

# Vishnu Prateek Kakaraparthi

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## EDUCATION

<b>Master of Business Administration</b>		<b>July 2024</b>
Quantic School of Business and Technology		
<b>Ph.D., Computer Science</b>		<b>May 2024</b>
<b>NSF-NRT Smart Cities Research Fellow</b>	<b>GPA: 4.00</b>	
Ira A. Fulton Schools of Engineering - Arizona State University	<b>GPA: 4.00</b>	<b>Tempe, Arizona</b>
<ul style="list-style-type: none"><li>Relevant Coursework: Introduction to Smart Cities, Smart &amp; Resilient Communities, Smart City Infrastructures and Technology, Introduction to Policy Informatics.</li></ul>		
<b>Master of Computer Science</b>		<b>December 2018</b>
Ira A. Fulton Schools of Engineering - Arizona State University	<b>GPA: 3.80</b>	<b>Tempe, Arizona</b>
<ul style="list-style-type: none"><li>Relevant Coursework: Distributed Database Systems, Artificial Intelligence, Statistical Machine Learning, Natural Language Processing, Data Visualization, Data Mining, Knowledge Representation and Reasoning, Perception in Robotics, and Software Verification/Validation/Test.</li></ul>		
<b>Bachelor in Computer Science and Engineering</b>		<b>November 2016</b>
SRM University	<b>GPA: 3.80</b>	<b>Kattankulathur, India</b>

## TECHNICAL SKILLS AND CERTIFICATIONS

<b>Programming:</b>	Python, Java.
<b>Databases:</b>	MySQL, PostgreSQL, MongoDB.
<b>Big Data Tools:</b>	Hadoop MapReduce, Apache Spark, Mahout.
<b>Data Science Tools:</b>	Tensorflow, Keras, Pandas, NumPy, SciPy, Matplotlib, Scikit-learn.
<b>Other Data Tools:</b>	Tableau, Elasticsearch.
<b>Other Tools/Software:</b>	InVision Studio, iMotions, Git.
<b>Cloud Platforms:</b>	Amazon Web Services (AWS), Google Cloud (GCP).
<b>Certifications:</b>	Deep Learning Specialization (deeplearning.ai, Coursera), Machine Learning (Stanford, Coursera).

## RESEARCH EXPERIENCE

<b>Doctoral Researcher</b>		<b>July 2020 - Present</b>
Center for Cognitive Ubiquitous Computing (CUBiC) Lab		
<ul style="list-style-type: none"><li>Advisors: Dr. Troy McDaniel, Dr. Morris Goldberg, Dr. Hemanth Venkateswara.</li><li>Developing advanced machine learning and image learning algorithms for a novel wrist-worn camera device.</li><li>Collaborating as a Co-PI for Global Sport Institute Grant to understand and develop valuable tools for sports enthusiasts and old age adults living alone track to physical activities using novel wrist-worn camera device.</li><li>Collaborating as a Co-PI for WearTech to develop useful pill-taking tools for people with old age living alone using novel wrist-worn camera device.</li></ul>		
<b>Doctoral Researcher</b>		<b>January 2019 - July 2020</b>
innovative Learner and User eXperience (iLUX) Lab   Adidas, Pizza Hut, Edgenuity		
<ul style="list-style-type: none"><li>Advisors: Dr. Robert Atkinson, Dr. Maria Elena Chavez-Echeagaray.</li><li>Researched effects of light noise on Cognitive activity using Pupil Dilation using Eye Tracking and Brain-Computer Interfaces. Other research paths include modeling new constructs such as trust and motivation using EEG and GSR data.</li><li>Our innovative instruments based on biometric sensors combined with traditional instruments allow us to gather holistic information from the user's experience and use this information to improve those experiences.</li><li>Roles include data pre-processing and analysis involvement, mentoring, and managing graduate and undergraduate students collaborating in our lab.</li></ul>		
<b>Doctoral Researcher</b>		<b>January 2019 - July 2020</b>
Advanced Next Generation Learning Environments (ANGLE) Lab   FedEx		
<ul style="list-style-type: none"><li>Collaborated as a researcher in projects related to user experience in fields such as education, marketing, merchandising, product, and space design. User experience considers diverse aspects, including cognitive and affective components of every human experience.</li></ul>		

