Videoconferencing in On-the-Go Contexts : Collaboration Challenges and Interaction Design

Context : Large research network on digital collaboration involving more than 100 research groups : PEPR eNSEMBLE.
Keywords : Videoconferencing, collaboration, micro-asynchrony, mobile device, microgesture, augmented reality.
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1. Research Context and Motivation

With the rise of remote work and hybrid meetings, users increasingly participate in videoconferencing from a wide range of devices, including laptops, tablets, and smartphones. However, most videoconferencing platforms remain primarily designed for desktop environments. As mobile participation continues to grow, new collaboration challenges emerge.

Mobile devices are constrained by their small display size and limited input capabilities [4, 10]. As a result, users cannot access all relevant meeting information simultaneously (e.g., participant videos, chat messages, shared documents, or slides). Instead, they must constantly switch between views, which increases cognitive load and disrupts the flow of collaboration. These challenges are further amplified by the contexts in which mobile devices are used. Mobile participation often occurs in dynamic environments—for example, while walking or using public transportation—where users move between indoor and outdoor settings, experience varying noise levels, and face interaction [1, 5, 12] and collaboration disruptions. In such situations, attention is divided between the meeting and the surrounding environment (e.g., navigating crowded spaces or crossing a street), which may reduce engagement and participation. Consequently, mobile videoconferencing fundamentally alters the conditions of attention and collaboration in hybrid meetings. This gives rise to the following research question in collaboration design : How can videoconferencing platforms be designed to effectively support mobile participation in on-the-go contexts while preserving user engagement, comprehension, and collaborative effectiveness ? Addressing this question constitutes the central objective of this thesis.

2. Research Method and Thesis Objectives

The research investigates how videoconferencing platforms can better support collaboration in heterogeneous collaboration spaces, in which some collaborators are situated in on-the-go contexts.

To address this issue the research method is iterative and integrates both deduction and induction. In this method, conceptual and empirical work feed into each other : conceptual models guide the design of collaboration techniques, while empirical evaluation of these techniques enriches the conceptual models. This feedback loop of deduction and induction relies on the development of collaboration techniques. Controlled laboratory experiments on the developed collaboration techniques will focus on a limited set of factors (for examples of controlled lab studies while walking [4]).

This iterative research method defines a progressive research agenda structured around three objectives : first, understanding on-the-go participation practices and constraints, which initiate the iterative research process and are continuously enriched by empirical results ; second, designing collaboration

techniques adapted to mobile settings; and third, designing collaboration techniques suited to intermittent participation in mobile contexts.

1. **Understanding mobile videoconferencing participation.** The first objective is to understand and model how users participate in videoconferencing meetings when joining through mobile devices, particularly in on-the-go contexts. This objective examines how mobile users navigate between artefacts that contribute to shared understanding and coordinative practices, how they manage divided attention between the meeting and their physical environment, and how these constraints affect engagement and collaboration. As an entry point to this iterative research process, it emphasizes the collection of individuals' lived experiences to better understand the challenges mobile collaborators face. To this end, the research approach builds on the one described in [7], combining focus group interviews and participatory design workshops. This objective addresses technical, physical, and social factors arising from the videoconferencing experience on the go.
2. **Designing collaboration techniques for mobile videoconferencing.** Building on the findings of Objective 1, the second objective aims to design and evaluate collaboration techniques that better support participation in videoconferencing on mobile devices. The study will consider techniques that facilitate common meeting tasks, including navigation between meeting spaces, communication controls (e.g., muting/unmuting, toggling the camera, raising a hand, reacting with emojis, or leaving the meeting), and interaction with shared content. The focus is on techniques that are usable in realistic mobile conditions, enable more fluid interaction while on the move, and minimize both manual effort and visual demand.
   One research direction is the exploration of microgestures [2, 3, 6, 11] and around-device interaction [8, 9, 10]. Another research direction, based on augmented reality, involves exploring augmented spatial workspaces in which meeting elements—such as shared documents, chat, participant views, or annotations—can be organized around the user (spatial multiplexing) rather than accessed solely through sequential screen switching (temporal multiplexing).
3. **Designing collaboration techniques under intermittent participation in mobile contexts** Building on the findings of Objective 1, the third objective is to design techniques that support intermittent participation in mobile contexts. Because mobile users may temporarily lose attention or connectivity (e.g., due to environmental distractions), the thesis will investigate mechanisms for managing short periods of micro-asynchrony, helping users quickly re-engage with the meeting while also informing other participants in real time of their status. This includes, for example, lightweight ways to review missed information or recent messages.

3. Nature of Digital Collaboration

The thesis targets synchronous collaboration in hybrid and remote settings, where participants interact in real time but operate within different spatial and attentional contexts. It places particular emphasis on mobile users participating on-the-go. These settings introduce variability in attention, mobility, and environmental conditions, which significantly shape collaborative practices and system requirements. It also considers the continuum between synchronous and asynchronous collaboration, with a focus on transitions in videoconferencing meetings. In particular, it addresses short interruptions (seconds to minutes), referred to as micro-asynchrony, which temporarily disrupt real-time collaboration.

The thesis considers small to medium-sized groups, ranging from dyads to meetings involving larger numbers of participants, as commonly found in private and professional videoconferencing contexts. A focus is placed on heterogeneous collaboration spaces, where participants do not share the same physical or attentional context, with particular attention to on-the-go mobile users who face mobility

constraints, divided attention, and dynamic physical environments.

