Ibrahim Tahmid
XR Researcher

(540) 998-9675
iatahmid@vt.edu

https://iatahmid.github.io/portfolio
linkedin.com/in/iatahmid

XR researcher with a focus on human-centered AI agents to reduce cognitive load. 5 years of experience prototyping and evaluating intelligent XR products for DoD analysts through multi-modal behavioral studies with 200+ users. Proven command of experimental design, mixed-effects modeling, and rapid prototyping of XR experiences, turning research insights into deployable features. First-author on cross-disciplinary work at ISMAR, IUI, and USENIX Sec with over 200 citations, demonstrating proficiency at the intersection of UX, XR, and AI.

SELECTED PROJECTS

Human-Centered AI Interaction Design for XR (4 Projects)   **2021 — Present**
Unity, MRTK, Eye Tracking, Cognition-Aware, Mixed Methods, Varjo XR-3, HoloLens 2, Quest Pro, Transformer   *ISMAR 22,23, IUI 25*

- Introduced the concept of **Rich Semantic Interaction** to predict and act on users' interest from implicit interactions such as gaze, speech, neural signals, etc. Planned **four projects over five years** to hypothesize, design, test, and present the findings to the Department of Defense sponsors, showcasing the implications of the results on increasing the efficiency of intelligence analysts.
- Validated the model's ability to predict user-perceived interest on up to three different levels while discarding noise, even in highly cognitive tasks, laying down the **groundwork for user experiences with human-centered AI**.
- Designed and led a within-subject study (N=27, 3 conditions) to determine the **preferred level of AI assistance** in cognition-heavy tasks. Quantitative measures (completion time, task load, usability) revealed that AI assistance was making them faster, while the qualitative analysis of the semi-structured interviews revealed the users' **desire to have more control and creativity in automated systems**.
- Leveraged LLMs to drive a gaze-aware recommendation engine based on the findings and ran a between-subject study (N=26, 2 conditions) to show that it was up to 90% precise in helping users find interesting information. Statistical analyses showed that the **recommendations were making users up to 28% more efficient** in using their time.
- Identified critical issues with AI-mediated sensemaking through thematic coding of the interview transcripts and turned them into a set of **design guidelines promoting the importance of explainable AI** in human-AI interaction.
- Proposed two types of visual cues to represent the user's evolving interest in an immersive environment, and led a study with 4 conditions to show that the cues can reduce the physical demand of the task.

Hybrid Collaboration in the Immersive Space   **2023 — 2025**
Unity, PUN2, 4-People 3-location Study, Synchronous and Asynchronous Collaboration, Quest Pro   *Finalist, ISMAR Design Contest*

- Recreated a hybrid Zoom meeting scenario in XR to facilitate the social presence and **collaboration between remote and collocated participants** distributed across 3 locations.
- Adapted study and user interaction designs through iterative sessions with 2 collocated, 4 collocated, 2 collocated and 1 remote, and finally, 2 collocated and 2 remote participants. The final iteration involved 4 people in 3 separate locations.
- Designed a mixed-method comparative study (N=32) where the between-subject analysis allowed comparison between AR vs. VR, while the within-subject analysis allowed comparison between remote and collocated.
- Ran a Gini coefficient analysis to show that **collaborators contribute more when everyone is immersive** at the same level on the Milgram-Kishino continuum.

Generative Model to Defend Deep Neural Network Based Text Classifiers   **2019 — 2020**
DNN, LSTM, Bi-LSTM, Transformer, Tensorflow   *Usenix Security 21*

- Developed 'Trojan-Miner (T-Miner)', a robust defense framework against backdoor attacks on **deep neural network text classifiers, leveraging sequence-to-sequence generative models**.
- Achieved **98.75% detection accuracy across 1100 model instances**, including various DNN architectures, classification tasks, and trigger phrases, demonstrating strong robustness with minimal false positives.
- Validated **resilience against advanced adaptive attacks on online safety measures such as fake news detection and social media sentiment analysis**, enhancing trust and integrity in DNN-based NLP system.

