Glenn Fernandes

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4th Year, Ph.D. candidate, Computer Science + Preventive Medicine glenn124f.github.io

I'm passionate about interdisciplinary research at the intersection of technology, healthcare, and data science, focusing on developing impactful platforms and tools for broad societal impact. This includes designing end-to-end mobile health systems to detect health-risk behaviors and creating interpretable ML tools that facilitate a deeper understanding of health data for users and healthcare professionals.

Interests: wearables, sensing, mobile health, computer vision, embedded ML, visualization, explainable AI

Education

2020 – 2025 Northwestern University, Chicago, IL, United States
Ph.D. Candidate, Computer Science, Advisor: Nabil Alshurafa
Thesis: From sensing to digital biomarkers

2020 – 2022 Northwestern University, Chicago, IL, United States
M.S. Computer Science, GPA: 4.0/4.0
Relevant Coursework: Machine Learning, Interactive Information Visualization, Generative Methods, Interactive Systems for Health, Wireless and Mobile Health, Microprocessors System Design, Bioelectronics

2014 – 2019 Birla Institute of Technology & Science (BITS), Pilani, India
Dual Degree, B.E. (Hons.) in Electrical and Electronics Engineering and
M.Sc. (Hons.) in Biological Sciences
Thesis at Fluid Interfaces, MIT Media Lab: PAL, A Wearable Platform for Real-time, Personalized and Context-Aware Health and Cognition

Experience

Summer '23 **Dolby Laboratories**, *Research Intern*, Sunnyvale, CA, United States.
Designed and developed a wearable haptic system synced with audio-visual content.
Conducted psychophysics studies to test the efficacy of the system

2019 – 2020 **MIT Media Lab**, *Researcher at Fluid Interfaces*, Cambridge, MA, United States.
Designed and developed a wearable camera system with open-ear audio for personalized context-aware behavior and habit change interventions using on-device deep learning.
`https://www.media.mit.edu/projects/pal/overview/`

Aug – Dec 18 **Indian Institute of Science (IISc)**, *Researcher*, Bangalore, KA, India.
Designed experiments and measured the neural correlates of key components of attention, namely sensitivity and bias, using behavioral psychophysics and electroencephalography

Summer 2018 **Google Summer of Code**, *Student*, Stemformatics: The University of Melbourne, Remote.
Designed a web interface to enable stem cell scientists to ease the entry of biological data and the ability to annotate, categorize, analyze, and work on it.
Medium Blog Link

Current Projects

2022 - now HabitSense: Low power wearable camera system (RGB-Thermal) for real-time eating and smoking detection *[Embedded ML][Video Understanding]*

2022 - now HealthSense: Predicting blood pressure using a combined ECG and PPG flexible sensor *[Signal Processing][Deep Learning]*

Publications

IMWUT 2024 **Fernandes, Glenn**, Jiayi Zheng, Mahdi, Christopher Romano, Farzad Shahbi, Blaine Rothrock, Thomas Cohen, Helen Zhu, Tanmeet Butani, Josiah Hester, Aggelos Katsaggelos, Nabil Alshurafa. HabitSense Experience: Design, Development and Evaluation of a Privacy Conscious Wearable Camera for mHealth Applications ACM IMWUT, Interactive, Mobile, Wearable and Ubiquitous Technologies. Under Review

FAcct 2024 Ulloa, M., **Fernandes, G.**, Kamali, N, Soyemi, E., Beltzer, M., Kaveladze, B., Kornfield, R., Alshurafa, N. Jacobs, M. Patient ML Design Toolkit: Integrating Patients Perspectives into Health Tools Using Machine Learning. ACM FAccT, Conference on AI Fairness, Accountability, and Transparency. Under Review

JMIR 2023 **Fernandes, Glenn J.**, Arthur Choi, Jacob Michael Schauer, Angela F. Pfammatter, Bonnie J. Spring, Adnan Darwiche, and Nabil I. Alshurafa. An Explainable Artificial Intelligence Software Tool for Weight Management Experts (PRIMO): Mixed Methods Study. Journal of Medical Internet Research 25 (2023): e42047. https://doi.org/10.2196/42047

CHI 2023 **Fernandes, Glenn**, Helen Zhu, Mahdi Pedram, Jacob Schauer, Soroush Shahi, Christopher Romano, Darren Gergle, and Nabil Alshurafa. Is cartoonized life-vlogging the key to increasing adoption of activity-oriented wearable camera systems? In Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, pp. 1-8. 2023.https://doi.org/10.1145/3544549.3585812

CHI 2023 **Fernandes, Glenn**, Mahdi Pedram, and Nabil Alshurafa. Preventing Prototyping Pitfalls and Going Beyond: A Strategy for Affordable and Modular Wearable Embedded Systems.. In Beyond Prototyping Boards Workshop at 2023 CHI Conference on Human Factors in Computing Systems.

