Kevin Fan

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EXPERIENCE

Senior Research Engineer
Fujitsu

10/2023 – Current
Vancouver, Canada

- Develop a Digital Twin simulation platform for global supply chain analytics, integrating XR for interactive visualization and GenAI assistant for real-time decision-making.
- Build a synthetic data generation pipeline for computer vision, leveraging MetaHuman, Mass, Motion Matching, Chaos Physics (Unreal Engine/C++/Python).

Senior HCI Researcher
Huawei

03/2019 – 09/2023
Toronto, Canada

- Research and develop interactive systems and IP, for emerging technology and products in the areas of smartphones, watches, headsets, vehicle infotainments.
- Lead and deliver 4 R&D projects, managing a team of engineers and designers.
- 8 patents filed (6 granted and 2 pending).

Deep Learning Engineer
WrnchAI

04/2018 – 02/2019
Montreal, Canada

- Engineered a human pose estimation pipeline including data preprocessing, heatmap generation, data augmentation in Tensorflow (C++/Python) based on RGB camera image.
- Utilized a VGG based CNN architecture for facial keypoints training and estimation (Python).

Research Assistant & Postdoctoral Researcher
National Institute of Advanced Industrial Science and Technology

04/2016 – 03/2018
Tokyo, Japan

- Developed VR support (C++/Oculus native SDK) for a Windows digital human software, enabling the VR experience of embodying diverse digital humans with motion capture.
- AR utilizing HoloLens for bringing digital humans to the real environment evaluation (Unity).
- Using XR to augment human ergonomics analysis for consumer products.

Research Intern
Microsoft Research Asia

05/2015 – 11/2015
Beijing, China

- Designed and built PCB for electric muscle stimulation as a channel for user notification.

Research Intern
Singapore University of Technology and Design

11/2013 – 01/2014
Singapore

- Developed custom video passthrough HMD with Oculus DK1 using native SDK(C++/OpenGL) with webcams and utilize computer vision optical flow analysis for motion detection.

EDUCATION

Keio University
Ph.D. in Human-Computer Interaction
Awards: Microsoft Research Asia Fellowship | Keio University Research Grant

Tokyo, Japan
09/2013 – 03/2017

Keio University
Master in Human-Computer Interaction
Awards: Young Researcher's Award (Virtual Reality Society of Japan) | MEXT Scholarship

Tokyo, Japan
09/2011 – 08/2013

University of British Columbia
Bachelor of Applied Science in Software Engineering
Awards: President's Entrance Scholarship | B.C. Government Scholarship

Vancouver, Canada
09/2006 – 06/2010

TECHNICAL SKILLS

Languages: C++, C#, Python, Kotlin
XR HMDs: Oculus (Meta), HTC VIVE, HoloLens, GearVR/Cardboard (Android)
XR/Simulation Engines: Unity, UE5, Nvidia Omniverse
Motion Capture: OptiTrack, Vicon, Leap Motion, Kinect
Machine Learning: Scikit-learn, PyTorch, Tensorflow
Hardware Tinkering: Arduino, Raspberry Pi, 3D Printing

Patents & Publications

Patents

- **Fan, S. W.**, Deng, Y., and Ye, J. (2024). Methods and systems for preventing motion sickness via postural analysis. US Patent App. 18/062,553

- Khan, T. A., **Fan, S. W.**, Changqing, Z., Xu, J., and Li, W. (2024). Devices, methods, systems, and media for an extended screen distributed user interface in augmented reality. US Patent 12,093,704

- **Fan, S. W.** (2023). Systems and methods for classifying touch events based on relative orientation. US Patent 11,797,100

- Changqing, Z., Akhtar, Y. W., **Fan, S. W.**, Xu, J., and Li, W. (2023). Methods and systems for rendering virtual objects in user-defined spatial boundary in extended reality environment. US Patent 11,640,700

- Khan, T. A., **Fan, S. W.**, and Li, W. (2023). Systems and methods for prediction-based driver assistance. US Patent 11,794,766

