# Sidharth Kaliappan

PhD Candidate, Manning College of Information and Computer Sciences
University of Massachusetts Amherst, Amherst, MA, USA

**Email:** skaliappan@umass.edu — **LinkedIn:** linkedin.com/in/sidharth-kaliappan — **Website:** sidhrth.github.io


## RESEARCH INTERESTS

I am a PhD candidate specializing in Human-Computer Interaction with a focus on personal health informatics, self-tracking, and AI-assisted health interventions. My research explores conversational AI systems for personalized health experimentation and aging populations, with emerging work in stress management and digital wellbeing.
Key interests: Personal Health Informatics & Self-Tracking, Conversational AI for Health Interventions, Self-Experimentation & N-of-1 Studies, Technology for Aging Populations, and Stress Management & Digital Wellbeing.

## 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

**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*
- 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 Transactions on Computing for Healthcare*
- Dolman, A., **Kaliappan, S.**, Zhou, Y., Palleti, D., Marquard, J., Lee, S.I., Karkar, R., & Jimison, H.B. (2025). A Systematic Review of Unmet Needs of Older Adults in Home Settings and Their Implications for Novel Technological Solutions. *Innovation in Aging*, 8, 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.

### Under Review

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

## 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*

- **CS 325: Human-Computer Interaction** Fall 2025
  - Mentored students in course projects involving user research and interface design
- **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

## 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
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
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
Master's Thesis Supervisor