Vishnu Kakaraparthi

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Education

Ph.D. in Computer Science — Arizona State University
Master of Business Administration — Quantic School of Business and Technology
Master of Computer Science — Arizona State University
Bachelor of Computer Science and Engineering — SRM University

Work Experience

Movement Interactive – HijiBand — Jan 2025 – Aug 2025

AI Researcher — *Tempe, AZ*

- Developing a machine learning–based **fall detection system** using wearable motion and physiological sensors to enhance safety for older adults.
- Specializing in **post-fall analysis** to determine assistance needs, integrating real-time AI motion analysis and biometric monitoring.
- Optimizing models for **high-accuracy detection**, reducing false positives and improving response time through adaptive algorithms.

Boomi Inc — May 2024 – Aug 2024

Gen AI Engineering Intern — *Remote*

- Developed AI-powered documentation tools using Prompt Engineering, Retrieval-Augmented Generation (RAG), and dynamic prompt classification, **reduced manual effort by 10x and improved accuracy by 95%.**
- Integrated Chainlit to build real-time conversational AI experiences, **increasing user engagement by 70%** and reducing support tickets by 5%.
- Accelerated LLM pipeline performance by **cutting retraining time by 95%** through LangChain-based optimizations and modular workflow design.

BrainChip Inc — Zalmotek, Mercedes-Benz — Jun 2023 – Aug 2023

Machine Learning Intern — *Laguna Hills, CA*

- Led a multi-modal neuromorphic-based anomaly detection initiative, using quantized models on AKD1000 chips, yielded **4× smaller size models, 500× energy savings, and 4× faster inference** over traditional systems.
- Collaborated on distracted driving detection systems with sensor integration, positioning the work for application in the Mercedes-Benz Vision EQXX Concept.

Toy Upgrade (ASU Startup) — Jun 2018 – Jan 2020

Head of Engineering — *Tempe, AZ*

- Led a 5-member team to create an educational toy with speech interaction, **boosting user engagement by 300%**.
- Enhanced pronunciation matching accuracy by 20% using the SoapBox Labs API, tailored to children's speech patterns.

Heyludwig – Partners Dog Training (Startup) — Jun 2018 – Jan 2020

Technical Lead — *Tempe, AZ*

- Built and deployed a chatbot using Dialogflow to streamline client interaction, achieving a **25% increase in engagement** and **15% reduction in response time**.

Ericsson India Pvt Ltd. — Jan 2016 – Apr 2016

R&D Intern — *Gurugram, India*

- Led a churn prediction project using Apache Spark and ML libraries, **achieving 64.8% accuracy** by analyzing call detail records.
- Built a multiclass classifier for Facebook stream analytics, **reaching 87.6% accuracy** in categorizing user posts into service-related segments.

Research Experience

Ph.D. Research **Jul 2019 – Present**

Doctoral Researcher *Arizona State University*

- Led the development of groundbreaking wrist-centric technology and innovative machine learning algorithms for a wrist-worn camera device, advancing human action understanding and expanding its applications.
- Co-PI for the Global Sport Institute and WearTech initiative grants, creating tools for sports enthusiasts and elderly individuals to track physical activities and manage pill-taking effectively.

Master's Research **Jan 2018 – Dec 2018**

Master's Researcher *Arizona State University*

- Collaborated with global brands like Adidas, Pizza Hut, and Edgenuity to develop tools leveraging affective computing and Tobii eye-tracking technology, revolutionizing user experience data collection and analysis.
- Conducted cutting-edge research on cognitive activity using Brain-Computer Interfaces (BCI), EEG, GSR data, and eye-tracking to model trust and motivation, optimizing e-commerce sales through A/B testing.

SRM University **Jan 2016 – Jul 2016**

Bachelor's Thesis Research *Kattankulathur, India*

- Evaluated diverse machine learning methods to predict Indian stock market closing prices, achieving 0.79 accuracy for Random Forests and 0.77 for Deep Neural Networks.

Projects

AutoTrader Bot: Automated Stock Trading Platform **Aug 2025 – Present**

- Built an end-to-end trading automation system using **n8n** and the **Charles Schwab API**, integrating real-time market data, financial news feeds, and semantic analysis for informed portfolio decisions and autonomous trade execution with stop-loss and profit-taking logic.
- Engineered modular workflows for dynamic asset allocation across mid-, low-, and high-cap stocks, combining quantitative signals with news-driven sentiment to deliver real-time performance alerts and support AI-driven predictive modeling.

