

ANAM AHMAD KHAN, PH.D.

Postdoctoral Researcher in Human Computer Interaction

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ABOUT

I am a researcher working at the intersection of Human-Computer Interaction (HCI) and Artificial Intelligence (AI), affiliated with the **Make Lab research group at KAIST**. Prior to this, I was associated with the **Interactive Systems research group at Lancaster University**. I hold a Doctoral degree from the **Human-Computer Interaction group at The University of Melbourne**.

RESEARCH INTEREST AND EXPERTISE

My research interests lie at the intersection of **Human-Computer Interaction**, **Machine Learning**, and **Educational Technologies**, with a focus on understanding and improving how people interact with digital information. My work explores themes such as **multimodal and implicit interaction**, **intelligent and adaptive user interfaces**, **note-taking and reading practices in digital environments**, and contextual modeling of sensor and interaction data.

At a higher level, my research is guided by two overarching questions: **How can user interfaces be augmented with intelligence to support interaction?** and **What insights about human behavior can be derived from interaction and sensor data**. Addressing these questions enables interdisciplinary collaboration across computer science, cognitive science, and education research, with the goal of designing systems that are both technically robust and human-centered.

EDUCATION

Doctor of Philosophy (Engineering)

The University of Melbourne, Australia

📅 Jan 2018 - Feb 2022

Thesis title: Gaze and Voice Assisted Note-taking: Towards Improved Digital Text Comprehension

Field of Research: Computer-Human Interaction; Pattern Recognition and Data Mining

Supervisors: Prof. James Bailey and Dr. Eduardo Velloso

Masters in Information Technology

The University of Melbourne, Australia

📅 Feb 2017 - Dec 2017

Graduated with Distinction – Dean's Honours List

B.Sc. in Computer Science

National University of Science and Technology, Pakistan

📅 Sept 2012 - June 2016

GPA: 3.91/4

Field of Research: Computer Vision

Thesis Topic: Real time lane detection on a lower resource platform

Supervisor: Prof. Faisal Shafait

RESEARCH EXPERIENCE

Post- Doctoral Fellow

MAKE Lab, KAIST

📅 June 2025 - Present

📍 South Korea

In this role, I actively contribute to multiple research projects aimed at **developing creativity support tools**. These projects are conducted and supervised by A Prof. Andrea Bianchi (<https://make.kaist.ac.kr/about>). Specifically, my research explored how gaze and speech can be effectively used for human-computer interaction, including gaze as an input modality for programming and coding tasks, as well as the design and evaluation of interactive tools that support creativity and expressive work.

Research Associate

Interactive Systems Research Group, Lancaster University

📅 March 2023 – April 2025

📍 United Kingdom

In this role, I actively contribute to 5+ research projects aimed at **advancing interaction methods employing eye, head, and body movements**. These projects are conducted within the framework of an ERC Advanced Grant project, which are supervised by Prof. Hans Gellersen (<https://gemini-erc.eu/>). In this position, my research focuses on investigating the collaborative use of eye and head input to understand and model attention shifts in VR environments

Research Assistant

School of Computing and Information Systems, The University of Melbourne

📅 Jan 2018 – Feb 2022

📍 Australia

I have provided research assistance for projects at the Microsoft Research Centre for Social NUI, including software development, data analysis and dissemination of results. My contribution in these projects involved using **data science skills on sensor data** of users for understanding their cognitive state for domains such as learning analytics and attention aware systems.

Research Intern

Hungary

📅 July 2015 – May 2016

📍 New York, United States

In this role, I contributed to a project focused on developing a real-time lane detection and tracking system tailored for heavy vehicles in complex environments. My role involved developing the algorithm of the system using computer vision techniques that focus on optimizing the convergence points of tracked lanes.

