Vinay Krishna Kumar

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 vinayk99 vinay2201

Skills

Programming Languages:	Python, Java, C++, JavaScript, TypeScript, Go
ML & NLP:	PyTorch, TensorFlow, Scikit-Learn, Transformers, Hugging Face, BERT
Data & Cloud:	ETL Pipelines, PostgreSQL, MongoDB, AWS lambda, Databricks
DevOps & Tools:	Tableau, Git, Docker, Jenkins, Jira, CI/CD Pipelines
Certification:	Oracle Database SQL Certified Associate, AWS Certified Developer – Associate (In Progress).

Education

- **University of Maryland, Baltimore County (UMBC)** — Aug'23 - May'25
  Master of Science, Information Systems — *GPA: 3.9/4.0*

  Relevant Course: *Data Mining, Information Extraction, Advanced Database Management Systems, Deep Learning, Decision Support System, Machine Learning, Structured Systems Analysis & Design*

- **SRM Easwari Engineering College, Chennai, India** — Jul'16 - Apr'20
  Bachelor of Engineering, Electronics and Communication Engineering — *GPA: 3.9/4.0*

  Relevant Course: *OOPs, Computer Architecture, Computer Networks, DBMS, Signals & Systems, Digital Signal Processing*

Experience

- **Research Assistant - UMBC (P.I: - Dr. Nirmalya Roy)** — Dec'23 - Current
  - Developed and validated middleware to simulate and evaluate network performance in virtual multi-robot systems, using machine learning to detect Line-of-Sight scenarios.
  - Built scalable data pipelines to process multi-robot network simulation data, improving data availability and reducing data processing time by 40%.
- **Research Intern - CARDS Lab, Maryland** — May'24 - August'24
  - Optimized Federated Learning model training, improving data adaptability by 25% across 10+ field experiments.
  - Deployed a novel lightweight Simultaneous Localization And Mapping (SLAM) algorithm, reducing computational overhead by 30%, on Clearpath Jackal and Boston Dynamics SPOT robots.
  - Engineered a real-time data monitoring system, enhancing remote tracking of 6+ robotic agents
- **Senior Software Engineer - Tata Communications, Chennai, India** — Jul'21 - Aug'23
  - Developed front-end using AngularJS and integrated with Java and JDBC backend, boosting user engagement and conversions by 15%. Optimized parallel job execution on AWS EC2 clusters, reducing processing time by 30%.
  - Engineered robust data models and optimized MS SQL schemas to enhance data storage and retrieval efficiency, significantly improving query performance by 20%.
  - Built dashboard visualizations using Tableau to present data-driven insights for internal teams.

Academic Projects

- **Volatility Forecasting Using Machine Learning**
  - Developed advanced models, including GARCH-LSTM and Moment-1-Large, to predict stock market volatility.
  - Processed 10 years of stock data from Yahoo Finance and engineered features such as log returns, moving averages, and RSI.
  - Achieved high prediction accuracy, with Moment-1-Large delivering an R^2 of 94.3% and an MSE of 0.015
- **Stock Market Price Prediction using Machine Learning**
  - Developed and implemented machine learning models, including Linear Regression, Random Forest, and Gradient Boosting, achieving 92% accuracy and reducing overfitting by optimizing hyperparameters.
  - Used sliding window techniques for adaptive sequential predictions.
- **Image Segmentation for Autonomous Vehicles**
  - Achieved 87% accuracy with a deep learning image segmentation model for real-time object classification in autonomous vehicles.
  - Engineered U-Net and DeepLab architectures to segment vehicles, pedestrians, and road signs from onboard camera images.
- **Advanced In-Car Anomaly Detection System for Driver Behavior Analysis**
  - Designed and implemented a driver behavior monitoring system to enhance safety by detecting drowsiness with 90% accuracy through facial expression and eyelid monitoring.
  - Deployed machine learning algorithms on AWS to analyze driver behavior in real-time, delivering alerts and warnings to prevent accidents.

Publications

- Dey, E., Ravi, A., **Kumar, V.K.**, Lewis, J., Freeman, J., Gregory, T., Suri, N., Busart, C. & Roy, N. (2025). DACC-Comm: DNN-Powered Adaptive Compression and Flow Control for Robust Communication in Network-Constrained Environments. In the COMSNETS Conference. (Accepted for publication)
- Dey, E., Ravi, A., **Kumar, V.K.**, Lewis, J. & Roy, N. (2024). Empirically Driven Adaptive Transmission for Enhanced Communication in Adversarial Environment. In the IEEE Military Communications (MILCOM) Conference. (Accepted for publication)