

COMPUTER AND CONTROL ENGINEERING

DAUIN - User-driven Personalisation of Agentic Interfaces

Funded By	Dipartimento DAUIN
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Context of the research activity	<p>The Ph.D. proposal aims exploring how users can meaningfully guide and personalise the behaviour of agentic interfaces. As such, the student will study, build, and evaluate different aspects of user interfaces that can act autonomously while allowing users to influence, constrain, or adapt their agentic behaviours to align with their personal goals, values, and contexts.</p>
	<p>Interactive systems are increasingly shifting from reactive to proactive modes of operation, where interfaces no longer wait for explicit commands but try to anticipate user needs. This shift introduces new challenges for maintaining user agency and trust in systems that act autonomously. Understanding how to design personalisable agentic interfaces is therefore essential for building the next generation of adaptive, user-centred technologies.</p> <p>Recent advances in Artificial Intelligence have enabled interfaces that can act proactively through agents. Such agents can initiate actions, make recommendations, or adjust their behaviour without explicit user commands. They promise to reduce cognitive load and increase efficiency, yet they also challenge long-standing Human-Computer Interaction principles of user control, transparency, and predictability. Users may benefit from systems that "know what they want", but can also feel disempowered or uncertain when the same systems act autonomously or alter interfaces without explaining changes or considering the user's context.</p> <p>End-user personalisation emerged as a key strategy for maintaining alignment between users and computers. It has been widely explored and adopted in the context of intelligent and Internet-of-Things systems, for example. End-user personalisation approaches allow users to guide and shape some of the system behaviours, balancing autonomy and understanding.</p> <p>The Ph.D. proposal, as such, addresses critical questions about shared agency between humans and intelligent systems. Its aim is to study, design, build, and evaluate methods and tools that enable users to directly or indirectly steer how an agentic user interface adapts to them, while ensuring transparency, trust, and mutual adaptation.</p> <p>The specific research questions are:</p>

Objectives

1. User steering and control: How can users directly or indirectly influence how an agentic UI adapts to them (e.g. through preferences, feedback, or demonstrations)?
2. Transparency and explainability: How can the system effectively communicate why it changed its behaviour or interface layout?
3. Co-adaptation: How do user and system mutually adapt to one another over time, and what patterns of collaboration emerge?
4. Trust and calibration: When does proactive personalisation increase versus decrease user trust, and how can systems support trust calibration?
5. Design frameworks and tools: Can we define generalisable design patterns or toolkits for building personalisable agentic interfaces?

The work plan will be organized according to the following four phases, partially overlapping.

Phase 1 (months 0-6): literature review and study on agentic interfaces, mixed-initiative interaction, adaptive UIs, co-adaptive systems, and explainable AI.

Phase 2 (months 6-12): based on the results of the previous phase, definitions and development of a set of use cases and interesting contexts to be adopted. Consequent creation of an initial conceptual model describing the involved dimensions and conducting formative user studies.

Phase 3 (months 12-24): research, definition, and experimentation of interactive prototypes demonstrating different strategies for user-driven personalisation (e.g. preference editing, adjustable autonomy, feedback-based adaptation) in the defined use cases, starting from the outcome of the previous phase. Such solutions will imply the design, implementation, and evaluation of intelligent user interfaces, designed to account for users' preferences, intentions, and skill levels across different agentic systems.

Phase 4 (months 24-36): extension and possible generalization of the previous phase to include additional contexts and use cases, towards the creation of a framework and toolkit for creating transparent and controllable agentic UIs. Evaluation in real-world contexts of one or more implemented systems over an extended period, to observe long-term co-adaptation and calibration.

For each of the previously mentioned phases, at least one conference or journal publication is expected. Suitable venues might include:

ACM CHI, ACM IUI, ACM Transactions on Computer-Human Interaction, International Journal of Human Computer Studies.

Skills and competencies for the development of the activity

The ideal candidate must have a solid background in Computer Engineering, software design and development, with prior experience with Human Computer Interaction, especially around user-centred methodologies, iterative prototyping and mixed-method user studies. In addition, the candidate should have a positive research aptitude and curiosity to cross disciplinary boundaries, as well as good communication and presentation skills.