- Khan, T. A., **Fan, S. W.**, Changqing, Z., and Li, W. (2022). Devices, methods, systems, and media for selecting virtual objects for extended reality interaction. US Patent 11,327,630

- **Fan, S. W.**, Khan, T. A., and Li, W. (2022). Methods and systems for selection of objects. US Patent 11,475,642

- **Fan, S. W.**, Hengguang, Z., Xu, Q., and Li, W. (2021). System and method for video processing using a virtual reality device. US Patent App. 17/244,807

Publications

- Patel, S. G., Dufresne-Camaro, C.-O., Sakamoto, Y., **Fan, K.**, Hasan, K., and Irani, P. (2023). On the road to productivity: Investigating text-presentation techniques and audio assistance for non-driving tasks in conditionally automated vehicles. In *Proc. MUM 2023*, pages 122–133

- Bardot, S., Rey, B., Audette, L., **Fan, K.**, Huang, D.-Y., Li, J., Li, W., and Irani, P. (2022). One ring to rule them all: An empirical understanding of day-to-day smartring usage through in-situ diary study. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, 6(3):1–20

- Herath, A., Rey, B., Bardot, S., Rempel, S., Audette, L., Zheng, H., Li, J., **Fan, K.**, Huang, D.-Y., Li, W., et al. (2022). Expanding touch interaction capabilities for smart-rings: An exploration of continual slide and microroll gestures. In *Proc. CHI EA 2022*, pages 1–7

- Bardot, S., Rawat, S., Nguyen, D. T., Rempel, S., Zheng, H., Rey, B., Li, J., **Fan, K.**, Huang, D.-Y., Li, W., et al. (2021). Aro: Exploring the design of smart-ring interactions for encumbered hands. In *MobileHCI 2021*, pages 1–11

- Faleel, S. A., Gammon, M., **Fan, K.**, Huang, D.-Y., Li, W., and Irani, P. (2021). Hpui: Hand proximate user interfaces for one-handed interactions on head mounted displays. *IEEE TVCG*, 27(11):4215–4225

- Saniee-Monfared, G., **Fan, K.**, Xu, Q., Mizobuchi, S., Zhou, L., Irani, P. P., and Li, W. (2020). Tent mode interactions: Exploring collocated multi-user interaction on a foldable device. In *Proc. MobileHCI 2020*, pages 1–12

- **Fan, K.**, Murai, A., Miyata, N., Sugiura, Y., and Tada, M. (2017). Multi-embodiment of digital humans in virtual reality for assisting human-centered ergonomics design. *Augmented Human Research*, 2:1–14

- **Fan, K.**, Chan, L., Kato, D., Minamizawa, K., and Inami, M. (2016). Vr planet: interface for meta-view and feet interaction of vr contents. In *ACM SIGGRAPH 2016 VR Village*, pages 1–2

- **Fan, K.**, Huber, J., Nanayakkara, S., and Inami, M. (2014). Spidervision: extending the human field of view for augmented awareness. In *Proc. 5th augmented human international conference*, pages 1–8

- Low, S., Sugiura, Y., **Fan, K.**, and Inami, M. (2013). Cuddly: enchant your soft objects with a mobile phone. In *SIGGRAPH Asia 2013 Emerging Technologies*, pages 1–2

- **Fan, K.**, Izumi, H., Sugiura, Y., Minamizawa, K., Wakisaka, S., Inami, M., Fujii, N., and Tachi, S. (2013). Reality jockey: lifting the barrier between alternate realities through audio and haptic feedback. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 2557–2566

Academic Service

Reviewer

CHI '21'24 | UIST '16'19'23 | ISMAR '23 | IEEE VR '15'16'18'19 | TEI '17'18'19'21'22'23'24 | SIGGRAPH Asia '17'20 | Informatics '17 | Nature Scientific Reports '16 | AH '14'20

Committee

MobileHCI 2022 Student Design Competition Co-Chair