SKILLS

HCI/UX	Mixed-Methods Studies, Survey Design, Multi-Modal, Semi-Structured Interviews, Think-Aloud, Statistical Modeling (Python, JMP), Qualitative Coding (Atlas.ti), Figma
XR Prototyping	Unity, Unreal, MRTK, MetaXR, MagicLeap SDK, OpenXR, C#, Python, AndroidXR, Foveated Rendering
AI	Tensorflow, Transformer, LSTM, Bi-LSTM, DNN

EDUCATION

Ph.D., Computer Science, *Virginia Tech, Adv: Doug Bowman & Chris North*   August 2019 — September 2025
Thesis: Toward AI-Mediated Immersive Sensemaking with Gaze-Aware Semantic Interaction
B.Sc., Computer Science, *Bangladesh University of Engineering and Technology (BUET)*   February 2013 — September 2017

Professional Experience

Graduate Research Assistant   **August 2019 — Present**
3D Interaction Group, Virginia Tech

- Conducted systematic literature review of 150+ academic articles in intelligent immersive analytics and identified two enhancement opportunities for foraging and synthesis.
- Rapidly built and iterated high-fidelity XR prototypes in Unity across Quest Pro, Magic Leap 2, Varjo XR-3, and HoloLens 2, adapting research protocols to intuitive user experiences and showcasing platform-agnostic development agility.
- Applied advanced statistical modeling (mixed-effects, ANOVA, time-series) to multimodal datasets, triangulating quantitative and qualitative measures to deliver data-backed design recommendations.
- Synthesized findings into peer-reviewed research papers and conference talks, presenting to cross-functional teams (engineers, analysts, executives) and mentoring junior researchers.

Interim Engineering Intern   **May 2025 — August 2025**
XR Systems, Qualcomm

- Analyzing the latency distribution in the life of an eye-tracked frame in AndroidXR and showcasing findings with novel visualization techniques. Streamlined the workflow of optimizing eye-tracked foveated rendering, reducing up to 75% workload.
- Designed and led a study evaluating the effects of inaccuracy, latency, and frequency of ET camera on the foveated image quality.

Graduate Scholar Intern   **June 2022 — August 2022**
Lawrence Livermore National Lab

- Mastered Unreal Engine in under eight weeks and spearheaded a cross-disciplinary initiative to prototype XR workflows for collaborative defect detection in additive-manufacturing models.
- Devised and implemented three research-backed visualization/interaction paradigms (selective occlusion culling, layered transparency, and spatial annotations) that enable both synchronous and asynchronous inspection of 3D-printed models; tested the system with manufacturing engineers and presented results to executive stakeholders, paving the way for a multi-year research grant in partnership with Virginia Tech.

Full Stack Software Developer   **November 2017 — July 2019**
Reve Systems

- Led a cross-functional team in modernizing the legacy Android app experience with 1M+ downloads and 20K+ concurrent users; combined heuristic audits and in-app telemetry to drive design iterations that increased daily retention by 18%.
- Architected and optimized a MySQL data pipeline ingesting 50M+ user-interaction events per week, delivering real-time behavioral dashboards that fueled A/B experiments, cohort analyses, and evidence-based UX road-map decisions.

Leadership and Honors

Mentoring: *Ayush Roy (Ph.D.), Tanya Dinesh (Masters), Rehnuma Taskin (Undergrad)*	2024 – Present
Leading Community-Driven Research: *Cranwell, Association for Bangladeshi Students*	2023 – Present
Big Idea Winner, *for proposing a detailed research pathway to ubiquitous context-aware XR*	VT CHCI Workshop, 2025
Aspire Winner, *for pursuit of building common ground through creative, thoughtful, and impactful projects*	Virginia Tech, 2024
Winner of 3D User Interface Design Contest, *for educational XR experience with novel interaction techniques*	IEEEVR 2021, 2022

Selected Publications

1. Tahmid et al. Enhancing immersive sensemaking with gaze-driven recommendation cues. In *Proceedings of the 30th International Conference on Intelligent User Interfaces*, pages 641–659, 2025

2. Tahmid et al. Evaluating the feasibility of predicting information relevance during sensemaking with eye gaze data. In *2023 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, pages 713–722, Sydney, Australia, 2023. IEEE

3. Tahmid et al. Evaluating the Benefits of Explicit and Semi-Automated Clusters for Immersive Sensemaking . In *2022 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, pages 479–488, Los Alamitos, CA, USA, October 2022. IEEE Computer Society

4. Tahmid et al. Colt: Enhancing collaborative literature review tasks with synchronous and asynchronous awareness across the reality-virtuality continuum. In *2023 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*. IEEE, 2023