Sidharth Kaliappan

PhD Student, Manning College of Information and Computer Sciences, University of Massachusetts Amherst, Amherst, MA, USA
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RESEARCH INTERESTS

Human-Computer Interaction, Personal Health Informatics, Self-Tracking and Self-Experimentation, Conversational AI for Health, Aging and Technology, Digital Health Interventions, Stress Management, AI-Assisted Health Systems

EDUCATION

University of Massachusetts Amherst, Amherst, MA, USA — August 2023 — May 2028 (Expected)
Doctor of Philosophy in Computer Science — GPA: 3.88/4.0
Advisor: Dr. Ravi Karkar
Dissertation Focus: Conversational AI Systems for Personal Health Informatics

University of Geneva, Geneva, Switzerland — September 2019 — February 2022
Master of Science in Computer Science — GPA: 5.75/6.0
Thesis: Player Profiling via Physiological Response Analysis in Gameplay

K J Somaiya College of Engineering, Mumbai, India — August 2015 — June 2019
Bachelor of Technology in Electronics and Telecommunication

PUBLICATIONS

Journal Articles

- **Kaliappan, S.**, Liu, C., Jain, Y., Karkar, R., & Saha, K. (2025). Online Communities as a Support System for Alzheimer's Disease and Dementia Care: Large-Scale Exploratory Study. *JMIR Aging*, Accepted. https://preprints.jmir.org/preprint/6
- Saha, K., Jain, Y., Liu, C., **Kaliappan, S.**, & Karkar, R. (2025). AI vs. Humans for Online Support: Comparing the Language of Responses from LLMs and Online Communities of Alzheimer's Disease. *ACM Digital Health*, 1-23. https://dl.acm.org/doi/10.1145/3709366
- Dolman, A., **Kaliappan, S.**, Zhou, Y., Palleti, D., Marquard, J., Lee, S.I., Karkar, R., & Jimison, H.B. (2024). A Systematic Review of Unmet Needs of Older Adults in Home Settings and Their Implications for Novel Technological Solutions. *Innovation in Aging*, 8, igaf106. https://doi.org/10.1093/geroni/igaf106

Conference Papers & Workshop Publications

- **Kaliappan, S.**, Anand, A., Saha, K., & Karkar, R. (2024). Exploring the Role of LLMs for Supporting Older Adults: Opportunities and Concerns. In *CHI 2024 Workshop on HCI and Aging: New Directions, New Principles*. Honolulu, HI. https://arxiv.org/abs/2411.08123

Under Review

- **Kaliappan, S.**, et al. CASEbot: A Conversational Agent for Structuring and Personalizing the Design of Self-Experiments in Personal Health. (Manuscript under review, 2025)

RESEARCH EXPERIENCE

University of Massachusetts Amherst — Amherst, MA, USA
PhD Student, Manning College of Information and Computer Sciences — August 2023 — Present

- **CASEbot: Conversational AI for Self-Experimentation** - Designed and developed an LLM-powered conversational agent using Rasa framework and Claude 3.7 Sonnet to guide users through designing structured, personalized, and safe self-experiments in health domains. Conducted within-subjects mixed-methods study with 42 participants, demonstrating 19.20% improvement in experiment quality through theory-driven prompt engineering.
- **Digital Support for Dementia Caregivers** - Extracted key caregiver concerns and support needs from 100,000+ posts in Alzheimer's online communities using topic modeling (LDA). Engineered ML classifiers (SVM, Random Forest, Neural Networks) achieving AUC scores of 0.83-0.87 for detecting emotional and informational support patterns.
- **Systematic Review of Technology Needs for Older Adults** - Conducted comprehensive literature review identifying unmet needs of older adults in home settings. Collaborated with interdisciplinary team to synthesize findings and develop evidence-based design recommendations for aging-in-place technologies.
- **Needs Assessment Research with MassAITC** - Conducted 3 focus groups with older adults to assess technology needs and challenges. Synthesized qualitative data to inform design of accessible technology solutions for aging populations.

