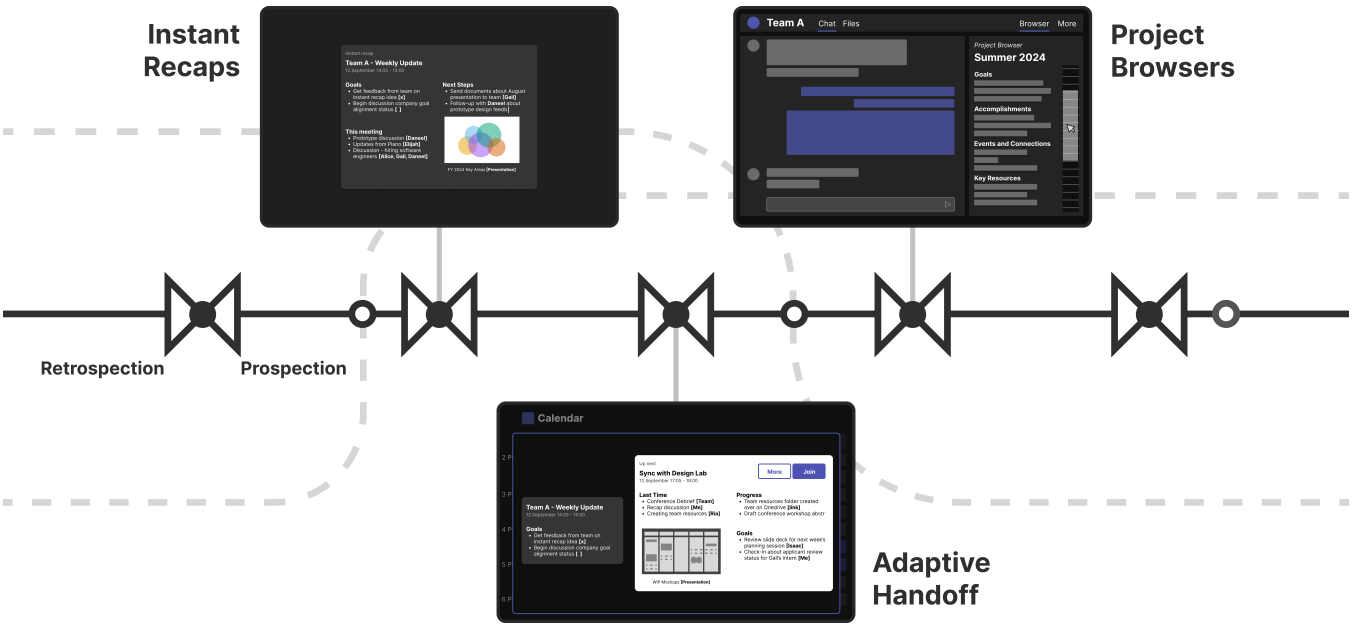

Figure 11: The Chain of Intentionality. The three interfaces shown here—Instant Recaps (§5.2.1), Adaptive Meeting Handoff (§5.2.2), and Project Browsers (§5.2.3)—are examples of supports for retrospection and prospection in knowledge work, designed using our framework for exploring the intersection of objective and subjective time (§4).

temporal work in the modern workplace. By keeping this framework in mind while exploring Generative AI capabilities with the Sandbox, we were able to envision ideas that can potentially support real temporal work. The framework and Sandbox are thus in some ways tools for thought, that researchers can use to guide their own design and development efforts when addressing the complexities of temporal work with Generative AI.

We also acknowledge the potential of collaborative interfaces in supporting temporal work, which our current explorations only touch upon. Future research should focus on designing and evaluating collaborative tools that facilitate group reflection and collective intentionality. Understanding how teams engage in temporal work collectively, and how technology can support these processes, remains an important area for exploration.

While our early experimentation suggests that Generative AI can produce outputs that are meaningful and relevant to meeting discussions, we have not yet conducted a structured evaluation of the overall quality or accuracy of these outputs. Even with the simple prompts used in the prototypes, we have observed signs of promise that more complex patterns of temporal work can be identified and surfaced. For instance, when operating on the internal meeting corpus, LLM outputs were able to connect many of the links across meetings that emerged from our qualitative analysis (Figure 3). We leave the exercise of iterative prompt refinement and evaluation to future work that addresses context-specific needs while being informed by the conceptual framework provided here.

