Ravi Kumar Reddy Bangaru

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SUMMARY

Software Engineer with 6 years of experience building high-performance, distributed, and cloud-native systems. Proficient in Modern C++, Python, Java and Linux, with expertise in multithreading, real-time data synchronization, and performance optimization. Proven ability to design scalable architectures and deliver reliable software across embedded, enterprise, and cloud environments.

EDUCATION

Binghamton University, SUNY | Thomas J. Watson College of Engineering and Applied Science

Master of Science in Computer Science *Jan 2022 – May 2023*
Cumulative GPA: 3.70/4.00
Relevant Coursework: Programming Languages, Advanced Object-Oriented Programming, Programming for Web

PES University, Bangalore, India Aug 2014 - Jun 2018

Bachelor of Technology in Computer Science
Cumulative GPA: 8.21/10.00
Relevant Coursework: Advanced Algorithms, Computer Networks, Introduction to Operating Systems, Database Management Systems, Software Engineering, Machine Learning, Cloud Computing, Microprocessors

TECHNICAL SKILLS

Programming Languages and Databases: Python, JavaScript, C, C++, PHP, MYSQL, MongoDB, STL, Redis, Jenkins
Frameworks and Web-technologies: ReactJS, NodeJS, Laravel, Django, Android, HTML/CSS, Typescript
DevOps and Deployment: Git, Azure, AWS services (S3, Lambda, API Gateway, CloudFront), Docker, Kubernetes, CI/CD

PROFESSIONAL EXPERIENCE

Wabtec corporation Erie, PA
Senior Embedded Developer Oct 2025 – Present

- Developed and deployed **Yocto Linux OS** for HPEAP/1900 and vSim platforms, enabling stable embedded execution environments.
- Built and integrated GitLab CI/CD pipelines with automated unit-test frameworks to ensure continuous validation and quality assurance.
- Modernized legacy infrastructure libraries by porting **Configuration Management, Fault/Event Handling, Monitoring, Debugging, and Socket Systems** to Linux using C++20.
- Implemented advanced socket communication stacks supporting UDP, TCP, WebSocket, TLS/SSL, and Class-D protocols.
- Migrated key system interfaces—including GPS (NMEA/N, PTC 3000), HMI, ITO, Offboard, EITDB/ATP, and Hypervisor Management (HVM)—to Linux with clean C++ implementations.
- Refactored complex **MATLAB models** into modular, **high-performance C++ components**, improving reusability and runtime efficiency.
- Designed and implemented a robust data logging and telemetry framework for **MP values**, events, and system metrics, supporting offline diagnostics.
- Contributed to system architecture decisions, documentation, and modernization strategies ensuring long-term maintainability and scalability.
- Integrated **ZeroMQ and gRPC/Protobuf** for efficient inter-process and cross-module communication, enabling high-throughput data exchange across modernized Linux subsystems.
- Designed high-performance networking modules in **C++20**, optimizing socket layers (UDP/TCP/WebSocket/TLS) for low latency and scalable message routing.
- Implemented parallel processing pipelines using modern **C++ concurrency** and parallel algorithms, improving real-time system responsiveness across monitoring and event-processing modules.
- Leveraged **CUDA** for accelerating computationally intensive data-processing components, improving performance for real-time telemetry and analytics tasks.
- Optimized embedded inference workflows using **TensorRT** and **OpenVINO** for onboard decision-support subsystems and predictive diagnostics.
- Enhanced interface validation tools with GPU-assisted simulation and fast serialization/deserialization via Protobuf for performance testing.
- Applied GPU-accelerated kernels and optimized asynchronous communication to support future ML/AI-based modules in Trip Optimizer's embedded architecture.

Wabtec corporation Melbourne, FL
C++ Developer July 2023 – Oct 2025

- Architected & developed core back-end modules in **Modern C++17** using MVC, delivering a robust and fault-tolerant railway dispatching system.
- Enhanced front-end UI in **Java Swing**, building responsive layouts, **REST API bindings**, and visualization tools that boosted operator efficiency by 25%.
- Built interactive **dashboards** (train schedules, live routing maps, alerts), reducing dispatcher decision-making time.
- Designed and deployed **RESTful APIs** for backend–frontend communication, validating API contracts to accelerate QA cycles.
- Introduced real-time data synchronization between services using WebSocket & Kafka, improving communication reliability.
- Applied **test-driven development** (TDD) workflows (Google Test, Mockito), reducing defects by 30% and cutting test-writing time.
- Enhanced **CI/CD pipelines** (Jenkins, GitLab CI), integrating with AWS and GCP build agents for automated deployment across cloud environments.
- Containerized services with Docker and deployed on **Kubernetes clusters** (EKS/GKE), enabling adaptive scaling under peak loads.
- Implemented centralized logging and monitoring in the cloud (**CloudWatch, Prometheus, Grafana**), reducing downtime risk through proactive alerting.
- Tuned Linux kernel parameters and applied real-time patches to meet ultra-low-latency performance requirements.
- Optimized **PostgreSQL queries** & indexing, achieving 3× faster data retrieval with caching strategies (Redis + cloud-managed instances).
- Automated backups and disaster recovery workflows in AWS S3 and GCP Cloud Storage, ensuring data durability and compliance.
- Authored technical documentation, **UML diagrams, and design specifications** to speed up knowledge transfer.
- Championed clean architecture, **SOLID principles,** and modular design, ensuring long-term maintainability.