TEACHING EXPERIENCE

Sessional Lecturer

School of Electrical Engineering and Computer Science, National University of Science and Technology

📅 June 2022 – Jan 2023

📍 Pakistan

As a lecturer, I undertook the sole responsibility of research in HCI and teaching two undergraduate-level courses, namely Computer Architecture and Organization, and Fundamentals of ICT, throughout my tenure. My role encompassed delivering lectures, designing course structures, modules, and teaching material for these subjects. Additionally, I was responsible with developing, evaluating, and moderating examinations and assessments for both courses. Furthermore, I conducted independent research leading to two CHI publications and provided supervision for students' research projects, ensuring their progress and success.

Teaching Assistant

School of Computing and Information Systems, The University of Melbourne

📅 Feb 2018 – Dec 2021

📍 Australia

The role involved developing tutorials and assignment material, delivering tutorials, developing rubrics for marking assignments, marking student-generated material, guiding and mentoring student group projects and holding office hours to provide support at both postgraduate and undergraduate level for five subjects: Artificial Intelligence, Machine Learning (Head teaching associate) Elements of Data Processing (Head teaching associate), Introduction to Python Programming and Algorithm and Data Structures.

Research Mentoring

KAIST & Lancaster University

📅 Feb 2023 – Present

📍 United Kingdom

I have mentored 6+ research students as part of my academic training, which has resulted in authored publications at top tier venues and ongoing collaborations.

Jungwoo Rhee (Phd project), KAIST - Video Prototyping in XR.

Heeji Kim (Masters project), KAIST - Augmenting Brainsketching by Atomizing Generative Visual Outputs.

Guanlin Li (Masters project), Lancaster University - Understanding ergonomics in Extended Reality interaction.

Baosheng James Hou (Masters project), Lancaster University - Eye-head-based interaction techniques in Virtual Reality.

Sophia Quesada (BSc Final Year Project), Lancaster University - Eye Gesture Recognition using Electrooculography for Eye-Based Interaction

Alexandra Gerbert (BSc Final Year Project), Lancaster University - Pointing in the Ground in XR

AWARDS, PATENT, GRANT

Jang Young Sil Fellow - 2025

Secured the Jang Young Sil Fellowship to conduct academic research at KAIST

System and Method for Audio Annotation, International Patent Application

4 April 2022, App. No. PCT/AU2020/050926 with The University of Melbourne (First inventor)

PhD Travel Scholarship - 2018

Awarded by Microsoft Research Centre for Social NUI Valued at \$3,000

Melbourne Graduate Research Scholarship - 2018

Awarded by The University of Melbourne to undertake doctoral degree. Valued at \$100,000

Dean's Honours List - 2017

Awarded to recognize the outstanding academic performance during postgraduate studies.

Melbourne School of Engineering Scholarship - 2017

Awarded to undertake postgraduate studies. Valued at \$15,000

Rector's Gold medal - 2016

Awarded to the student who submits the best undergraduate thesis.

Presidential Gold medal - 2016

Awarded to the student graduating top of the class from undergraduate studies.

Best Industry Judged Project - 2016

Awarded to the student who presents the best undergraduate projects, judged by an industry panel

KEY SKILLS

Tools and Libraries

Unity, Pandas, Keras, Sklearn, SteamVR, Visual Studio, OpenCV

Quantitative

Experimental Design, Laboratory Studies, Questionnaires, Machine and deep learning, Data Wrangling and Analysis, Explainable AI using SHAP, Natural Language Processing, Statistical Analysis

Qualitative

Semi-structured interview, Contextual inquiring, Thematic Analysis

Languages

Python, R, Java, C#, C++

Other Skills

Usability testing, Prototyping for VR, mobile and desktop applications, Eye Tracking, Thermal Imaging

WORKSHOP ORGANISED

Workshop on Gaze and Eye Movement in Interaction in XR (GEMINI) at IEEE VR 2024, IEEE VR 2025 & IEEE VR 2026

The objective of this workshop is to bring together researchers and practitioners from different domains to discuss gaze-based research, such as 3D user interfaces, applications, and gaze analysis in XR, and to reflect on the current state and future directions of gaze-based interaction in shaping the future of XR (<https://sites.google.com/view/w-gemini/>).