The rapid rise of Generative AI use in both research about knowledge work and commercial meeting support tools comes with a need to more urgently guide design, and this has been a key motivation for us. Instead of features driven largely by what Generative AI "can" do, we offer a pathway for more considered design that is grounded in the reality of temporal work. However, we acknowledge that there are many risks and concerns associated with Generative AI use that the research community is actively engaging with—accuracy and bias in model outputs [26, 84], privacy risks [42, 59], and ethical considerations [63] to name but a few. In particular, for tools informed by our approach, verifying outputs based on multimodal meeting data spanning long periods of time is likely to be a key challenge. Navigating the boundaries between private, shared, and public information is another aspect that must be considered when designing such systems in collaborative contexts. There is much work needed to build reliable, trustworthy, and useful meeting support systems that make use of Generative AI, and future research should investigate how to best achieve this while supporting the needs of temporal work.

In summary, our aim with this paper is to chart a potential path forward in supporting temporal work through design and technology, rather than providing definitive solutions. We encourage future research to build upon our framework, address the limitations identified, and contribute to the development of tools and practices grounded in both temporal work and Generative AI.

7 CONCLUSION

The acts of looking back and ahead are central to meaningful work. Building upon research from organizational and cognitive sciences that highlight the importance of temporal work, we have demonstrated how recurring team meetings can serve as a valuable lens to understand the extent of temporal work, and to chart a broader

map of temporal interactions in the workplace. We synthesized these insights to propose a framework for conceptualizing temporal work, based on the axes and spaces of objective and subjective time. Through a design and prototyping exercise, we developed three interface concepts—Instant Recaps, Adaptive Meeting Handoff, and Project Browsers—that support temporal work across different timescales. By developing a Content Sandbox tool for structured exploration of Generative AI capabilities, and interactive prototypes to demonstrate the concepts with real model output, we outline a design process that is grounded in both our understanding of temporal work, and of the strengths of Generative AI. We provide the code for both the Sandbox and the interface prototypes, to enable other researchers to explore these concepts, and build upon our ideas. By integrating theoretical insights with practical design considerations, we provide a pathway for future implementations aimed at strengthening the chain of intentionality and reflection across time. We hope that this collection of exploratory exercises serves as a helpful guide for future endeavors seeking to enhance continuity, coherence, and intentionality in knowledge work.

ACKNOWLEDGMENTS

Many of the ideas presented in this paper revolve around insights obtained from analyzing the corpus of meeting recordings, and we thank the teams that agreed to share them with us. This research took place during a summer internship at Microsoft Research Cambridge, and benefited greatly from conversations and support from the Tools for Thought team, the Design Guild, and the broader intern community. We would like to thank Richard Banks, Britta Burlin, and Pratik Ghosh, for formative discussions about these ideas, and members of the HCI corner—Krishna Akhil Kumar Adavi, Hank Lee, Samantha Dalal, Nari Johnson, Liz Ankrah, and Siobhan Hall—for everything. Finally, we thank Jack, for the gelato.

REFERENCES

[1] Bon Adriel Aseniero, Marios Constantinides, Sagar Joglekar, Ke Zhou, and Daniele Quercia. 2020. MeetCues: Supporting Online Meetings Experience. In *2020 IEEE Visualization Conference (VIS)*. Institute of Electrical and Electronics Engineers, 236–240. https://doi.org/10.1109/VIS47514.2020.00054

[2] Bayarma Alexander, Dick Ettema, and Martin Dijst. 2010. Fragmentation of work activity as a multi-dimensional construct and its association with ICT, employment and sociodemographic characteristics. *Journal of Transport Geography* 18, 1 (2010), 55–64. https://doi.org/10.1016/j.jtrangeo.2009.05.010

[3] Joseph A. Allen, Tammy Beck, Cliff W. Scott, and Steven G. Rogelberg. 2014. Understanding workplace meetings: A qualitative taxonomy of meeting purposes. *Management Research Review* 37, 9 (Jan. 2014), 791–814. https://doi.org/10.1108/MRR-03-2013-0067

[4] Riku Arakawa, Hiromu Yakura, and Masataka Goto. 2023. CatAlyst: Domain-Extensible Intervention for Preventing Task Procrastination Using Large Generative Models. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*. ACM, Hamburg Germany, 1–19. https://doi.org/10.1145/3544548.3581133

