

# Sidharth Kaliappan

PhD Candidate, Manning College of Information and Computer Sciences

University of Massachusetts Amherst, Amherst, MA, USA

s kaliappan@umass.edu | linkedin.com/in/sidharth-kaliappan | sidhrth.github.io

## RESEARCH INTERESTS

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PhD candidate specializing in Human-Computer Interaction with a focus on personal health informatics, self-tracking, and AI-assisted health interventions. My research centers on improving the quality and reliability of self-reported health tracking and developing technologies that make health tracking more accurate, useful, and trustworthy.

**Key interests:** Personal Health Informatics and Self-Tracking, AI-Assisted Health Interventions, Self-Experimentation and N-of-1 Studies, Data Quality in Health-Tracking Platforms, and Technology for Older Adults.

## EDUCATION

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### University of Massachusetts Amherst

August 2023 to 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 to 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 to June 2019

Bachelor of Technology in Electronics and Telecommunication

## PUBLICATIONS

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### Conference Papers

- Ishita, S. Z., **Kaliappan, S.** (co-first authors, equal contribution), Rashik, M., Epstein, D. A., & Karkar, R. (2026). CASEbot: A Conversational Agent for Structuring and Personalizing the Design of Self-Experiments in Personal Health. CHI 2026, Barcelona, Spain. DOI: 10.1145/3772318.3791551

### 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, 8, e68890. DOI: 10.2196/68890
- 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. DOI: 10.1145/3709366
- 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, 9(Suppl 1), S14 to S23, igaf106. DOI: 10.1093/geroni/igaf106

### Workshop Publications

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

### Under Review

- A Needs-First Approach to Digital Technology for Aging in Place: Perspectives from Older Adults, Caregivers, and Professionals. Under review at Innovation in Aging.

## RESEARCH EXPERIENCE

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

*August 2023 to Present*

- **CASEbot: Conversational AI for Self-Experimentation.** Designed and developed an LLM-powered conversational agent using the Rasa framework and Claude 3.7 Sonnet to guide users through designing structured, personalized, and safe self-experiments in health domains. Conducted a within-subjects mixed-methods study with 42 participants, demonstrating a 19.20% improvement in experiment quality over a traditional worksheet approach through theory-driven prompt engineering.
- **Data Quality in Health-Tracking Platforms.** Developing a heuristic evaluation framework to help developers recognize and mitigate data quality issues (completeness, accuracy, validity, contextuality) earlier in the development cycle. Grounded in a synthesis of 85 papers and refined through semi-structured developer interviews.
- **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 to 0.87 for detecting emotional and informational support patterns.
- **Systematic Review of Technology Needs for Older Adults.** Conducted a comprehensive literature review identifying unmet needs of older adults in home settings; collaborated with an interdisciplinary team to 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 the design of accessible technology solutions for aging populations.

**Koita Centre for Digital Health, Indian Institute of Technology Bombay**  
*Research Associate, Mumbai, India*

*April 2022 to June 2023*

- **Intelligent OCR for Medical Records.** Implemented a 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), 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 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 to August 2020*

- **Player Profiling via Physiological Signals.** Designed a 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

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*University of Massachusetts Amherst, Teaching Assistant*

- **CS 325: Human-Computer Interaction** (Fall 2025, Spring 2026). 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 AND TALKS

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- **Lightning Talk, NYU Tandon School of Engineering** (June 2026). Supported by an awarded travel grant.
- **ACM Interactive Health Conference (IH '26), Porto, Portugal** (July 2026). Full paper presentation of CASEbot.
- **CHI 2024 Workshop on HCI and Aging, Honolulu, HI** (May 2024). Presented: Exploring the Role of LLMs for Supporting Older Adults: Opportunities and Concerns.

## AWARDS AND HONORS

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- **Best PhD Poster** at the 2026 Computational Social Science Student Poster Session, UMass Amherst (May 2026), for CASEbot (with Sabrina Zaman Ishita).
- **Travel Grant** awarded to support the lightning talk at NYU Tandon School of Engineering (2026).

## SERVICE AND PROFESSIONAL ACTIVITIES

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- **Peer Reviewer**, DIGITAL HEALTH (SAGE Publishing).

## SELECTED COURSES

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**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 and II, Cryptography I and II.

## RESEARCH SKILLS

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**Machine Learning and 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 and 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 and Platforms:** Git, Qualtrics, Excel, Prompt Engineering, API Integration (Anthropic Claude)

## LANGUAGES

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

## REFERENCES

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- **Prof. Ravi Karkar (PhD Advisor)**
  - Assistant Professor, Manning College of Information and Computer Sciences, University of Massachusetts Amherst
  - Email: rkarkar@cs.umass.edu
- **Prof. Ganesh Ramakrishnan (Research Supervisor at IIT Bombay)**
  - Institute Chair Professor, Department of Computer Science and Engineering, Indian Institute of Technology Bombay
  - Email: ganesh@cse.iitb.ac.in
- **Prof. Guillaume Chanel (Master's Thesis Supervisor)**
  - Head of the SIMS Group, Computer Science Department, University of Geneva
  - Email: Guillaume.Chanel@unige.ch