## Forecasting closing price indices | Python, Keras, TensorFlow, scikit-learn, pandas, numpy

January 2016 - July 2016

Bachelor's Thesis

Kattankulathur, India

- Comparative study of different machine learning algorithms such as Random Forests, Support Vector Machine, and Deep Neural Networks along with traditional methods including Linear regression and Random Forests.
- Linear Regression: 0.63, SVM: 0.70, Decision Tree: 0.72, Random Forests: 0.79, and Deep NN: 0.77.

## SRM - PURA (Providing Urban Amenities in Rural Areas)

January 2013 - August 2015

SRM University

Kattankulathur, India

- Provided rural areas with e-learning, IT empowerment, e-governance, agriculture, healthcare, and women empowerment infrastructure.
- Integrated APIs to front-end and provided back-end design support in MySQL and PHP.
- Implemented audio translation of website to Tamil on hover.

## SRM-SE (SRM Search Engine)

January 2013 - December 2015

SRM University and NIXI

Kattankulathur, India

- SRM-SE (SRM Search Engine) is a search engine that revolutionizes search experience by diversifying the number of results for a specified query. SRM-SE also filters junk results, clusters results into different categories relevant to query, and displays them in a user-friendly manner.
- Contributed mainly to server and network administration.

## PUBLICATIONS AND PATENTS

- A Hand-Directed System For Identifying Activities, Patent Pending, Troy McDaniel, Mozest Goldberg, Hemanth Kumar Demakethapalli Venkateswara, Sethuraman Panchanathan, Vishnu Prateek Kakaraparthi. U.S. patent App. #20230324993.
- Kakaraparthi, V., Goldberg, M., McDaniel, T. (2023). Wrist View: Understanding Human Activity Through Hand. HCII 2023. Lecture Notes in Computer Science, vol 14021. Springer, Cham. [https://doi.org/10.1007/978-3-031-35897-5\\_41](https://doi.org/10.1007/978-3-031-35897-5_41)
- Kakaraparthi, V., McDaniel, T., Venkateswara, H., Goldberg, M. (2022). PERACTIV: Personalized Activity Monitoring - Ask My Hands. HCII 2022. Lecture Notes in Computer Science, vol 13326. Springer, Cham. [https://doi.org/10.1007/978-3-031-05431-0\\_18](https://doi.org/10.1007/978-3-031-05431-0_18)

## WORK EXPERIENCE

### Machine Learning Intern

June 2023 - August 2023

BrainChip Inc | Zalotec, Mercedes-Benz

Laguna Hills, California

- Developed and deployed efficient machine learning models, achieving **4x smaller size weights**, **500x energy efficiency**, and **4x faster processing than GTX 1080** for real-world applications, emphasizing performance and sustainability.
- Led a **multimodal anomaly detection** project that integrated sensor data (vibration, pressure, temperature, flow rate, voltage, and current consumption), enhancing detection accuracy across diverse domains, and showcasing adaptability and innovation.
- Managed **end-to-end collaboration with hardware firms**, especially Zalotec, to successfully build and demonstrate remarkable capabilities of BrainChip's Akida platform, underscoring my pivotal role in driving development and delivery of cutting-edge anomaly detection solutions.
- Spearheaded development of **distracted driving technology**, achieving energy and processing gains, positioning for potential project collaboration with **Mercedes-Benz** for **Vision EQXX Concept**, and showcasing capabilities of AKD1000 in the automotive safety domain.

### Technical Lead

June 2018 - January 2020

Toy Upgrade (ASU Startup)

Tempe, Arizona

- Oversaw and motivated a development team of 5 in developing a futuristic educational toy to enable learning with fun.
- Developed a pronunciation matching system to verify and check correctness of spoken words using different APIs such as Soap Box Labs.