[5] Sumit Asthana, Sagi Hilleli, Pengcheng He, and Aaron Halfaker. 2025. Summaries, Highlights, and Action Items: Design, Implementation and Evaluation of an LLM-powered Meeting Recap System. , 29 pages. https://doi.org/10.1145/3711074

[6] Michel Avital. 2000. Dealing with Time in Social Inquiry: A Tension between Method and Lived Experience. *Organization Science* 11, 6 (2000), 665–673. https://www.jstor.org/stable/2640376

[7] Dawna Ballard and Felipe Gómez. 2006. Time to Meet: Meetings as Sites of Organizational Memory. In *Time and Memory*. Brill, 303–314. https://doi.org/10.1163/9789047411178_025

[8] Henning Bang, Synne L. Fuglesang, Mariann R. Ovesen, and Dag Erik Eilertsen. 2010. Effectiveness in top management group meetings: The role of goal clarity, focused communication, and learning behavior: Effectiveness in top management meetings. *Scandinavian Journal of Psychology* 51, 3 (Jan. 2010), 253–261. https://doi.org/10.1111/j.1467-9450.2009.00769.x

[9] Evangelia Baralou and Dionysios D. Dionysiou. 2021. Routine dynamics in virtual teams: the role of technological artifacts. *Information Technology & People* 35, 7 (Jan. 2021), 1980–2001. https://doi.org/10.1108/ITP-03-2020-0109

[10] Roy F. Baumeister, Kathleen D. Vohs, and Gabriele Oettingen. 2016. Pragmatic Prospection: How and Why People Think about the Future. *Review of General Psychology* 20, 1 (March 2016), 3–16. https://doi.org/10.1037/gpr0000060

[11] C. S. Bedingfield and P. J. Clarkson. 2020. Design Meetings: Towards an understanding of the stages and activities that influence success. *Proceedings of the Design Society: DESIGN Conference* 1 (May 2020), 501–510. https://doi.org/10.1017/dsd.2020.334

[12] Ana Cristina Bicharra Garcia, John Kunz, and Martin Fischer. 2004. Cutting to the chase: improving meeting effectiveness by focusing on the agenda. In *Proceedings of the 2004 ACM conference on Computer supported cooperative work (CSCW '04)*. Association for Computing Machinery, New York, NY, USA, 346–349. https://doi.org/10.1145/1031607.1031664

[13] Deirdre Boden. 1997. Temporal Frames: Time and Talk in Organizations. *Time & Society* 6, 1 (Feb. 1997), 5–33. https://doi.org/10.1177/0961463X97006001001

[14] Jean Carletta, Simone Ashby, Sebastien Bourban, Mike Flynn, Mael Guillemot, Thomas Hain, Jaroslav Kadlec, Vasilis Karaiskos, Wessel Kraaij, Melissa Kronenthal, Guillaume Lathoud, Mike Lincoln, Agnes Lisowska, Iain McCowan, Wilfried Post, Dennis Reidsma, and Pierre Wellner. 2006. The AMI Meeting Corpus: A Pre-announcement. In *Machine Learning for Multimodal Interaction*, Steve Renals and Samy Bengio (Eds.). Springer, Berlin, Heidelberg, 28–39. https://doi.org/10.1007/11677482_3

[15] Scott Carter, Jennifer Marlow, Aki Komori, and Ville Mäkelä. 2016. Bringing mobile into meetings: enhancing distributed meeting participation on smartwatches and mobile phones. In *Proceedings of the 18th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '16)*. Association for Computing Machinery, New York, NY, USA, 407–417. https://doi.org/10.1145/2935334.2935355

[16] Senthil Chandrasegaran, Chris Bryan, Hidekazu Shidara, Tung-Yen Chuang, and Kwan-Liu Ma. 2019. TalkTraces: Real-Time Capture and Visualization of Verbal Content in Meetings. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19)*. Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3290605.3300807

[17] Xinyue Chen, Shuo Li, Shipeng Liu, Robin Fowler, and Xu Wang. 2023. MeetScript: Designing Transcript-based Interactions to Support Active Participation in Group Video Meetings. *Proc. ACM Hum.-Comput. Interact.* 7, CSCW2 (Oct. 2023), 347:1–347:32. https://doi.org/10.1145/3610196

[18] Xinyue Chen, Lev Tankelevitch, Rishi Vanukuru, Ava Elizabeth Scott, Payod Panda, and Sean Rintel. 2025. Are We On Track? AI-Assisted Active and Passive Goal Reflection During Meetings. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*, Vol. 1. Association for Computing Machinery (ACM). https://doi.org/10.1145/3706598.3714052