CHI 2023 Pedram, Mahdi, **Glenn Fernandes**, Christopher Romano, Boyang Wei, Sougata Sen, Josiah Hester, and Nabil Alshurafa. Experience: Barriers and Opportunities of Wearables for Eating Research. In Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, pp. 1-8. 2023. https://doi.org/10.1145/3544549.3573841

CHI 2022 **Fernandes, Glenn**, Arthur Choi, Maia Jacobs and Nabil Alshurafa. Do Exact Explanations Make a Difference? A Case Study Among Weight Management Experts.. In Trust and Reliance in AI-Human Teams (TRAIT) Workshop at 2022 CHI Conference on Human Factors in Computing Systems. https://cs.kennesaw.edu/~achoi13/assets/pdf/FCJDA22.pdf

IEEE BSN 2022 Shahi, Soroush, Mahdi Pedram, **Glenn Fernandes**, and Nabil Alshurafa. SmartAct: Energy Efficient and Real-Time Hand-to-Mouth Gesture Detection Using Wearable RGB-T. In 2022 IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks (BSN), pp. 1-4. IEEE, 2022. https://doi.org/10.1109/BSN56160.2022.9928492

SBM 2022 **Fernandes, Glenn**, Arthur Choi, Angela F. Pfammatter, Bonnie Spring, Adnan Darwiche, and Nabil Alshurafa. Weight-Loss Prediction: A Mobile Health Case Study of Explainable AI. In Annals of Behavioral Medicine, vol. 56, no. SUPP 1, pp. S678-S678. Journals dept, 2001 Evans RD, Cary, NC 27513 USA: Oxford Univ Press INC, 2022. https://academic.oup.com/abm/article/56/Supplement_1/S1/6572209

UMAP 2021 Khan, Mina, **Glenn Fernandes**, Akash Vaish, Mayank Manuja, and Pattie Maes. Wearable System for Personalized and Privacy-preserving Egocentric Visual Context Detection using On-device Deep Learning. In Adjunct Proceedings of the 29th ACM Conference on User Modeling, Adaptation and Personalization, pp. 35-40. 2021. https://doi.org/10.1145/3450614.3461684

Persuasive 2021 Khan, Mina, **Glenn Fernandes**, and Pattie Maes. Users want diverse, multiple, and personalized behavior change support: Need-finding survey. In International Conference on Persuasive Technology, pp. 245-255. Cham: Springer International Publishing, 2021. https://doi.org/10.1007/978-3-030-79460-6_20

Persuasive 2021 Khan, Mina, **Glenn Fernandes**, Akash Vaish, Mayank Manuja, Pattie Maes, and Agnis Stibe. Improving context-aware habit-support interventions using egocentric visual contexts. In International Conference on Persuasive Technology, pp. 115-131. Cham: Springer International Publishing, 2021. https://doi.org/10.1007/978-3-030-79460-6_10

Augmented Humans 2021 Khan, Mina, **Glenn Fernandes**, and Pattie Maes. PAL: Wearable and Personalized Habit-support Interventions in Egocentric Visual and Physiological Contexts. In Proceedings of the Augmented Humans International Conference 2021, pp. 265-267. 2021. https://doi.org/10.1145/3458709.3458963

IUI 2021 Khan, Mina, **Glenn Fernandes**, and Pattie Maes. PAL: Privacy-preserving Audio, Visual, and Physiological Contexts for Wearable Context-aware Behavior Change Support. In IUI Workshops. 2021. https://ceur-ws.org/Vol-2903/IUI21WS-HEALTHI-6.pdf

SIGGRAPH 2020 Pataranutaporn, Pat, Ali Shtarbanov, **Glenn Fernandes**, Jingwen Li, Parinya Punpongsanon, Joe Paradiso, and Pattie Maes. Wearable Sanitizer: Design and Implementation of an Open-source, On-body Sanitizer. In SIGGRAPH Asia 2020 Emerging Technologies, pp. 1-2. 2020. https://doi.org/10.1145/3415255.3422897

Skills

Software Python, C/C++, Firmware - RTOS, Web-Dev (HTML, CSS, JS, D3.js), Tableau

Hardware Embedded Development, Circuit Design (KiCAD), AutoCAD, 3D Design (Fusion360) and 3D printing (Formlabs)

Language English, Hindi

Services

Reviewer 2023: CHI

Teaching Experience

2023 Spring Instructor, Computing Everywhere Workshop on *Detecting human activities using wearable sensors*

2023 Winter Teaching Assistant, Wireless and Mobile Health, Computer Science, Northwestern University. *Assisting students in embedded development projects for mobile health applications*

2018 – 2019 Teaching Assistant, Wireless and Mobile Communication, Work Integrated Learning Program (WILP) at BITS Pilani. *Designed teaching material and test questions for Master's course on wireless and mobile communications*

AWARDS

2024 Presidential Fellowship Nominee, Computer Science, Northwestern University
2023 IBM Research Fellowship Nominee, Computer Science, Northwestern University
2019 Travel Grant Thesis Abroad, International Program and Collaboration Division, BITS Pilani
2019 Summer Internship Assistance, BITS Pilani Alumni
2017 Codechef Snackdown Qualifier Round
2016 Arduino Open Winner at Quark (BITS Pilani Technical Fest)
2015 Cubing Challenge (Blindfolded) Winner at Waves (BITS Pilani Cultural Fest)
2012 Inspire Scholarship (12th Grade) - Top 1% in Maharashtra State Board Examination

Press

2024 The AI Will See You Now
`https://magazine.northwestern.edu/features/artificial-intelligence-medicine-health-care-abel-kho-sanjiv-shah-brenna-argall-molly-losh-maia-jacobs-nabil-alshurafa/`

2023 Patient-Focused AI System Seeks to Reduce Stress during Pregnancy
`https://casmi.northwestern.edu/news/articles/2023/patient-focused-ai-system-seeks-to-reduce-stress-during-pregnancy.html`

2023 Changing Behaviors with Technology, Society of Behavioral Medicine (SBM)
`https://www.youtube.com/watch?v=bm6UjVNdwuM`
`https://www.sbm.org/about`

Affiliations

Center for Advancing Safety of Machine Intelligence (CASMI)

Hobbies

Speed Cubing (3x3x3 Cube), Music - Guitar, Piano, Swimming, Urban Sketching