RAKESH PANDRINKI
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SUMMARY

Master's candidate in Electrical and Electronics Engineering with specialized expertise in Computer Vision, AI/ML, and Enterprise Software Development. Proven experience architecting industrial imaging systems with dual-YOLO detection frameworks, implementing advanced image processing pipelines using C#/.NET and OpenCV, and building high-performance multithreaded applications. Strong background in full-stack development, cloud-native microservices architecture, and database optimization across banking and financial domains. AWS Certified Solutions Architect – Professional with expertise in modern concurrency patterns, real-time processing, and distributed system design.

SKILLS

Programming Languages: Python, Java, JavaScript, TypeScript, C, C++, C#
Advanced C#/.NET Development: .NET Framework, WPF/XAML, Memory Management, SemaphoreSlim, CancellationToken, Multithreading.
Web & Application Development: Spring Boot, React.js, Angular, Node.js, Django, Flask, FastAPI, HTML, CSS
Computer Vision & AI/ML: OpenCV, YOLO (YOLOv5), ONNX Runtime, TensorFlow, PyTorch, Scikit-learn, Emgu CV.
Cloud & DevOps: AWS (EC2, S3, Lambda, DynamoDB), Azure, Google Cloud, Terraform, CI/CD, Git
Databases: SQL, MySQL, PostgreSQL, Oracle, MongoDB
Performance Optimization: Lock-free Data Structures,SIMD Operations, Memory- mapped I/O.
Communication & Caching: gRPC, Redis, RESTful APIs.
Software Development & Best Practices: Agile, Scrum, SDLC, Performance Optimization, Code Review, Version Control (Git, GitHub)
Operating Systems: Linux, Unix, Windows
Project Management & Collaboration: Visual Studio , JIRA, Confluence
Soft Skills: Problem-Solving, Critical Thinking, Communication, Collaboration, Adaptability, Leadership, Time Management

PROFESSIONAL EXPERIENCE

Computer Vision Software Engineer, SeeDevice Inc   **May 2025-present|Texas**

- Architected enterprise-grade industrial imaging platform using C#/.NET WPF with custom User-Controls and Writeable-Bitmap rendering, implementing thread-safe bitmap pooling and zero-copy memory operations to achieve 30+ FPS real-time processing with concurrent ONNX Runtime inference on 16-bit sensor data streams.
- Engineered dual-YOLO AI detection framework combining custom-trained animal models with YOLOv5 COCO detection, implementing sophisticated conflict resolution algorithms with IoU-based matching and model priority systems, achieving 92% detection accuracy with intelligent frame-skipping optimization (1-4x adaptive intervals).
- Created sophisticated motion tracking and prediction system using multithreaded Kalman filtering with velocity-based motion prediction, implementing atomic operations and lock-free data structures for concurrent object tracking with temporal stability algorithms achieving sub-pixel accuracy and 95% tracking consistency.
- Developed hospital-grade image enhancement suite featuring Non-Local Means (NLM) denoising and CLAHE histogram equalization specifically calibrated for raw 16-bit sensor data, enabling diagnostic-quality imaging from industrial cameras by compensating for missing ISP functionality.
- Engineered high-performance multithreaded processing architecture with async/await patterns, SemaphoreSlim concurrency control, and Cancellation Token-based task management, implementing parallel SIMD tensor operations and achieving 30+ FPS while reducing CPU usage by 45%**.**
- Built comprehensive calibration and correction pipeline implementing Grey Level Correction (GLC), Black/Saturation Level Correction (BLC/SLC), and Bayer Demosaicing with horizontal flip support, utilizing parallel processing and memory-mapped I/O for real-time correction of 16-bit sensor data streams.
- Developed cloud-ready microservices architecture with containerized ONNX inference services, implementing gRPC communication protocols and distributed caching strategies using Redis, enabling horizontal scaling and sub-100ms response times for edge computing deployments.
- Implemented enterprise-grade filter architecture with dependency injection, factory patterns, and thread-safe parameter adjustment through reactive WPF MVVM bindings, supporting real-time gamma correction, bilateral filtering, and unsharp masking with zero-copy memory operations and GPU acceleration readiness.
- Optimized memory management and performance through custom bitmap pooling to reduce GC pressure, producer-consumer queues for frame buffering, memory-mapped I/O operations for high-throughput data processing, and GPU-acceleration readiness with DirectML integration for edge computing deployments.
- Optimized real-time 16-bit image processing application to run smoothly on low-end laptops by implementing asynchronous background processing, custom memory pooling, and intelligent frame caching—achieving 30+ FPS on CPU-only systems while reducing memory overhead by 60% and eliminating UI lag