[19] Chun-Wei Chiang, Zhuoran Lu, Zhuoyan Li, and Ming Yin. 2024. Enhancing AI-Assisted Group Decision Making through LLM-Powered Devil's Advocate. In *Proceedings of the 29th International Conference on Intelligent User Interfaces*. ACM, Greenville SC USA, 103–119. https://doi.org/10.1145/3640543.3645199

[20] Patrick Chiu, John Boreczky, Andreas Girgensohn, and Don Kimber. 2001. LiteMinutes: an Internet-based system for multimedia meeting minutes. In *Proceedings of the 10th international conference on World Wide Web (WWW '01)*. Association for Computing Machinery, New York, NY, USA, 140–149. https://doi.org/10.1145/371920.371971

[21] Melissa A. Cohen, Steven G. Rogelberg, Joseph A. Allen, and Alexandra Luong. 2011. Meeting design characteristics and attendee perceptions of staff/team meeting quality. *Group Dynamics: Theory, Research, and Practice* 15, 1 (2011), 90–104. https://doi.org/10.1037/a0021549

[22] Anita Cremers, Inge Kuijper, Peter Groenewegen, and Wilfried Post. 2007. The Project Browser: Supporting Information Access for a Project Team. In *Human-Computer Interaction. HCI Applications and Services*, Julie A. Jacko (Ed.). Springer, Berlin, Heidelberg, 571–580. https://doi.org/10.1007/978-3-540-73111-5_65

[23] Ross Cutler, Yasaman Hosseinkashi, Jamie Pool, Senja Filipi, Robert Aichner, Yuan Tu, and Johannes Gehrke. 2021. Meeting Effectiveness and Inclusiveness in Remote Collaboration. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW1 (April 2021), 173:1–173:29. https://doi.org/10.1145/3449247

[24] Mary Czerwinski, Eric Horvitz, and Susan Wilhite. 2004. A diary study of task switching and interruptions. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '04)*. Association for Computing Machinery, New York, NY, USA, 175–182. https://doi.org/10.1145/985692.985715

[25] Doodle. 2019. *The Doodle State of Meetings Report 2019*. Technical Report. Doodle. https://doodle.com/en/resources/research-and-reports-/the-state-of-meetings-2019/

[26] Shiran Dudy, Thulasi Tholeti, Resmi Ramachandranpillai, Muhammad Ali, Toby Jia Jun Li, and Ricardo Baeza-Yates. 2025. Unequal Opportunities: Examining the Bias in Geographical Recommendations by Large Language Models. In *International Conference on Intelligent User Interfaces, Proceedings IUI*. Association for Computing Machinery, 1499–1516. https://doi.org/10.1145/3708359.3712111

[27] Mustafa Emirbayer and Ann Mische. 1998. What Is Agency? *Amer. J. Sociology* 103, 4 (1998), 962–1023. https://doi.org/10.1086/231294

[28] Jennifer L. Geimer, Desmond J. Leach, Justin A. DeSimone, Steven G. Rogelberg, and Peter B. Warr. 2015. Meetings at work: Perceived effectiveness and recommended improvements. *Journal of Business Research* 68, 9 (Sept. 2015), 2015–2026. https://doi.org/10.1016/j.jbusres.2015.02.015

[29] W. Geyer, H. Richter, and G.D. Abowd. 2003. Making multimedia meeting records more meaningful. In *2003 International Conference on Multimedia and Expo. ICME '03. Proceedings (Cat. No.03TH8698)*, Vol. 2. Institute of Electrical and Electronics Engineers, II–669. https://doi.org/10.1109/ICME.2003.1221705

[30] Silvia Gherardi and Antonio Strati. 1988. The Temporal Dimension in Organizational Studies. *Organization Studies* 9, 2 (April 1988), 149–164. https://doi.org/10.1177/017084068800900201

[31] Victor M. González and Gloria Mark. 2004. "Constant, constant, multi-tasking craziness": managing multiple working spheres. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '04)*. Association for Computing Machinery, New York, NY, USA, 113–120. https://doi.org/10.1145/985692.985707

[32] Walter A. Green and Harold Lazarus. 1991. Are Today's Executives Meeting with Success? *Journal of Management Development* 10, 1 (Jan. 1991), 14–25. https://doi.org/10.1108/02621719110139034