### Technical Lead

June 2018 - January 2020

HeyLudwig - Partners Dog Training (Startup)

Tempe, Arizona

- Oversaw development and deployment of chatbot built using Dialog Flow with Facebook Messenger.
- HeyLudwig uses Artificial Intelligence to generate personalized dog training content created by an industry-leading dog training school to consider every factor of your dog's behavior.

### Research and Development Intern | Java, Apache Spark, Spark SQL, Spark ML

January 2016 - April 2016

Ericsson India Pvt Ltd.

Gurugram, India

- **Churn Prediction** - Achieved **84.8% accuracy** in predicting potential subscriber loss by analyzing call behavior patterns and correlating with previously churned subscribers.

- **Facebook Stream Analytics** - Achieved **67.6% accuracy** on segmenting Facebook posts from news feeds into Customer Service, Network, Promotions, and Other categories for each service provider with multiclass logistic regression.

## OPEN SOURCE CONTRIBUTIONS

**Mayhem Heroes** | Rust, Docker, Cargo, DevOps, DevSecOps, Github Actions **April 2022 - June 2022**

- Integrated Mayhem, an autonomous AI fuzzy testing tool that finds new exploitable bugs in **48 qualified** OSS projects.
- Recognized as a **Top 2<sup>nd</sup> Mayhem Hero** for integrating Mayhem.

## ACADEMIC PROJECTS

**A Dementia Framework** **January 2022 - February 2022**

Introduction to Policy Informatics **Tempe, Arizona**

- Developed and presented a Participatory Design Framework for Dementia Technology, integrating key pillars of Technology, Laws, Architecture, Markets, Norms, and Education.

**Relationship Between Technological Tools and those Affected by Dementia** | Python **August 2021 - December 2021**

Smart City Infrastructures and Technology **Tempe, Arizona**

- Understanding Relationship Between Technological Tools and those Affected by Dementia with **Co-initiate, Co-discover, Co-inspire, Co-define, Co-develop, Co-deliver** phases.
- Those living with dementia do not require high fidelity technology solutions but low fidelity. Technologies that need to be worn or lugged around by a dementia patient are complex solutions. Environmental sensors may be a better intervention.
- Location services are of interest as a future mode of operation but are riddled with usability problems for now.
- Compassion by design was an adequate framework for human-centered development.

**LIDAR Object Detection** | Python, o3d, laspy, TensorFlow, and ROS. **February 2019 - May 2019**

Perception in Robotics **Tempe, Arizona**

- Pioneered cutting-edge LIDAR object detection algorithms including **PointNet, PointNet++, and VoxelNet** enhancing precision in environmental perception.

**Vision based manipulator movement with Fetch** | Python, ROS, opencv **February 2019 - May 2019**

Perception in Robotics **Tempe, Arizona**

- Successfully implemented a visual serving technique using depth estimation for Fetch robot to locate and reach target objects.
- Developed a novel approach using wrist-centric view to find pose of end effector for Fetch robot.
- Developed an approach using stereo cameras on robot's head to estimate depth and determine pose of objects, which overcame previous challenges with obstructed views and tangled cables.

**Semantic Search on Movie Summary** | Python, Keras **January 2018 - May 2018**

Natural Language Processing **Tempe, Arizona**

- Led a team of four to model a question-answering system based on semantics of a movie summary to help a user find a movie based on users' arbitrary knowledge about movie using Convolution Neural Networks, Coreference Resolution, Sentence Embedding, Event and Named Entity Networks and **achieved 54.7% accuracy**.

**Spatial Hot Spot Analysis from Geo Spatial-Temporal Data** | Spark, Apache Sedona **August 2017 - November 2017**

Distributed Database Systems **Tempe, Arizona**

- Built a hot spot analysis model analyzing 50 GB+ NYC Taxi and Limousine Commission data set using Getis-Ord statistic, Apache Spark, Scala, and Ganglia. Identified 50 most statistically significant NYC locations by passenger count.