Software Developer, TCS   **Aug 2021 - Dec 2022 | India**

- Designed and developed enterprise-level applications for global banking and financial clients, leveraging Java, Spring Boot, and Angular, improving application performance and supporting seamless customer experiences for millions of users worldwide.
- Integrated third-party APIs for payment processing and external data consumption, reducing API response time, which improved transaction speeds and real-time data flow across systems.
- Led cloud migrations and deployments to AWS and Azure, implementing efficient scaling strategies and reducing cloud infrastructure costs by 21%, while improving performance and availability.
- Optimized SQL queries and database schemas in Oracle and MySQL, reducing query execution times and enhancing the efficiency of high-volume transactions, leading to better performance under high traffic conditions.
- Developed reusable and dynamic UI components using React.js and Angular, leading to a 24% improvement in user engagement and significantly enhancing the overall customer experience.
- Strengthened application security through code audits, vulnerability assessments, and the implementation of secure authentication protocols like JWT and OAuth, reducing potential vulnerabilities by 28% and enhancing compliance with industry standards.
- Integrated JUnit and Selenium into CI/CD pipelines, boosting test coverage to 92% and accelerating release cycles by 30% through automated early bug detection.
- Collaborated with Agile teams, managing sprint tasks, and improving on-time delivery of product features through careful planning, prioritization, and effective cross-team communication using JIRA.
- Troubleshot and resolved production issues, utilizing log analysis, debugging techniques, and collaboration with other teams to reduce downtime and improve the overall system reliability and customer experience.

University of North Texas - Research Assistant   **May 2024 - Aug 2024 | Texas**
- Implemented predictive Machine Learning models using Python, TensorFlow, and Scikit-learn, increasing solar energy forecasting accuracy by 30% under dynamic irradiance conditions.
- Engineered a custom Moteino-based communication protocol, integrating Raspberry Pi and Arduino, improving wireless sensor network (WSN) energy efficiency.
- Architected an automated energy distribution algorithm using LabVIEW and statistical modeling, optimizing real-time sensor data acquisition and reducing energy waste by 25%
- Built scalable data pipelines with Pandas and NumPy, ensuring efficient real-time processing and analysis of sensor data.
- Performed exploratory data analysis (EDA) and statistical modeling using Excel, MATLAB, and SAS, enabling key business insights and improving operational efficiency in large dataset.

University of North Texas - Teaching Assistant   **Jan 2024 - Dec 2024 | Texas**
- Assisted 50+ students in Engineering Electromagnetics, leading to a 15% improvement in performance.
- Conducted machine learning-based signal analysis using MATLAB in Signals and Systems labs, increasing student understanding of data-driven techniques.

EDUCATION

Master of Science in Electrical and Electronics Engineering
University of North Texas, TX   **Jan 2023 - Dec 2024**
Bachelor of Engineering in Electrical Engineering
National Institute of Technology, India   **Aug 2017 - Aug 2021**

PROJECTS

Medical Data Extraction Project   **May 2024 - Aug 2024**
- Engineered an automated document processing pipeline that transformed 1,000+ PDF pages into high-resolution images, cutting manual conversion time by 75%.
- Implemented image preprocessing using OpenCV and OCR extraction with Pytesseract, applying decision trees and statistical techniques for text classification, increasing extraction accuracy by 35%.
- Leveraged Pandas for data manipulation, cleaning, and analysis of extracted medical data, enabling efficient processing of large datasets.
- Utilized signal processing techniques for noise reduction in document images, enhancing OCR accuracy.
- Conceived and optimized a FastAPI-powered microservice for document parsing and data extraction, boosting processing efficiency by 40%.

Real Time Environmental Monitoring project   **Feb 2023 - May 2023**
- Pioneered an IoT-based real-time monitoring system using Arduino, Raspberry Pi, and ESP8266 sensors for continuous environmental data acquisition.
- Crafted a machine learning model in PyTorch to detect anomalies in collected data, elevating system accuracy and predictive analytics.
- Applied Generative AI techniques to generate synthetic environmental data, improving model robustness and predictive capability in low-data scenarios.
- Harnessed statistical techniques to analyze environmental data trends and identify outliers, boosting data driven decision making.
- Constructed an interactive web dashboard using Python (Flask) and JavaScript for real-time data visualization and analytics.

CERTIFICATIONS

AWS Certified Solutions Architect - Professional