[33] John Hassard. 1999. Studying Organization: Theory & Method. In *Studying Organization: Theory & Method*. SAGE Publications Ltd, London, 327–344. https://doi.org/10.4135/9781446218556

[34] Thomas Haynes, Sandip Sen, Neeraj Arora, and Rajani Nadella. 1997. An automated meeting scheduling system that utilizes user preferences. In *Proceedings of the first international conference on Autonomous agents (AGENTS '97)*. Association for Computing Machinery, New York, NY, USA, 308–315. https://doi.org/10.1145/267658.267733

[35] Yasaman Hosseinkashi, Lev Tankelevitch, Jamie Pool, Ross Cutler, and Chinmaya Madan. 2024. Meeting Effectiveness and Inclusiveness: Large-scale Measurement, Identification of Key Features, and Prediction in Real-world Remote Meetings. *Proc. ACM Hum.-Comput. Interact.* 8, CSCW1 (April 2024), 93:1–93:39. https://doi.org/10.1145/3637370

[36] Shamsi T. Iqbal and Eric Horvitz. 2007. Disruption and recovery of computing tasks: field study, analysis, and directions. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '07)*. Association for Computing Machinery, New York, NY, USA, 677–686. https://doi.org/10.1145/1240624.1240730

[37] Gregory A. Janicik and Caroline A. Bartel. 2003. Talking about time: Effects of temporal planning and time awareness norms on group coordination and performance. *Group Dynamics: Theory, Research, and Practice* 7, 2 (2003), 122–134. https://doi.org/10.1037/1089-2699.7.2.122

[38] Elliott Jaques. 1982. *The Form of Time*. Crane, Russak.

[39] Vaiva Kalnikaitė, Patrick Ehlen, and Steve Whittaker. 2012. Markup as you talk: establishing effective memory cues while still contributing to a meeting. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work (CSCW '12)*. Association for Computing Machinery, New York, NY, USA, 349–358. https://doi.org/10.1145/2145204.2145260

[40] Sarah Kaplan and Wanda J. Orlikowski. 2013. Temporal Work in Strategy Making. *Organization Science* 24, 4 (2013), 965–995. https://www.jstor.org/stable/42002889

[41] Desmond J. Leach, Steven G. Rogelberg, Peter B. Warr, and Jennifer L. Burnfield. 2009. Perceived Meeting Effectiveness: The Role of Design Characteristics. *Journal of Business and Psychology* 24, 1 (March 2009), 65–76. https://doi.org/10.1007/s10869-009-9092-6

[42] Hao-Ping (Hank) Lee, Yu-Ju Yang, Thomas Serban Von Davier, Jodi Forlizzi, and Sauvik Das. 2024. Deepfakes, Phrenology, Surveillance, and More! A Taxonomy of AI Privacy Risks. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '24)*. Association for Computing Machinery, New York, NY, USA, Article 775, 19 pages. https://doi.org/10.1145/3613904.3642116

[43] K. Lewin. 1943. Defining the 'field at a given time.'. *Psychological Review* 50, 3 (1943), 292–310. https://doi.org/10.1037/h0062738

[44] Yiren Liu, Si Chen, Haocong Cheng, Mengxia Yu, Xiao Ran, Andrew Mo, Yiliu Tang, and Yun Huang. 2024. How AI Processing Delays Foster Creativity: Exploring Research Question Co-Creation with an LLM-based Agent. , 25 pages. https://doi.org/10.1145/3613904.3642698

[45] Gloria Mark, Daniela Gudith, and Ulrich Klocke. 2008. The cost of interrupted work: more speed and stress. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '08)*. Association for Computing Machinery, New York, NY, USA, 107–110. https://doi.org/10.1145/1357054.1357072

[46] Sara McComb and Deanna Kennedy. 2020. Rhythm of Team Communication. In *Computational Methods to Examine Team Communication: When and How to Change the Conversation*, Sara McComb and Deanna Kennedy (Eds.). Springer International Publishing, Cham, 57–78. https://doi.org/10.1007/978-3-030-36159-4_4

[47] Joseph E. McGrath. 1991. Time, Interaction, and Performance (TIP). *Small Group Research* 22 (May 1991), 147–174. https://doi.org/10.1177/1046496491222001

[48] Moira McGregor and John C. Tang. 2017. More to Meetings: Challenges in Using Speech-Based Technology to Support Meetings. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW '17)*. Association for Computing Machinery, New York, NY, USA, 2208–2220. https://doi.org/10.1145/2998181.2998335

[49] George Herbert Mead. 1932. *The Philosophy of the Present*. Prometheus Books, Amherst, N.Y.