**Classification of Higgs Boson Particle** | Python, Keras, TensorFlow, scikit-learn, pandas **January 2017 - May 2017**

Statistical Machine Learning **Tempe, Arizona**

- Built an ensemble of three neural networks and six random forest models using TensorFlow and scikit-learn. Trained models on 11 million records and **achieved 71% accuracy**.

**Maximize NYC Taxi Driver Revenue Visualization** | JavaScript, D3, crossfilter, dc.js. **January 2017 - May 2017**

Data Visualization **Tempe, Arizona**

- Implemented visualization system using state-of-the-art techniques such as Shneiderman's Information Visualization mantra and multiple coordinated views using
- Developed query-based visualization from 1 billion taxi trips for insights on pickup locations based on location, pickup time, fare, tip, and passenger count.
- The system helps taxi drivers increase productivity and revenue by allowing them to query and find best pickup locations.

**Knowledge Base Based Question Answering System** | Stanford NLP Tools, and SPARQL **January 2017 - May 2017**  
Knowledge Representation and Reasoning **Tempe, Arizona**

- Developed Question Answering System by implementing Semantic Parsing, Query formulation, and Graph matching modules to answer questions related to firms using DBpedia as knowledge base.

**INVITED TALKS**

- FSE 150 Perspectives on Grand Challenges for Engineering - Joy of Living through Technology.
- Invited Speaker at ASU Data/Methods Workshop, delivering expert insights on Python Programming and Machine Learning.

**HACKATHON PROJECTS\***

**WizardEyes** | Python, OpenVino, DepthAI, AWS. **September 2021**

- Successfully developed a Smart Cities and Infrastructure Module using a Luxonis Oak-D-IoT-40 (Edge device) for Occupancy Counter, Queue Counter, Mask Detection, Social Distance Checker, and Huge Crowd Counter.
- Provided a public API for crown analytics.

**AWARDS AND HONORS**

**WearTech Grant (Greater Phoenix Economic Council (GPEC))** **July 2021 - June 2022**

Cognitive Ubiquitous Computing (CUBiC) Lab. **Tempe, Arizona**

- Successfully secured a **\$20,000 grant** as a **Co-PI** to conduct research on improving medication adherence among elderly individuals living alone.
- Developed innovative video-detection algorithms to detect and address pain points and reasons for unsuccessful pill-taking activities using a novel wrist-worn camera device.

**Global Sport Institute Grant** **January 2021 - December 2021**

Cognitive Ubiquitous Computing (CUBiC) Lab. **Tempe, Arizona**

- Successfully secured a **\$20,000 grant** as a **Co-PI** to develop innovative tools for tracking physical activities and improving remote training experiences.
- Developed a novel wrist-worn camera device to facilitate tracking of physical activities and reduce need for personal trainers, particularly among sports enthusiasts and elderly individuals living alone.
- Developed valuable tools using a novel wrist-worn camera device to track physical activities, improve remote training experience, and reduce need for personal trainers among sports enthusiasts and elderly individuals living alone.
- Part of the third prize-winning team in All India Software Development SESCON-15 conducted at Sri Eshwar College of Engineering in 2015.
- Won first prize in a coding competition, Denken Fest, conducted during Aaruush at SRM University in 2014.
- Award for Academic Excellence by Indus Foundation in 2014.
- Won first prize in CTF (Capture flag) conducted at eHack by Infysec as a group competition and placed at sixth position in individual competition in 2013.

**TEACHING EXPERIENCE**

**Graduate Teaching Assistant** **January 2019 - July 2023**

School of Computing and Augmented Intelligence, Arizona State University **Tempe, Arizona**

- Taught over 200 students Human-Computer Interaction (CSE 463) under Dr. Hasti Seifi concepts like prototyping, usability principles, and heuristics from Spring 2023. Assisted professor in designing course structure, quizzes, examinations, and grading.
- Course Instructor for FSE 100: Introduction to Engineering (Fall 2020, 2022 and 2023) fundamental concepts in engineering design process; working in engineering teams; engineering profession; engineering models; written and oral technical communication skills.
- Taught over 1400 students Human-Computer Interaction (CSE 463) under Dr. Robert Atkinson concepts like prototyping, usability principles, and heuristics from Spring 2019, Fall 2019, and Spring 2020. Assisted professor in designing course structure, examinations, and grading.
- Lab Instructor for CSE 110 : Principles of Programming with Java (Summer 2019, 2020, and 2022). Taught basics of Java to a class of 60 students and provided one-on-one attention and mentorship to inculcate interest in coding.