INVITED TALKS

Gaze-assisted Interaction

1 November 2024, MAKE LAB, KAIST, South Korea

Gaze-assisted Interaction for Affecting Computing

28 Oct 2024, Ubiquitous Affective Computing and Health Informatics (UACHI) Workshop, KAIST, South Korea

Gaze-assisted Interaction

11 Oct 2024, UVR Lab, KAIST, South Korea

Exploring Planned and Feature-driven Attention Shift Using Eye and Head Dynamics

24 Jan 2024, 6th GEMINI Lancaster-Aarhus Workshop, Lancaster University, United Kingdom

Gaze and Voice Assisted Note-taking: Towards Digital Text Comprehension

16 July 2021, Institute for Visualization and Interactive Systems (VIS) The University of Stuttgart, Germany

Gaze Assisted Voice Note Taking System

11 September 2019, Doctoral colloquium presentation at 21st International Conference on Ubiquitous and Pervasive Computing (Ubicomp) 2019, London United Kingdom

Gaze Assisted Voice Note Taking System

16 September 2019 HCI Seminar Series, The University of Melbourne, Australia

ACADEMIC SERVICE

Invited Program Committee Membership

Associate Chair, Blending Interaction Committee, CHI 2026

Associate Editor, Program Committee, ETRA Short Papers 2024

Program committee member, Workshop on Advancing Physiological Methods in Human-Information Interaction (APhyMeHII), at UbiComp/ISWC 2024

Journal Reviewer

International Journal of Human - Computer Studies (2025)

ACM Transactions on Computer-Human Interaction (TOCHI, 2025)

IEEE Transactions on Education (2024)

Proceedings of the ACM on Interactive, Mobile, Wearable & Ubiquitous Technologies (IMWUT,2020, 2021, 2024)

Conference Reviewer

ACM Conference on Designing Interactive Systems (DIS, 2024)

ACM Conference on Computer-Human Interaction (CHI, 2022-2024)

ACM Symposium on Eye Tracking Research & Applications (ETRA, 2023 – 2024)

ACM International Conference on Multimodal Interaction (ICMI 2023)

ACM International conference on Mobile Human-Computer Interaction (MobileHCI, 2020)

Australian Conference on Human-Computer Interaction (OzCHI, 2020)

PUBLICATIONS

Journal Articles

- Khan, A A, Hou, B. J., & Gellersen, H. (2026). Directed or guided? classification of gaze attention shifts based on eye and head movement. *Proc. ACM Hum.-Comput. Interact.*, 10(ETRA). doi:10.1145/3806016
- Lee, G., Khan, A A, & Bianchi, A. (2026). Passthrough cognitive assistant: Xr-based ai support for interpreting real-world visual media. *HCI Korea*.
- Rhee, H., Khan, A A, & Bianchi, A. (2026). Understanding xr-supported creative collaboration in music through a domain-specific lens. *HCI Korea*.
- Hou, B. J., Newn, J., Sidenmark, L., Khan, A A, & Gellersen, H. (2024). Gazeswitch: Automatic eye-head mode switching for optimised hands-free pointing. *Proc. ACM Hum.-Comput. Interact.*, 8(ETRA). doi:10.1145/3655601
- Nawaz, S., Srivastava, N., Yu, J. H., Khan, A A, Kennedy, G., Bailey, j., & Baker, R. S. (2022). How difficult is the task for you? modelling and analysis of students' task difficulty sequences in a simulation-based poe environment. *International Journal of Artificial Intelligence in Education*, 32(2), 233–262.
- Khan, A A, Newn, J., Kelly, R. M., Srivastava, N., Bailey, j., & Velloso, E. (2021). Gavin: Gaze-assisted voice-based implicit note-taking. *ACM Trans. Comput.-Hum. Interact.*, 28(4). doi:10.1145/3453988
- Brishtel, I., Khan, A A, Schmidt, T., Dingler, T., Ishimaru, S., & Dengel, A. (2020). Mind wandering in a multimodal reading setting: Behavior analysis & automatic detection using eye-tracking and an eda sensor. *Sensors*, 20(9), 2546.
- Abdelrahman, Y., Khan, A A, Newn, J., Velloso, E., Safwat, S. A., Bailey, j., ... Schmidt, A. (2019). Classifying attention types with thermal imaging and eye tracking. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, 3(3), 1–27.

