

Hemachandran Balaji

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EDUCATION

University of California, Davis

Master of Science in Computer Science, GPA: 4.00

Davis, California

Sep. 2023 – June 2025

Vellore Institute of Technology

Bachelor of Technology in Computer Science & Engineering, GPA: 3.88

Vellore, India

July 2019 – June 2023

TECHNICAL SKILLS

Certifications: AWS Certified Cloud Practitioner (2021 – 2027)

Languages: Python, C/C++, SQL (MySQL), NoSQL (MongoDB), JavaScript, HTML, CSS, R

Technologies: Git, AWS, Azure, VS Code, Docker, Node.js, React, Flask, Django

EXPERIENCE

Teaching Assistant

Sep. 2023 - March 2025

University of California

Davis, California

- Assisted in teaching over 100+ students in understanding core concepts of C++, data structures, and algorithms.
- Led weekly office hours, providing guidance to troubleshoot coding issues, debug complex problems and guided students through their final projects, offering mentorship on project design, code optimization, and software development.

Embedded Software Engineer

Oct. 2023 - June 2024

Laboratory for AI, Robotics and Automation - UC Davis

Davis, California

- Designed and developed an Arduino-based assistive device to aid visually impaired individuals with real-time navigation.
- Spearheaded a team to build a proof of concept (POC) focusing on optimizing sensor response and system reliability.
- Developed and implemented an optimized algorithm, **reducing response time** per update cycle of the device by **50%**.
- Led end-to-end testing and iterative optimization, enhancing stability through code and hardware refinements.

Software Engineer Intern

May 2022 - June 2022

Software Engineering Research Center (SERC) - IIIT Hyderabad

Telangana, India

- Developed a real-time data acquisition pipeline for a pressure-sensitive mat, improving data retrieval speed by 50%.
- Built a data processing framework to clean and serialize sensor data into **JSON**, reducing processing time by 25%.
- Visualized pressure patterns using **Matplotlib** and **Plotly**, enhancing gait analysis accuracy for real-time monitoring.
- Implemented a recognition algorithm with **Eigenfaces**, improving gait analysis by **100%** using feature extraction.
- Integrated multiple pressure mats using scalable modules, reducing data processing latency by 50% for additional mats.
- Improved latency by 20% using **sparse matrix techniques** to eliminate redundant data and optimize memory usage.

PROJECTS

SRGAN-KD: Efficient Image Super-Resolution with Knowledge Distillation | Python, TensorFlow, GANs

- Replaced content loss with EfficientNet and PatchGAN, improving image quality by 12% on SSIM and reducing blur.
- Reduced inference time by 35% using Knowledge Distillation, training a lightweight student generator with fewer layers.
- Fine-tuned on the DIV2K dataset, lowering LPIPS by 10% via adversarial-perceptual loss balancing and feature tuning.
- Optimized training via hyperparameter tuning and distillation loss, enhancing detail retention in super-resolved images.

WindScope: Predicting Optimal Wind Farm Locations | Python, Pandas, Folium, Selenium

- Developed Python scripts to scrape and process wind speed, land cost, and capacity data using **Selenium** and web **APIs**.
- Built a master dataset using automated data cleaning pipelines, enhancing data accuracy for predictive analysis.
- Built an interactive geospatial map using **Folium** and **GeoJSON**, identifying optimal wind farm sites, cost and viability.

The NPM Dilemma: Too Many Packages or Too Few Standards? | Machine Learning, ESE

- Scraped data from GitHub to classify NPM packages, improving categorization accuracy with unsupervised learning.
- Applied regression and clustering models to analyze inter-category relationships, identifying dependency issues, and potential dead packages, and visualized package ecosystems using network graphs to identify outliers.

RESEARCH & PUBLICATIONS

- Comparative Study of Classification Algorithms in Sign Language Recognition, IEEE ICCNT 2022 ([Link](#))
- Comparative Study of Clustering Algorithms in Parallel and Serial Environments, IEEE INCOFT 2022 ([Link](#))