**Graduate Services Assistant - Grader/Lab Instructor** **August 2017 - July 2022**

School of Computing and Augmented Intelligence, Arizona State University **Tempe, Arizona**

- Assisted professor in Introduction to Software Engineering (CSE 360) in designing course structure, assignments, examinations, and grading.
- CSE 180 : Computer Literacy (Summer 2020). Taught basic computer fundamentals such as Microsoft Excel, Word, HTML, SQL, Networking, Security, etc., to a class of 150 students.

- Assisted professor in designing course structure, examinations, and grading for Intro to Human-Computer Interaction (CSE 463).
- Assisted professor in grading assignments and examinations for CSE 110: Principles of Programming with Java.

### **Capstone Team Mentor**

**August 2021 - May 2022**

Center for Cognitive Ubiquitous Computing (CUBiC) Lab

**Tempe, Arizona**

- Mentored four undergraduate students and one undergraduate volunteer to develop and test new wearable technology using off-the-shelf components and develop mobile and deep learning applications.

### **Capstone Team Mentor**

**January 2019 - December 2020**

innovative Learner and User eXperience (iLUX) Lab

**Tempe, Arizona**

- Mentored three teams of 2 graduate students and 18 undergraduate students developing and testing new features in applications like driver tracking, new payment options, and new localization layouts.

### **AI Instructor**

**June 2020 - June 2020**

AI4ALL

**Tempe, Arizona**

- Created and taught a premier AI curriculum for 24 high school students covering concepts such as Clustering, Classification, Naive Bayes, Regression, Neural Networks, Data and Bias with hands-on experience developing projects.

### **Capstone Team Mentor**

**January 2019 - December 2019**

innovative Learner and User eXperience (iLUX) Lab

**Tempe, Arizona**

- Mentored four students to build a web-based and standalone application to help clean and process data collected from various sources such as Brain-Computer Interfaces, Galvanic Skin Response, AFFDEX/FACET Facial Expression, and Eye Tracking to increase efficiency of teams working with data.

### **Capstone Team Mentor**

**January 2019 - December 2019**

Advanced Next Generation Learning Environments (ANGLE) Lab

**Tempe, Arizona**

- Mentored two teams of one graduate and 12 undergraduate students to efficiently improve packing methods for shipping companies, especially freight shipping for FedEx.
- Two applications are used as a tutoring or supervising system that helps to build stable pallets and efficiently fill shipping containers of various sizes and shapes.

## **ADMINISTRATIVE EXPERIENCE**

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### **Administrative Researcher**

**January 2019 - July 2020**

innovative Learner and User eXperience (iLUX)

**Tempe, Arizona**

Advanced Next Generation Learning Environments (ANGLE) Lab

**Tempe, Arizona**

- Orchestrated seamless daily operations providing unwavering support to a dynamic team, and offering invaluable mentorship to foster professional growth.
- Spearheaded and streamlined diverse research initiatives in Affective Computing and Augmented Reality utilizing Hololens, guiding collaborative efforts, securing grants through meticulously crafted proposals, and nurturing the development of both graduate and undergraduate talents.

## **PROFESSIONAL SERVICES**

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### **PC Member & Reviewer**

- ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)
- ACM Conference on Human Factors in Computing Systems (CHI)
- Pacific Visualization Symposium (PacificVis)
- Computer-Human Interaction of Australia (OzCHI)
- International AAAI Conference on Web and Social Media (ICWSM)
- Conference on Human Robot Interaction (HRI)
- International Conference on Human-Computer Interaction (HCIII)