[50] Microsoft. 2023. Work Trend Index | Will AI Fix Work? https://www.microsoft.com/en-us/worklab/work-trend-index/will-ai-fix-work

[51] Microsoft. 2024. AI at Work Is Here. Now Comes the Hard Part. https://www.microsoft.com/en-us/worklab/work-trend-index/ai-at-work-is-here-now-comes-the-hard-part

[52] Karin Niemantsverdriet and Thomas Erickson. 2017. Recurring Meetings: An Experiential Account of Repeating Meetings in a Large Organization. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (Dec. 2017), 84:1–84:17. https://doi.org/10.1145/3134719

[53] Carol T. Nixon and Glenn E. Littlepage. 1992. Impact of meeting procedures on meeting effectiveness. *Journal of Business and Psychology* 6, 3 (1992), 361–369. https://doi.org/10.1007/BF01126771

[54] Payod Panda, Molly Jane Nicholas, David Nguyen, Eyal Ofek, Michel Pahud, Sean Rintel, Mar Gonzalez-Franco, Ken Hinckley, and Jaron Lanier. 2023. Beyond Audio: Towards a Design Space of Headphones as a Site for Interaction and Sensing. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference (DIS '23)*. Association for Computing Machinery, New York, NY, USA, 904–916. https://doi.org/10.1145/3563657.3596022

[55] Gun Woo (Warren) Park, Payod Panda, Lev Tankelevitch, and Sean Rintel. 2024. CoExplorer: Generative AI Powered 2D and 3D Adaptive Interfaces to Support Intentionality in Video Meetings. In *Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems (CHI EA '24)*. Association for Computing Machinery, New York, NY, USA, 1–10. https://doi.org/10.1145/3613905.3650797

[56] Gun Woo (Warren) Park, Payod Panda, Lev Tankelevitch, and Sean Rintel. 2024. The CoExplorer Technology Probe: A Generative AI-Powered Adaptive Interface to Support Intentionality in Planning and Running Video Meetings. In *Proceedings of the 2024 ACM Designing Interactive Systems Conference (DIS '24)*. Association for Computing Machinery, New York, NY, USA, 1638–1657. https://doi.org/10.1145/3643834.3661507

[57] Sajjadur Rahman, Pao Siangliulue, and Adam Marcus. 2020. MixTAPE: Mixed-initiative Team Action Plan Creation Through Semi-structured Notes, Automatic Task Generation, and Task Classification. *Proc. ACM Hum.-Comput. Interact.* 4, CSCW2 (Oct. 2020), 169:1–169:26. https://doi.org/10.1145/3415240

[58] Rutger Rienks, Anton Nijholt, and Paulo Barthelmess. 2008. Pro-active meeting assistants: attention please! *AI Soc.* 23, 2 (Aug. 2008), 213–231. https://doi.org/10.1007/s00146-007-0135-0

[59] Kat Roemmich, Florian Schaub, and Nazanin Andalibi. 2023. Emotion AI at Work: Implications for Workplace Surveillance, Emotional Labor, and Emotional Privacy. In *Conference on Human Factors in Computing Systems - Proceedings*. Association for Computing Machinery, 20. https://doi.org/10.1145/3544548.3580950

[60] Steven G Rogelberg. 2018. *The surprising science of meetings: How you can lead your team to peak performance*. Oxford University Press, USA.

[61] N.C. Romano and J.F. Nunamaker. 2001. Meeting analysis: findings from research and practice. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences*. Institute of Electrical and Electronics Engineers, 13 pp. https://doi.org/10.1109/HICSS.2001.926253

[62] Daniel L. Schacter, Donna Rose Addis, and Randy L. Buckner. 2007. Remembering the past to imagine the future: the prospective brain. *Nature Reviews Neuroscience* 8, 9 (Sept. 2007), 657–661. https://doi.org/10.1038/nrn2213

[63] Beau G. Schelble, Jeremy Lopez, Claire Textor, Rui Zhang, Nathan J. McNeese, Richard Pak, and Guo Freeman. 2024. Towards Ethical AI: Empirically Investigating Dimensions of AI Ethics, Trust Repair, and Performance in Human-AI Teaming. *Human Factors* 66, 4 (April 2024), 1037–1055. https://doi.org/10.1177/00187208221116952

[64] Martin Schroder. 2023. AutoScrum: Automating Project Planning Using Large Language Models. https://doi.org/10.48550/arXiv.2306.03197

[65] Helen B. Schwartzman. 1986. The meeting as a neglected social form in organizational studies. *Research in Organizational Behavior* 8 (1986), 233–258.