AutoResumeGen: Multi-Agent Resume Generator **Jun 2025 – Present**

- Built a modular system using Crew AI and GPT-4o to generate tailored, ATS-optimized resumes from job descriptions and user profiles.
- Designed and deployed agents including **RoleParser**, **PersonaCalibrator**, **BulletRewriter**, and **PDFExporter** with asynchronous orchestration via LangChain and RAG-enabled vector search.
- Integrated input preprocessing with **JDParser** and dynamic persona modeling, and implemented a **ResumeCritiqueAgent** for LLM-based feedback on tone, clarity, and keyword alignment.
- Integrated a **MockInterviewAgent** to generate contextual interview questions and model responses tailored to the resume and job description, supporting candidate preparation and reflection.

Dementia Framework **Jan 2022 – Feb 2022**

- Developed and presented a Participatory Design Framework for dementia care technology, integrating policy informatics principles across technology, law, architecture, markets, norms, and education.

Technological Tools for Dementia Care **Aug 2021 – Dec 2021**

- Analyzed relationships between assistive technologies and dementia patients; proposed low-fidelity solutions like environmental sensors, addressing usability and location tracking limitations.

LIDAR Object Detection **Feb 2019 – May 2019**

- Implemented advanced 3D object detection models (PointNet, PointNet++, VoxelNet) using Python and TensorFlow to enhance robotic perception from LIDAR data via ROS and Open3D.

Vision-Based Manipulator Control with Fetch **Feb 2019 – May 2019**

- Applied visual servoing and depth estimation with ROS and OpenCV to guide a Fetch robot in reaching partially occluded objects, addressing challenges like cable entanglement and occlusion.

Bacteria Detection using Transfer Learning **Jun 2018 – Jul 2018**

- Developed a production-grade image classification system for NanoCheQ using AWS SageMaker and OpenCV, improving accuracy by 35% over baseline and achieving 94.9% overall accuracy.

Auto-Scaling Image Recognition API **Feb 2018 – May 2018**

- Built a scalable image classification service with Python and TensorFlow (Inception-V3), leveraging AWS EC2, S3, and SQS to dynamically scale compute for real-time image inference.

DropBy – Event Crowdsourcing App **Mar 2018 – Apr 2018**

- Developed a sentiment-aware event app using Java and Android Studio on Google Cloud Platform with features including real-time messaging, auto-scaling, and media sharing.

Semantic Search on Movie Summaries **Jan 2018 – May 2018**

- Led a team of four to build a QA system using convolutional neural networks and NLP techniques, including coreference resolution, sentence embedding, and named entity recognition, achieving 54.7% accuracy.

Spatial Hot Spot Analysis from Geospatial-Temporal Data **Aug 2017 – Nov 2017**

- Built a spatial analytics pipeline using Apache Spark and Sedona to analyze over 50 GB of NYC Taxi data, identifying high-activity zones via Getis-Ord statistics and real-time visualization.

Classification of Higgs Boson Particle **Jan 2017 – May 2017**

- Trained an ensemble of neural networks and random forest classifiers on 11M CERN records using Keras, TensorFlow, and scikit-learn, achieving 71% accuracy in detecting the Higgs Boson.

Knowledge-Based Question Answering System **Jan 2017 – May 2017**

- Built a QA system querying DBpedia using Python, Stanford NLP, and SPARQL, with modules for semantic parsing, query formulation, and graph matching focused on firm-related questions.

Maximizing NYC Taxi Revenue Visualization **Jan 2017 – May 2017**

- Created a JavaScript-based interactive dashboard using D3, Crossfilter, and dc.js, analyzing 1B+ taxi trips to provide actionable insights for fare, tip, location, and passenger behavior.

SRM - PURA (Providing Urban Amenities in Rural Areas) **Jan 2013 – Dec 2015**

- Developed backend systems and multilingual front-end features using PHP and MySQL; enabled e-learning, e-governance, and IT access in underserved rural communities.

SRM-SE (SRM Search Engine) **Jan 2013 – Dec 2015**

- Supported server and network administration for a university search engine project that filtered, clustered, and displayed results with improved usability and relevance.

Publications and Patents

- **Striking the Privacy-Model Training Balance: A Case Study using PERACTIV Device**, HCII 2024. Link
- **Innovating Medication Adherence for Smart Cities: Leveraging PERACTIV and Automated Annotation Pipeline**, International Conference on Smart Multimedia 2024.
- **A Hand-Directed System for Identifying Activities**, U.S. Patent App. #20230324993. Link
- **Wrist View: Understanding Human Activity Through Hand**, HCII 2023. Lecture Notes in Computer Science, vol 14021. Link
- **PERACTIV: Personalized Activity Monitoring - Ask My Hands**, HCII 2022. Link
- **Machine Learning Algorithm Hypothesis on Smart Gyroscopic Tuned Dampers for Earthquake Resistance Building**, International Journal of Multidisciplinary Research and Development, vol. 2, pp. 705-707, 2015. Link

Awards and Honors

Graduate Mentorship Award, ASU **Jan 2025 – May 2025**

- Recognized for exceptional mentorship of student researchers and capstone teams across interdisciplinary labs.

