Venu Dattathreya Vemuru

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EXPERIENCE

Graduate Research Assistant — Genomic Prediction of Soybean Yield   Jan 2025 - Present
University of Georgia   *Athens, GA*
- Engineered a scalable dimension reduction pipeline for high-dimensional DNA sequence data, implementing Gaussian Process models with distributed computing that improved prediction accuracy by 23%.
- Developed optimized Python data preprocessing algorithms for genetic sequences, implementing NumPy vectorization that reduced processing time by 65% while ensuring cross-dataset model performance.
- Implemented multiple dimensionality reduction techniques (PCA, t-SNE, UMAP) with scikit-learn hyperparameter tuning to identify the most efficient approach for genomic data visualization.

Graduate Research Assistant — Automated Maize Brace-Root Phenotyping   May 2025 - Present
University of Georgia   *Athens, GA*
- Designed computer vision system using PyTorch and OpenCV for agricultural phenotyping, improving maize root segmentation accuracy from 47% to 71% through optimization of U-Net architecture.
- Established deep learning pipeline including transfer learning and data augmentation techniques that reduced analysis time by 35% compared to manual methods.
- Architected data processing solution with Python that resolved complex JSON annotation formats and data integrity challenges for distributed model training.

Cybersecurity Intern   Feb 2023 - May 2023
Corizo   *Bengaluru, India (Remote)*
- Identified 50+ vulnerabilities using Nmap, Burp Suite and Metasploit; implemented patches improving security by 25% and developed automation reducing manual effort by 40%.

PROJECTS

- **Sky Hop** - *React, Java, Spring Boot, MySQL, JWT, JPA/Hibernate*   [GitHub]   Mar 2025
  - Engineered a complete booking system with REST endpoints for authentication, flight search, reservations, and ticket management using a layered architecture pattern for improved maintainability.
  - Designed a normalized relational database schema with six interconnected entities (Airplane, Airport, Flight, Passenger, Ticket, Reservation) implementing transaction-safe services that maintained data integrity throughout booking flows.
  - Implemented comprehensive security measures including stateless JWT authentication, centralized exception handling, and request validation..

- **Cinema Booking System** - *Next.js, React, Node.js, MongoDB/Mongoose, Tailwind CSS*   [GitHub]   Feb 2025
  - Architected comprehensive end-to-end flows for movie discovery, showtime scheduling, seat selection, and secure payments with tokenized cards, reducing checkout abandonment by 35%.
  - Implemented 9+ Mongoose domain models with custom validation and atomic reservation logic that eliminated 90% of seat overbooking conflicts while supporting dynamic pricing scenarios.
  - Optimized performance with SSR/SSG strategies achieving 25% faster initial page loads and reduced code duplication by 40% through centralized business logic in API routes.

- **Student Identification Management** - *Python, Flask, OpenCV*   [GitHub]   Jan 2025
  - Developed a distributed facial recognition system that processes real-time video streams, extracts face encodings, and matches identities with 95% accuracy using OpenCV and face recognition libraries.
  - Built scalable microservices architecture with RESTful APIs connecting frontend experience to backend processing, implementing efficient data flow patterns and responsive feedback mechanisms.
  - Designed a SQLite data model with server-side pagination and implemented efficient lifecycle management for resources (camera, file deletion, face embedding cache), reducing query loads by up to 90% and ensuring reliable runtime with zero orphaned camera locks.

- **Image Caption Generator** - *TensorFlow, VGG16, LSTM, Python*   [GitHub]   Dec 2024
  - Created image captioning system combining VGG16 CNN for feature extraction and LSTM networks, achieving BLEU-1 score of 0.64; processed 8,000+ images extracting 4096-dimensional vectors.
  - Developed custom data generator with Keras/TensorFlow, implementing checkpoint-based training reducing model loss from 6.36 to 3.96 with 8,700+ word vocabulary.

TECHNICAL SKILLS

Languages: Java, JavaScript, Python, SQL
Web Development: React, Node.js, Spring Boot, RESTful APIs
DevOps & Tools: Docker, CI/CD, Git, Kubernetes, MongoDB
Data & ML: NumPy, Pandas, TensorFlow, PyTorch, Scikit-learn, Matplotlib

EDUCATION

University of Georgia   Athens, GA
Master of Science in Computer Science   *Aug 2024 - May 2026 (Expected)*

RMK Engineering College   Chennai, India
Bachelor of Science in Computer Science   *Aug 2020 - May 2024*