[66] Helen B. Schwartzman. 2015. There's Something about Meetings: Order and Disorder in the Study of Meetings. In *The Cambridge Handbook of Meeting Science*, Joseph A. Allen, Nale Lehmann-Willenbrock, and Steven G. Rogelberg (Eds.). Cambridge University Press, Cambridge, 735–746. https://doi.org/10.1017/CBO9781107589735.031

[67] Ava Elizabeth Scott, Lev Tankelevitch, Payod Panda, Rishi Vanukuru, Xinyue Chen, and Sean Rintel. 2025. What Does Success Look Like? Catalyzing Meeting Intentionality with AI-Assisted Prospective Reflection. In *CHIWORK '25: Proceedings of the 4th Annual Symposium on Human-Computer Interaction for Work*. Association for Computing Machinery (ACM). https://doi.org/10.1145/3729176.3729204

[68] Ava Elizabeth Scott, Lev Tankelevitch, and Sean Rintel. 2024. Mental Models of Meeting Goals: Supporting Intentionality in Meeting Technologies. In

Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery, New York, NY, USA, 1–17. https://doi.org/10.1145/3613904.3642670

[69] Abigail J. Sellen and Steve Whittaker. 2010. Beyond total capture: a constructive critique of lifelogging. *Commun. ACM* 53, 5 (May 2010), 70–77. https://doi.org/10.1145/1735223.1735243

[70] Yang Shi, Chris Bryan, Sridatt Bhamidipati, Ying Zhao, Yaoxue Zhang, and Kwan-Liu Ma. 2018. MeetingVis: Visual Narratives to Assist in Recalling Meeting Context and Content. *IEEE Transactions on Visualization and Computer Graphics* 24, 6 (June 2018), 1918–1929. https://doi.org/10.1109/TVCG.2018.2816203

[71] Abbie J. Shipp and Karen J. Jansen. 2021. The "Other" Time: A Review of the Subjective Experience of Time in Organizations. *Academy of Management Annals* 15, 1 (Jan. 2021), 299–334. https://doi.org/10.5465/annals.2018.0142

[72] Adriana Meza Soria, Taylor Lopez, Elizabeth Seero, Negin Mashhadi, Emily Evans, Janet Burge, and André Van der Hoek. 2024. Characterizing Software Maintenance Meetings: Information Shared, Discussion Outcomes, and Information Captured. In *Proceedings of the IEEE/ACM 46th International Conference on Software Engineering (ICSE '24)*. Association for Computing Machinery, New York, NY, USA, 1–13. https://doi.org/10.1145/3597503.3623330

[73] Sangho Suh, Meng Chen, Bryan Min, Toby Jia-Jun Li, and Haijun Xia. 2024. Luminate: Structured Generation and Exploration of Design Space with Large Language Models for Human-AI Co-Creation. , 26 pages. https://doi.org/10.1145/3613904.3642400

[74] Sangho Suh, Bryan Min, Srishti Palani, and Haijun Xia. 2023. Sensecape: Enabling Multilevel Exploration and Sensemaking with Large Language Models. In *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST '23)*. Association for Computing Machinery, New York, NY, USA, 1–18. https://doi.org/10.1145/3586183.3606756

[75] Karl K. Szpunar, R. Nathan Spreng, and Daniel L. Schacter. 2014. A taxonomy of prospection: Introducing an organizational framework for future-oriented cognition. *Proceedings of the National Academy of Sciences* 111, 52 (Dec. 2014), 18414–18421. https://doi.org/10.1073/pnas.1417144111

[76] Ruotong Wang, Lin Qiu, Justin Cranshaw, and Amy X. Zhang. 2024. Meeting Bridges: Designing Information Artifacts that Bridge from Synchronous Meetings to Asynchronous Collaboration. *Proc. ACM Hum.-Comput. Interact.* 8, CSCW1 (April 2024), 35:1–35:29. https://doi.org/10.1145/3637312