Koita Centre for Digital Health, Indian Institute of Technology Bombay Mumbai, India
Research Associate April 2022 — June 2023

- **Intelligent OCR for Medical Records** - Implemented joint-learning framework using LayoutLMv1 for OCR and key-value extraction from 15,000+ printed and handwritten medical documents at Narayana Hrudayalaya Hospitals. Achieved high accuracy (Acc: 0.983, F1: 0.945) on real-world healthcare forms, enabling digitization of patient records.
- **Synthetic Medical Image Generation** - Developed GAN and Wasserstein Autoencoder (WAE) models for synthetic pneumonia X-ray generation. Implemented guided subset selection methodology to boost data diversity, improving classification accuracy by up to 21.64% on label-scarce datasets.

University of Geneva Geneva, Switzerland
Data Analyst Intern, Computer Science Department June 2020 — August 2020

- **Player Profiling via Physiological Signals** - Designed comprehensive player profiling pipeline using physiological signals (ECG, EDA, Respiration) and in-game events from 100+ Counter-Strike participants. Applied dimensionality reduction and model-based clustering (LDA, logistic regression) to identify gameplay-driven emotional response patterns.

TEACHING EXPERIENCE

University of Massachusetts Amherst Amherst, MA, USA
Teaching Assistant

- **INFO 490PA: Personal Health Informatics** Spring 2024, Spring 2025
  - Assisted in course delivery covering self-tracking technologies, personal informatics systems, and health data analysis
  - Held office hours, graded assignments, and provided technical support for student projects
- **CS 325: Human-Computer Interaction** Fall 2024
  - Supported instruction in fundamental HCI principles, user-centered design, and evaluation methods
  - Mentored students in course projects involving user research and interface design

PRESENTATIONS & TALKS

- **CHI 2024 Workshop on HCI and Aging**, Honolulu, HI, USA May 2024
  Presented workshop paper: "Exploring the Role of LLMs for Supporting Older Adults: Opportunities and Concerns"

SELECTED COURSES

PhD Courses

- Computing for Digital Biomarkers in Healthcare
- Distributed and Operating Systems
- Neural Networks

Master's Courses

- Information Analysis and Processing
- Software Modeling and Verification
- Natural Language Processing I
- Natural Language Processing II
- Cryptography I
- Cryptography II

RESEARCH SKILLS

- **Machine Learning & AI:** PyTorch, TensorFlow, Scikit-learn, Large Language Model Integration, Transfer Learning, GANs, Autoencoders
- **Natural Language Processing:** Topic Modeling (LDA), Sentiment Analysis, Text Classification, Transformer Models
- **Computer Vision:** Visual-Language Models (VLMs), Image Synthesis, Medical Image Analysis
- **Development & Frameworks:** Python, C++, Rasa (Conversational AI), MongoDB, SQL
- **Research Methods:** Mixed-Methods Research, User Studies, Within-Subjects Design, Qualitative Analysis (Thematic Coding, Focus Groups), Quantitative Analysis (Statistical Modeling, Regression)
- **Tools & Platforms:** Git, Qualtrics, Excel, Prompt Engineering, API Integration (Anthropic Claude)

LANGUAGES

- **English:** Fluent (Professional Working Proficiency)
- **Hindi:** Native

REFERENCES

Prof. Ravi Karkar
Assistant Professor, Manning College of Information and Computer Sciences
University of Massachusetts Amherst, Amherst, MA, USA
E-mail: rkarkar@cs.umass.edu
Relationship: PhD Advisor

Prof. Ganesh Ramakrishnan
Institute Chair Professor, Department of Computer Science and Engineering
Indian Institute of Technology Bombay, Mumbai, India
E-mail: ganesh@cse.iitb.ac.in
Relationship: Research Supervisor at IIT Bombay

Prof. Guillaume Chanel
Head of the SIMS Group, Computer Science Department
University of Geneva, Geneva, Switzerland
E-mail: Guillaume.Chanel@unige.ch
Relationship: Master's Thesis Supervisor