Conference Proceedings

- Khan, A A, Weidner, F., Rhee, J., Abdrabou, Y., Bianchi, A., Velloso, E., ... Newn, J. (2026). Gaze and speech in multi-modal human-computer interaction: A scoping review. In *Chi conference on human factors in computing systems*. doi:10.1145/3772318.3791662
- Hou, B. J., Newn, J., Sidenmark, L., Khan, A A, Bækgaard, P., & Gellersen, H. (2023). Classifying head movements to separate head-gaze and head gestures as distinct modes of input. In *Proceedings of the 2023 chi conference on human factors in computing systems*. doi:10.1145/3544548.3581201
- Newn, J., Quesada, S., Hou, B. j., Khan, A A, Weidner, F., & Gellersen, H. (2023). Exploring eye expressions for enhancing eog-based interaction. In *Human-computer interaction – interact 2023: 19th ifip tc13 international conference, york, uk, august 28 – september 1, 2023, proceedings, part iv* (pp. 68–79). doi:10.1007/978-3-031-42293-5_6
- Khan, A A, Nawaz, S., Newn, J., Kelly, R. M., Lodge, J. M., Bailey, j., & Velloso, E. (2022). To type or to speak? the effect of input modality on text understanding during note-taking. In *Chi conference on human factors in computing systems*. doi:10.1145/3491102.3501974
- Khan, A A, Newn, J., Bailey, H., & Velloso, E. (2022). Integrating gaze and speech for enabling implicit interactions. In *Chi conference on human factors in computing systems*. doi:10.1145/3491102.3502134
- Abdrabou, Y., Shams, A., Mantawey, M., Khan, A A, Khamis, M., Alt, F., & Abdelrahman, Y. (2021). Gazemeter: Exploring the usage of gaze behaviour to enhance password assessments. In *Proceedings of the 11th acm symposium on eye tracking research & applications*.
- Irshad, A., Khan, A A, Yunus, I., & Shafait, F. (2017). Real-time lane departure warning system on a lower resource platform. In *2017 international conference on digital image computing: Techniques and applications (dicta)* (pp. 1–8). IEEE.
- Naz, T., Khan, A A, & Shafait, F. (2017). Ubiquitous document capturing with deep learning. In *2017 international conference on digital image computing: Techniques and applications (dicta)* (pp. 1–8). IEEE.

Doctoral Consortia, Workshop Papers & Posters

- Li, G., Weidner, F., Khan, A A, Wang, H., Hu, J., & Gellersen, H. (2026). Straingain: Neck strain amplifies head pointing in vr. Accepted for publication in the Proceedings of the 2026 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW).
- Khan, A A. (2019). Gaze assisted voice note taking system. In *Adjunct Proceedings of the 2019 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2019 ACM International Symposium on Wearable Computers* (pp.367–371).
- Wang, H., Gerbert, A., Weidner, F., Khan, A A, Abdrabou, Y., Lee, H. S., & Gellersen, H. (2026). Exploring relative mapping for parabolic ground pointing in vr: Lessons learned and future directions. Accepted for publication in the Proceedings of the 2026 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW).

In Submission

- Lee, H. S., Weidner, F., Khan, A A, & Gellersen, H. (n.d.). *Gaze-based viewport control for 360° videos in vr head-mounted displays*. Under Submission at TOCHI.
- Li, G., Weidner, F., Khan, A A, Wang, H., Hu, J., & Gellersen, H. (n.d.). *Neckergonomics: Adapting head movement and pose in head-mounted displays based on neck muscle activity*. Under Submission at AVI, 2026.

REFEREES

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