Graduate Teaching Excellence Award, ASU **Aug 2023 – Dec 2023**

- Awarded for outstanding instructional contributions as an Instructor for FSE 100: Introduction to Engineering.

WearTech Grant, Greater Phoenix Economic Council (GPEC) **Jul 2021 – Jun 2022**

- Secured a $20,000 grant as Co-PI through CUbiC Lab (ASU) to advance wrist-based video analytics for medication adherence in elderly individuals.

Global Sport Institute Grant, ASU **Jan 2021 – Dec 2021**

- Awarded $20,000 as Co-PI to develop wearable tools for tracking physical activity and enhancing remote training for seniors and athletes.

Third Prize – All India Software Development SESCON-15 **2015**

- Won third place at a national-level software development competition held at Sri Eshwar College of Engineering.

First Prize – Denken Fest Coding Competition **2014**

- Won first place in a competitive coding challenge at Aaruush, SRM University.

Academic Excellence Award – Indus Foundation **2014**

- Received academic merit recognition for top performance among peers.

First Prize – CTF (Capture the Flag) at eHack **2013**

- Won first place in team CTF and placed sixth individually in the cybersecurity challenge hosted by Infysec.

Teaching Experience

Graduate Teaching Assistant at *School of Computing and Augmented Intelligence (SCAI), ASU* **Jan 2019 – Present**

- Instructor for FSE 100: Introduction to Engineering (Fall 2020; Fall 2022; Fall 2023; Fall 2025); covered engineering design, modeling, communication, and teamwork.
- Taught over **200 students** in CSE 463: Human-Computer Interaction under Dr. Hasti Seifi (Spring 2023); designed course structure, quizzes, and examinations.
- Taught **over 1400 students** in CSE 463 under Dr. Robert Atkinson (Spring 2019, Fall 2019, Spring 2020); supported course design, assessment, and grading.
- Lab Instructor for CSE 110: Principles of Programming with Java (Summer 2019, 2020, 2022); taught Java fundamentals and provided one-on-one mentorship.

Graduate Services Assistant – Grader / Lab Instructor at *SCAI, ASU* **Aug 2017 – Jul 2022**

- Assisted with course materials and grading for CSE 360: Introduction to Software Engineering and CSE 110: Java Programming.
- Taught computer fundamentals to 150 students in CSE 180: Computer Literacy, including Excel, Word, HTML, SQL, Networking, and Cybersecurity.
- Supported instructional design and grading for CSE 463: Human-Computer Interaction.

Capstone Team Mentor **Aug 2017 – Dec 2022**

- **CUbiC Lab (2021–2022)**: Mentored four undergraduates and one volunteer to develop wearable tech using off-the-shelf components and mobile deep learning.
- **iLUX Lab (2017–2020)**: Guided four major projects with over 20 students; contributions included UX feature development for Pizza Hut (Yum! Brands), data pipeline design from EEG, BCI, GSR, AFFDEX, Eye-tracking, and Android app benchmarking with WEKA.
- **ANGLE Lab (2019)**: Mentored two teams to develop AR-based pallet packing optimization systems for FedEx using spatial layout algorithms.

AI Instructor at *AI4ALL* **Jun 2020**

- Designed and taught an AI curriculum to 24 high school students, covering Clustering, Classification, Regression, Naive Bayes, Neural Networks, and Bias through hands-on projects.

Professional Services

Editorial Board Member at *Clareus Scientific Science and Engineering (ISSN: 3065-1182)* **2025 – Present**

Editorial Board Member at *PriMera Scientific Engineering (PSEN)* **2025 – Present**

Readers Committee Member at *International Journal of Artificial Intelligence and Knowledge Engineering (IJAIKE)* **2025 – Present**

Special Sessions Co-Chair at *International Conference on Smart Multimedia (ICSM 2025)* **2025**

Committee Member & Co-Chair at *ACM Symposium on Eye Tracking Research & Applications (ETRA 2025)* **2025**

Reviewer & Program Committee Member for Peer-Reviewed Conferences and Journals **2019 – Present**

