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# Adaptive XAI: Advancing Intelligent Interfaces for Tailored AI Explanations (2nd Edition)

**Abstract**
As artificial intelligence becomes increasingly embedded in daily decision-making processes, the need for effective communication between humans and AI systems grows more crucial. The Adaptive XAI (AXAI) workshop, now in its second edition, focuses on developing intelligent interfaces that can adaptively explain AI's decision-making processes. Building on the success of our inaugural event at IUI 2024, this workshop continues to explore the intersection of Explainable AI and adaptive user interfaces, emphasizing the development of interfaces that dynamically adapt to create explanations that resonate with diverse users. In line with the human-centric principles of the Future Artificial Intelligence Research (FAIR) project, we examine how emerging technologies such as conversational agents and Large Language Models can enhance AI explainability while ensuring explanations remain malleable and responsive to users' evolving cognitive states and contextual needs.

## 1 Introduction

The pervasiveness of AI systems in daily decision-making processes has intensified the need for clear communication between humans and artificial intelligence [6]. Following the success of our inaugural workshop at IUI 2024 [12], which established the foundations for exploring adaptive explanations in AI systems, this second edition of the Adaptive XAI (AXAI) workshop emerges at a crucial moment in the field's evolution.

The past year has seen significant developments in AI technologies, particularly in areas such as Large Language Models and autonomous systems, making the need for adaptive and contextual explanations more pressing than ever. Our first workshop highlighted several key challenges in this space, including the need for personalized explanations [5], the importance of domain-specific approaches [8], and the critical role of user trust in AI systems. Building on these insights, this second edition seeks to deepen our understanding of how intelligent interfaces can adapt to provide more effective and contextually appropriate explanations.

The field of XAI continues to evolve rapidly, with recent developments highlighting both new opportunities and persistent challenges in making AI systems truly explainable and accessible [7]. The convergence of AI and HCI, a cornerstone of the IUI conference [1, 2], has become increasingly important as AI systems grow more sophisticated and ubiquitous. This intersection presents unique opportunities for developing interfaces that can effectively bridge the gap between complex AI systems and their users, while

adapting to different user needs, contexts, and levels of technical expertise.

The AXAI workshop stands at this crucial intersection, addressing not only the technical challenges of generating explanations but also the human factors that influence their effectiveness. This year's edition builds on the momentum of our previous workshop while expanding its scope to include emerging technologies and methodologies, particularly in areas such as healthcare, cybersecurity, and smart environments. Our focus remains on developing interfaces that can dynamically adapt their explanations to match users' evolving needs and contexts, while maintaining transparency and trust.

## 2 Workshop Themes and Contributions

Our workshop addresses several emerging themes in the field of Adaptive XAI:

**Personalization and Adaptation** Recent work has demonstrated the importance of personalized XAI interfaces that adapt to users' evolving needs and contexts [5]. This includes consideration of different interaction modalities [4] and the development of domain-specific explanations [8].

**Ethical Considerations and Trust** A significant focus of current research involves addressing ethical considerations in adaptive XAI, particularly regarding transparency and user autonomy [9]. This includes examining how explanations can maintain appropriate user skepticism while fostering trust.

**Emerging Technologies** The role of Large Language Models in enhancing explainability has emerged as a crucial area of investigation [3]. Additionally, multimodal and immersive explanations are showing promise in making AI decisions more comprehensible [10].

### 2.1 Accepted Papers

The workshop received 13 high-quality submissions covering a diverse range of topics and applications:
(1) Davide Guizzardi, Barbara Rita Barricelli, and Daniela Fogli. A User-in-the-loop Digital Twin for Energy Consumption Prediction in Smart Homes.
(2) Md Montaser Hamid, Jonathan Dodge, Andrew Anderson, and Margaret Burnett. "Loss in Value": What it revealed about WHO an explanation serves well and WHEN.
(3) Yixin Li, Lucas Lefebvre, Sonali Parbhoo, Finale Doshi-Velez, and Isaac Lage. Human Factors in Human-Feature-Integration.
(4) Alan Dix, Tommaso Turchi, Ben Wilson, Anna Monreale, and Matt Roach. Talking Back — human input and explanations to interactive AI systems.
(5) Siting Liang and Daniel Sonntag. Explainable Biomedical Claim Verification with Large Language Models.
(6) Giuseppe Desolda, Francesco Greco, and Luca Viganò. APOLLO: A GPT-based tool to detect phishing emails and generate explanations that warn users.
(7) Simone Gallo, Sara Maenza, Andrea Mattioli, and Fabio Paternò. Context-dependent Explainable Daily Automations.
(8) Vito Nicola Losavio, Berardina De Carolis, Nicola Macchiarulo, Corrado Loglisci, Maria Grazia Miccoli, and Giuseppe Palestra. XFERa: Xplainable Emotion Recognition