[77] Steve Whittaker, Simon Tucker, Kumutha Swampillai, and Rachel Laban. 2008. Design and evaluation of systems to support interaction capture and retrieval. *Personal and Ubiquitous Computing* 12, 3 (March 2008), 197–221. https://doi.org/10.1007/s00779-007-0146-3

[78] Mikael Wiberg. 2001. RoamWare: an integrated architecture for seamless interaction in between mobile meetings. In *GROUP '01: Proceedings of the 2001 ACM International Conference on Supporting Group Work*. Association for Computing Machinery (ACM), 288–297. https://doi.org/10.1145/500286.500328

[79] Alex C. Williams, Harmanpreet Kaur, Gloria Mark, Anne Loomis Thompson, Shamsi T. Iqbal, and Jaime Teevan. 2018. Supporting Workplace Detachment and Reattachment with Conversational Intelligence. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, 1–13. https://doi.org/10.1145/3173574.3173662

[80] Tongshuang Wu, Ellen Jiang, Aaron Donsbach, Jeff Gray, Alejandra Molina, Michael Terry, and Carrie J Cai. 2022. PromptChainer: Chaining Large Language Model Prompts through Visual Programming. In *Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems (CHI EA '22)*. Association for Computing Machinery, New York, NY, USA, 1–10. https://doi.org/10.1145/3491101.3519729

[81] Haijun Xia, Tony Wang, Aditya Gunturu, Peiling Jiang, William Duan, and Xiaoshuo Yao. 2023. CrossTalk: Intelligent Substrates for Language-Oriented Interaction in Video-Based Communication and Collaboration. In *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST '23)*. Association for Computing Machinery, New York, NY, USA, 1–16. https://doi.org/10.1145/3586183.3606773

[82] Xiaotong (Tone) Xu, Jiayu Yin, Catherine Gu, Jenny Mar, Sydney Zhang, Jane L. E, and Steven P. Dow. 2024. Jamplate: Exploring LLM-Enhanced Templates for Idea Reflection. In *Proceedings of the 29th International Conference on Intelligent User Interfaces*. ACM, Greenville SC USA, 907–921. https://doi.org/10.1145/3640543.3645196

[83] Qian Yang, Aaron Steinfeld, Carolyn Rosé, and John Zimmerman. 2020. Re-examining Whether, Why, and How Human-AI Interaction Is Uniquely Difficult to Design. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–13. https://doi.org/10.1145/3313831.3376301

[84] Eric J. York, Eva Brumberger, and La Verne Abe Harris. 2024. Prompting Bias: Assessing representation and accuracy in AI-generated images. In *Proceedings of the 42nd ACM International Conference on Design of Communication, SIGDOC 2024*. Association for Computing Machinery, Inc, 106–115. https://doi.org/10.1145/3641237.3691658

A RECURRING MEETING ANALYSIS DATA

Table 2: Overview of Temporal Work across meetings

Meeting	Retrospection			Prospection					Combined Total
	Recollecting	Reflecting	Total	Planning	Intention	Prediction	Simulation	Total	
A1	41	15	56	8	14	6	11	39	95
A2	48	10	58	27	8	0	4	39	97
A3	38	8	46	35	11	0	4	50	96
A4	20	12	32	37	5	0	4	46	78
B1	34	28	62	15	17	1	13	46	108
B2	27	6	33	17	13	2	9	41	74
B3	22	8	30	32	15	2	4	53	83
B4	24	6	30	24	11	4	6	45	75

Table 3: Temporal Work Excerpt - Meeting A2

Temporal Work Excerpt - Meeting A2			
Time in Seconds	**Action**	**Detail**	**Horizon**
2138	Recollecting	Ongoing task of hiring	Last few months
2161	Planning	To extend an offer	Near future
2177	Recollecting	Previous conversation	Last few weeks
2182	Recollecting	Previous conversation	Last few weeks
2189	Reflecting	On implications	Last few weeks
2194	Intention	To discuss with other leaders	Near and distant future
2224	Intention	To discuss with other leaders	Near and distant future
2226	Planning	To have further conversations	Near and distant future
2238	Planning	To continue servicing projects	Near future
2258	Simulation	Changes in intentions of the team	Near and distant future
2303	Recollecting	Previous conversation	Recent past
2333	Recollecting	Ongoing process	Recent past
2360	Planning	To have brainstorming but simple ideas	Near future
2379	Planning	Syncing with another team	Near future