- Reviewed over **130** papers, with **46** reviews for top-tier conferences and journals in HCI, computer vision, and multimedia computing.
- Served as a PC member or reviewer for:
  - ACM CHI – Conference on Human Factors in Computing Systems
  - HRI – Conference on Human-Robot Interaction
  - ACM ETRA – Eye Tracking Research and Applications
  - ACM TOMM – Transactions on Multimedia Computing, Communications, and Applications
  - OzCHI – Computer-Human Interaction Conference (Australia)
  - ICWSM – International AAAI Conference on Web and Social Media
  - PacificVis – IEEE Pacific Visualization Symposium
  - HCII – International Conference on Human-Computer Interaction

Administrative Experience

Administrative Researcher at *CUbiC Lab, ASU* **Jan 2019 – Jul 2020**

- Secured a **$20,000 WearTech grant** as Co-PI through the **Center for Cognitive Ubiquitous Computing (CUbiC)** to research medication adherence among elderly individuals living alone, developing novel video-based activity recognition algorithms using a wrist-mounted camera system.
- Awarded a **$20,000 Global Sport Institute grant** as Co-PI to create computer vision–based tools for tracking physical activity and enhancing remote training experiences for both sports enthusiasts and aging populations.
- Supervised thesis students, capstone teams, and research volunteers in computer vision and human-computer interaction, supporting skill development and contributing to the lab's research pipeline.

Administrative Researcher at *iLUX Lab, ASU* **Jan 2019 – Jul 2020**

- Orchestrated daily operations at the **Innovative Learner and User eXperience (iLUX) Lab**, mentoring students and supporting a dynamic, interdisciplinary research team.
- Led projects in Affective Computing and eye-tracking, fostering collaborations and contributing to successful grant proposals.
- Worked with Edgenuity to improve its educational technology platform and partnered with Adidas and Pizza Hut to enhance sales and user experience through data-driven A/B testing.
- Mentored capstone teams and volunteers, advancing research in emotion-aware systems, learning analytics, and user-centered design.

Administrative Researcher at *ANGLE Lab, ASU* **Jan 2019 – Jul 2020**

- Led research initiatives in Augmented Reality at the **Advanced Next Generation Learning Environments (ANGLE) Lab**, mentoring graduate and undergraduate researchers.
- Secured research funding through successful grant proposals and coordinated cross-disciplinary collaboration within the lab.
- Partnered with FedEx to develop an Augmented Reality Unit Load Device (ULD) optimization tool using Microsoft HoloLens, improving cargo loading efficiency and spatial utilization.
- Supervised capstone projects and mentored student volunteers in AR/VR development, contributing to hands-on learning and lab research outcomes.

Guest Talks & Invited Instruction

ASU New College B^2C^2 Data and Methods Student Workshop **Nov 2020**

- Delivered invited instruction on AI, Python, machine learning, and data analytics to high school and undergraduate students.

Hackathon Projects

WizardEyes **Sep 2021**

- Developed a real-time computer vision module for Smart City infrastructure using edge AI, delivering actionable insights such as occupancy, queue length, mask compliance, and crowd density through a unified API.
- Leveraged Luxonis Oak-D-IoT-40 and cloud integration to enable low-latency inference and scalable deployment in urban monitoring systems.

Open-Source Contributions

Mayhem Heroes **Apr 2022 – Jun 2022**

- Ranked **#2 globally** in the Mayhem Heroes program for automating fuzz testing across **48 critical open-source repositories**, identifying zero-day vulnerabilities and enhancing software resilience.
- Led containerized deployments and CI/CD pipelines to integrate Mayhem's autonomous security engine into diverse OSS ecosystems, accelerating vulnerability discovery and responsible disclosure workflows.

Technical Skills

Languages: Bash, HTML/CSS, JavaScript, Python, SQL
Developer Tools: Git, Hugging Face Hub, Jupyter, LangChain, MLflow, n8n, REST APIs, Streamlit, VS Code, Weights & Biases
Technologies/Frameworks: Claude (Anthropic), FastAPI, Flask, Gradio, LLaMA, Mistral, OpenAI API, PyTorch, Retrieval-Augmented Generation (RAG), TensorFlow, Transformers (Hugging Face), Vector DBs (ChromaDB, Pinecone, Weaviate)
Cloud/Platforms: AWS (Bedrock, EC2, Lambda, S3, SageMaker), Azure OpenAI, Docker, GCP (Vertex AI), Kubernetes, MLOps, DevOps
Data/Visualization: Elasticsearch, Matplotlib, NumPy, pandas, scikit-learn, seaborn, Tableau