for improving transparency and trust.
(9) Radu-Daniel Vatavu. Explainable Artificial Intelligence Across Various Scales of Interaction and Experience, From Wearable to Ambient.
(10) Carlo Metta, Eleonora Cappuccio, and Salvatore Rinzivillo. Interactive Visual Exploration of Latent Spaces for Explainable AI: Bridging Concepts and Features.
(11) Ulysse Maes, Lien Michiels, and Annelien Smets. Mitigating Misleadingness in LLM-Generated Natural Language Explanations for Recommender Systems: Ensuring Broad Truthfulness Through Factuality and Faithfulness.
(12) Giovanni Arras, Tommaso Turchi, Giuseppe Prencipe, and Giuseppina Sgandurra. Human-Centered Design for Accessible and Sustainable XAI in Healthcare.
(13) Andrea Esposito, Giuseppe Desolda, and Rosa Lanzilotti. Toward a Human-Centered Metric for Evaluating Trust in Artificial Intelligence Systems.

**2.2 Key Themes**
The accepted papers can be grouped into several key themes:

**Novel Applications of LLMs in XAI**
Several papers explore innovative applications of Large Language Models for explainability. Notable contributions include work on biomedical claim verification using LLMs for transparent reasoning and natural language inference, and APOLLO, a GPT-based tool for phishing detection that generates user-friendly explanations. These papers demonstrate both the potential and challenges of using LLMs to generate human-understandable explanations while maintaining faithfulness to the underlying systems.

**Domain-Specific XAI Applications**
The workshop features papers addressing XAI in specific domains:
*Healthcare* Papers exploring accessible and sustainable XAI in clinical settings, facial emotion recognition explanations, and medical image analysis
*Smart Environments* Work on explainable digital twins for energy consumption and context-dependent automation explanations
*Cybersecurity* Research on explainable phishing detection systems
**Human Factors and Evaluation** Several papers focus on the human aspects of XAI:
• Novel evaluation metrics for trust and explanation effectiveness
• Studies on human-feature integration and personalization
• Investigation of bi-directional explanations between humans and AI systems
**Interactive and Visual Explanations** Papers in this theme explore various modalities for delivering explanations:
• Visual exploration of latent spaces for improved interpretability
• Multi-scale XAI interactions from wearable to ambient computing
• Interactive and context-dependent explanations for smart home automations 3 Research Agenda and Future Directions Based on the accepted papers and emerging

• **Responsible LLM Integration**: Developing frameworks for ensuring factuality and faithfulness in LLM-generated explanations while leveraging their natural language capabilities.

• **Context-Aware Adaptivity**: Advancing interfaces that can adapt not only to user preferences but also to different physical scales, contexts, and interaction modalities.
• **Evaluation and Metrics**: Creating standardized approaches for measuring trust, effectiveness, and user understanding of AI explanations across different domains.
• Human-AI Collaboration: Exploring bidirectional explanation flows between humans and AI systems to create more synergistic interactions.
• **Domain-Specific XAI**: Developing specialized approaches for high-stakes domains like healthcare, cybersecurity, and smart environments while ensuring accessibility and sustainability.

These goals align with the broader mission of making AI systems more transparent and user-centered [11], while addressing critical issues such as over-reliance and the integration of human decisionmaking processes.

## 4 Conclusion

The second edition of the Adaptive XAI workshop represents a significant step forward in developing more effective and usercentered explainable AI systems. By bringing together researchers and practitioners from diverse backgrounds, we aim to foster innovations in adaptive interfaces that can make AI systems more transparent and accessible to users across different domains and contexts.

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