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Gururaj Khot

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Education

The University of Tennessee, Knoxville — Knoxville, TN
B.S. in Computer Science, Minor in Machine Learning & Applied AI — *Aug 2023 – Present*
- Relevant Coursework: Data Structures & Algorithms I & II, Probability & Random Variables, Introduction to Machine Learning, Systems Programming, Introduction to Deep Learning, Software Engineering, Algorithm Analysis

Work Experience

Hack4Impact UTK — Knoxville, TN
Software Developer — *Oct 2025 – Present*
- Built automated data-processing pipelines and KPI calculations for real-time public transit analytics.
- Developed responsive Next.js and TypeScript interfaces connected to backend APIs and PostgreSQL.
- Optimized database workflows using Drizzle ORM, improving performance and maintainability.

Digit7 — Remote
Software Engineering Intern — *Jun 2025 – Aug 2025*
Backend (Month 1)
- Designed and implemented RESTful backend services using FastAPI and MongoDB, applying object-oriented design and Clean Architecture principles.
- Developed and deployed API using FastAPI MongoDB, serving daily requests with < 100ms response timeFocus on information relevant to the reader.
- Identified and fixed defects through validation logic and targeted test scenarios to ensure API reliability and code coverage.

Computer Vision (Month 2)
- Developed AI-based computer vision inference models using OpenCV and Lab color space to classify visual patterns under varying conditions.
- Improved model recall by 12% through preprocessing (CLAHE) and edge-based feature refinement, strengthening robustness and accuracy.

UTK Machine Learning Lab — Knoxville, TN
Research Assistant / Shadowee — *Sep 2024 – Nov 2024*
- Collaborated with Computer Scientist Hairong Qi to optimize neural network architectures using Python.
- Participated in 40+ literature reviews on machine learning advancements in NLP and Computer Vision.
- Assisted in the development of research protocols, including data collection, analysis, and reporting.

Projects

- **HighHeat — Baseball Computer Vision Analytics System**: Developed an AI-based inference pipeline using YOLOv8 to detect and track baseball trajectories from video. Converted raw detections into structured metrics such as velocity and movement, emphasizing robustness, signal consistency, and error analysis. Designed the system as an end-to-end analytics workflow from data ingestion to visualization. Awarded $**1,000** in competitive project funding by the University of Tennessee, Knoxville.
- **Gender API — FastAPI & MongoDB**: Built a realm-aware Gender API enabling secure access to tenant-specific MongoDB databases with dynamic filters, pagination, and sorting. Designed reusable aggregation utilities with Pydantic models and integrated validation for realm existence and header inputs.
- **Color Detection & Image Classification Model**: Implemented a classification pipeline using Lab color features robust to lighting variation. Evaluated preprocessing strategies (normalization, noise reduction, CLAHE) and benchmarked k-NN, SVM, and ANN classifiers for accuracy vs. computation trade-offs.

Skills

Programming Languages: Python, C/C++, MATLAB, JavaScript, Linux

AI & Data: OpenCV, NumPy, Pandas, TensorFlow, PyTorch

Systems & Tools: RESTful APIs, Async Programming, MongoDB, Git/GitHub, Docker, Kubernetes, AWS, Azure

Engineering: Object-Oriented Design, Technical Design, Testing & Defect Analysis