Subject for the Insa-UT PhD Program of The China Scholarship Council

PhD title: Advancing Information Transparency in Human-Computer Interaction for Public Utility Accessibility

Host laboratory: Connaissance et Intelligence Artificielle Distribuées (CIAD) – http://www.ciad-lab.fr

Specialty of PhD: Computer Science

Keywords: Information Accessibility, User Experience, Public Service Transparency, Urban Digital Inclusion

Introduction

Urban digital environments prioritize the delivery of public services such as public transit, sustainability reporting, and utility maintenance. These systems utilize data to provide residents and administrators with insights into city operations. The objective of these frameworks is "Inclusive Informatics," ensuring digital tools function as accessible resources for community engagement and service literacy.

Transparency in Human-Computer Interaction (HCI) is the mechanism for establishing public trust and ease of use. Clarifying how service recommendations are generated allows residents and local administrators to navigate digital interfaces effectively. Current challenges involve translating high-dimensional data into legible formats for diverse demographics and ensuring informational clarity does not impede system usability.

PhD Focus

This research investigates the design of legible digital interfaces for public service applications. Focus areas include data-driven tools for community sustainability, public transit scheduling, and municipal utility feedback. The methodology integrates behavioral science and user interface (UI) design to develop notification and explanation models tailored to non-technical users and public stakeholders.

Research Objectives

- Identify information formats that enhance resident understanding and utilization of public service data.
- Develop adaptive interface models that adjust explanation complexity based on user demographic and service context.
- Establish communication protocols between digital platforms and human users to maximize informational utility and service accessibility.

Planned Work

1. **State-of-the-Art Analysis:** Review existing frameworks for information transparency in public-facing software and community engagement tools.

2. **Model Development:** Design informational strategies (e.g., visual summaries, interactive glossaries) to clarify city service updates and administrative reporting.
3. **Simulation and User Testing:** Implement models in a simulated urban service environment to measure user comprehension and task completion rates.

Civil Impact

This research optimizes the accessibility of public digital infrastructure. In urban transit, transparent interfaces provide commuters with clear reasoning for schedule adjustments or route updates. In environmental services, residents gain actionable insights from air quality or energy consumption data. The project results in standardized guidelines for developing inclusive, legible, and transparent digital tools for public administration and community service.

Research Collaboration

- University of Luxembourg, Luxembourg
- Luxembourg Institute of Science and Technology, Luxembourg
- University of Warwick, England

References:

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2. Yazan Mualla, Igor Tchappi Haman, Timotheus Kampik, Amro Najjar, Davide Calvaresi, Abdeljalil Abbas-Turki, Stéphane Galland, and Christophe Nicolle. *The Quest of Parsimonious XAI: a Human-Agent Architecture for Explanation Formulation*. Artificial Intelligence. 2022. DOI : 10.1016/j.artint.2021.103573
3. Massimo Cossentino, Vincent Hilaire, Nicolas Gaud, Stéphane Galland, Abderrafiaa Koukam: *The ASPECS Process. Handbook on Agent-Oriented Design Processes* 2014: 65-114 Springer Berlin Heidelberg.
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5. Hemmer, P., Schemmer, M., Vössing, M. and Kühl, N., 2021. *Human-AI Complementarity in Hybrid Intelligence Systems: A Structured Literature Review*. PACIS, p.78.

Candidate Profile:

- The candidate should have a strong background in computer science (Master level)
- An advanced level in English (writing and speaking) is required.

The application to be sent to (yazan.mualla@utbm.fr) must include: a detailed CV, a copy of the Master degree or any document attesting the Master level, a copy of the Master transcripts, references and/or one to two recommendation letters.

Supervisor(s):

Supervisor: Dr. Yazan Mualla
Co-supervisor: Prof. Abderrafiaa Koukam