Harish Balaji Boominathan

+1 (347) 552-5608 | harish.balaji.b@nyu.edu | LinkedIn | Github | Portfolio

Education

New York University — New York, NY
Master of Science in Computer Engineering | GPA: 4.0/4.0 — *Aug. 2024 – May 2026*
- **Relevant Coursework:** Randomized Algorithms, Design and Analysis of Algorithms, Systems Engineering, Machine Learning, Deep Learning, Applied Matrix Theory.

SASTRA University — Tamil Nadu, India
Bachelor of Technology in Computer Science and Engineering — *Aug. 2020 – May 2024*
- **Relevant Coursework:** Data Structures, Design and Analysis of Algorithms, Operating Systems, Computer Networks, Python Programming with Web Frameworks, Computer Organization/Architecture.

Experience

Google Summer of Code 2025 Fellow — Jun. 2025 – Present
University of California, OSPO — *Remote*
- Engineered research-grade privacy metrics (e.g., *Markov-Model* risk scores) over 1M+ records, filtering 230k high-risk PII entries to prevent AI models from learning sensitive data.
- Designed a distributed async task queue with Celery and Redis to support the core APIs, optimized high-volume server work-loads and cut user wait times by 80%.
- Extended the framework to support 7 diverse image dataset types in collaboration with 2 research scientists from Lawrence Berkeley National Laboratory.
- **Tech Stack:** Python, JavaScript, Flask, Celery, Redis, Git, NumPy, Pandas, Matplotlib, CLIP, DinoV2.

Graduate Research Assistant — Jan. 2025 – Present
New York University — *New York, NY*
- Formulated and delivered a high-precision algorithm to synchronize 4K traffic videos at 30 FPS, achieving extremely high timing accuracy (videos synchronized with ∼2.8 milliseconds of deviation on average).
- Deployed an HRNet-based pose estimation model tracking 1000+ pedestrian trajectories from 3 intersections in Brooklyn with 95%+ accuracy.
- Led and mentored 4 lab members in data synchronization and pose detection, enabling them to work independently within 3 weeks and boosting the team throughput.
- **Tech Stack:** Python, OpenCV, GStreamer, FFmpeg, NumPy, Pandas, Flask, Git.

Projects

RouteWise | *Python, FastAPI, Neo4j, Pytest, Google Maps* — Jul. – Sep. 2025
- Developed scalable route-optimization platform solving TSP for 40+ locations, cutting delivery time by 25%.
- Established API endpoints for optimization using Greedy, DP and OR-Tools for optimal routes in $O(n^2)$.
- Integrated Simulated Annealing algorithm, enabling near-optimal solutions for 25+ locations.
- Augmented neo4j graph database for storage and caching, reducing the API cost by 77%.

El Silencio Acoustic Explorer | *Prometheus, Grafana, Cloud, FastAPI, CI/CD* — Jan. – May 2025
- Engineered an end-to-end ML audio-classification pipeline to detect 206 species of birds with 85% accuracy.
- Achieved 86% model compression via quantization, reduced latency to 23ms, and throughput increase by 380%.
- Deployed a highly optimized, low-power, offline edge ML solution on Raspberry Pi 5 for real-time bird species detection in the field, achieving 75ms latency with live monitoring.
- Built a live Prometheus/Grafana dashboard to monitor workloads on Chameleon cloud, ensuring efficient utilization across 4 GPU workers and 16 CPU cores.

DailyPod | *Python Flask, Docker, Redis, Celery* — Nov. – Dec. 2024
- Built a scalable, automated audio news delivery platform that can serve up to 5000 daily active Whatsapp users.
- Implemented distributed task-processing in the backend systems to handle 3x more concurrent user requests.

Technical Skills

Languages: Python, C/C++, Java, SQL (PostgreSQL), HTML/CSS, JavaScript
Frameworks: FastAPI, Flask, PyTorch, GraphQL (Neo4j)
Developer Tools: Git, Docker, Redis, CI/CD, Pytest, AWS, Cloud Platform
Libraries: NumPy, Pandas, Matplotlib, OpenCV, scikit-learn, CLIP, DINOv2