4. Contribution to Digital Collaboration

This thesis aims to produce empirical, theoretical, and technical contributions to mobile and hybrid videoconferencing collaboration. Empirically, it will provide insights into mobile participation practices, including interaction strategies, attentional trade-offs, and collaboration breakdowns in on-the-go contexts. Theoretically, it will advance understanding of collaboration in heterogeneous spaces by accounting for mobility, attentional fragmentation, and transitions between synchronous and asynchronous modes, including micro-asynchrony in videoconferencing. Technically, it will design and evaluate novel interaction techniques such as microgestures, around-device interaction, and spatial or augmented collaboration environments, aiming to reduce cognitive load and support continuous participation. In addition, the understanding of how users participate in videoconferencing meetings on the go, along with the resulting design guidelines and collaboration techniques developed in this thesis, could provide directions for extending the **LaSuite Visio tool** of LaSuite Numérique.

5. Positioning within the PEPR eNSEMBLE

This PhD is an integral part of the eNSEMBLE program on digital collaboration, as it focuses on videoconferencing meetings. It is particularly aligned with **PC1-CAT**S on collaboration spaces, aiming to design collaborative environments that enable continuous and seamless videoconferencing interactions. The thesis directly addresses the challenges of heterogeneous collaboration spaces (**Axis 1**, WP1.1 and WP1.3 of PC1-CATS) as well as the challenges of transitions (**Axis 4**, WP4.2 and WP4.4 of PC1-CATS), by focusing on one type of transition from synchronous to asynchronous collaboration, also referred to as micro-asynchrony in videoconferencing meetings.

6. Application and Research Environment

Candidate Profile

A successful candidate should hold an MSc degree or equivalent in Computer Science or Human-Computer Interaction, show a strong interest in conducting research in HCI and demonstrate good programming skills. The research is conducted in English, and a good command of English is required. Knowledge of French is not necessary to join our research groups.

Research groups

The PhD candidate will join the CRIStAL laboratory (UMR CNRS 9189) at the University of Lille and be part of the MINT research group. The thesis will be co-supervised by the IIHM research group at the LIG laboratory (UMR CNRS 5217) of the University Grenoble Alpes. The candidate will benefit from the complementary expertise of both groups and will have opportunities for regular exchanges and research visits between Lille and Grenoble.

Application

To apply, please send your resume and cover letter by email to Yosra Rekik and Laurence Nigay. The cover letter should explain what draws you to this topic, and present your vision for the project. It is also recommended to discuss your motivation for pursuing a career in academic research.

Bibliography

[1] J. Bergstrom-Lehtovirta, A. Oulasvirta, and S. Brewster. The effects of walking speed on target acquisition on a touchscreen interface. In *Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services*, MobileHCI '11, page 143–146, New York, NY, USA, 2011. Association for Computing Machinery.

[2] A. Caillet, A. Goguey, and L. Nigay. 3d selection in mixed reality : Designing a two-phase technique to reduce fatigue. In *Proceedings of the IEEE International Symposium on Mixed and Augmented Reality*, pages 800–809, 10 2023.

[3] A. Chaffangeon Caillet, A. Goguey, and L. Nigay. µglyph : a microgesture notation. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, CHI '23, New York, NY, USA, 2023. Association for Computing Machinery.

[4] J. Francone, G. Bailly, E. Lecolinet, N. Mandran, and L. Nigay. Wavelet menus on handheld devices : stacking metaphor for novice mode and eyes-free selection for expert mode. In *Proceedings of the International Conference on Advanced Visual Interfaces*, AVI '10, page 173–180, New York, NY, USA, 2010. Association for Computing Machinery.

[5] J. Kong, J. O. Wobbrock, T. Cai, and Z. Bylinskii. Supporting mobile reading while walking with automatic and customized font size adaptations. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, CHI '25, New York, NY, USA, 2025. Association for Computing Machinery.

[6] S. Lavenant, A. Goguey, S. Malacria, L. Nigay, and T. Pietrzak. Investigating single-handed microgesture scrolling techniques. In *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems*, CHI '26, New York, NY, USA, 2026. Association for Computing Machinery.

[7] M. Lee, W. Park, S. Lee, and S. Lee. Distracting moments in videoconferencing : A look back at the pandemic period. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, CHI '22, New York, NY, USA, 2022. Association for Computing Machinery.

[8] H. Rateau, T. Han, K. Hasan, K. Katsuragawa, Y. Rekik, and E. Lank. *Watch+AD : Disambiguing Around-the-Smartwatch Interaction*, pages 98–124. Interact '25. 09 2025.

[9] H. Rateau, Y. Rekik, and E. Lank. Ether-mark : An off-screen marking menu for mobile devices. In *Proceedings of the 25th International Conference on Multimodal Interaction*, ICMI '23, page 224–233, New York, NY, USA, 2023. Association for Computing Machinery.

[10] H. Rateau, Y. Rekik, E. Lank, and L. Grisoni. Ether-toolbars : Evaluating off-screen toolbars for mobile interaction. In *Proceedings of the 23rd International Conference on Intelligent User Interfaces*, IUI '18, page 487–495, New York, NY, USA, 2018. Association for Computing Machinery.

[11] J. Wambecke, A. Goguey, L. Nigay, L. Dargent, D. Hauret, S. Lafon, and J.-S. L. de Visme. M[eye]cro : Eye-gaze+microgestures for multitasking and interruptions. *Proc. ACM Hum.-Comput. Interact.*, 5(EICS), May 2021.

[12] J. O. Wobbrock, S. K. Kane, K. Z. Gajos, S. Harada, and J. Froehlich. Ability-based design : Concept, principles and examples. *ACM Trans. Access. Comput.*, 3(3), Apr. 2011.