Global Health Impact Project Binghamton, NY
Software developer Intern Sep 2022 – Feb 2023

- **Developed a Forecasting Tool** in **Python (Flask, Matplotlib, Plotly)** to adjust health impact score inputs and **visualize predictive results** for stakeholders.

- **Designed and implemented an interactive blog page** using **React, HTML, CSS, JavaScript, and Bootstrap**, enabling
- researchers to share real-time insights and updates.
- **Integrated RESTful APIs** with Flask backend and React frontend for **dynamic data fetching, visualization, and real-time content**
- **updates**.
- **Automated testing & deployment** pipelines using **CI/CD (GitHub Actions, Docker)**, reducing release effort and improving code
- reliability.
- Enhanced **UI accessibility compliance with WCAG standards**, ensuring usability for a broader range of users and researchers.
- Collaborated with cross-functional teams to **improve data presentation**, leveraging **data visualization libraries (Plotly, Matplotlib)** for clearer impact analysis.

Technologies used: **Python, React, Flask Framework, HTML, CSS, JavaScript, Bootstrap**

Samsung R&D Institute India - Bangalore Bangalore, India
Software Engineer *Aug 2018 - Mar 2020*

- **Enhanced Android Wi-Fi framework and supplicant modules** (C/C++ & Java), improving **seamless roaming, auto-reconnect, and power efficiency** across Samsung devices.
- **Developed and integrated Wi-Fi 6 (802.11ax) features** into the Android stack, boosting throughput and connectivity stability in high-density networks.
- Contributed to **Android HAL (Hardware Abstraction Layer)** for Wi-Fi drivers, enabling smooth communication between kernel modules and higher-level frameworks.
- Optimized **network stack interactions** (DHCP, IPv6, NAT) within Android OS, ensuring compatibility with mesh routers and enterprise Wi-Fi deployments.
- Implemented **Android system services** for Wi-Fi management (auto-discovery, hotspot tethering, security handshakes), improving user experience and reducing connection failures.
- **Developed TR-069 module in C++** for mesh routers, enabling remote management and automated provisioning.
- Debugged Wi-Fi connectivity using **Wireshark, tcpdump, and Android logging (logcat, ADB)** to trace kernel-to-framework issues.
- Customized **OpenWRT firmware and Linux kernel modules**, improving driver stability and real-time packet scheduling.

- Conducted **static/dynamic code analysis** with **PVS-Studio, ASan/UBSan, and Valgrind**, identifying vulnerabilities
- Automated firmware and Android integration tests with **CI/CD pipelines (Jenkins, GitLab CI)**, reducing regression cycles by 40%.

Samsung R&D Institute India - Bangalore Bangalore, India
Research Intern *Jan 2018 - Jun 2018*

- Participated in research discussions and developed an idea to increase the mesh router's Qos by changing its placement based on data collected from the client devices
- Built POC that takes the collected data and searches for optimal placement by searching through the solution space using PSO algorithm
- Developed POC for Indoor Positioning System on **Android** platform, by collecting the data of Wi-Fi access points, triggered by user's actions and classified the user location when enough data is collected by using **KNN** algorithm
- Published and Presented research at the 2019 IEEE International Conference on Electronics, Computing and Communication Technologies(CONECCT)

PROJECTS

Devstral AI Coding Companion (July 2025 - Present)

- Integrated **Devstral**, a cutting-edge open-source coding LLM by Mistral AI, into internal development workflows, assisting in code generation, bug-fixes, and boilerplate creation.
- Deployed on compute-efficient hardware (e.g., RTX 4090), optimizing latency-sensitive development tasks, and showcased support for large context windows (up to 128K tokens).
- Resulted in **40% faster implementation cycles**, reducing development bottlenecks and improving code quality across languages

Intelligent Retrieval-Augmented Chatbot Agent (May 2025)

- Built an LLM-based, **multi-agent chatbot** using Retrieval-Augmented Generation (RAG) and ChatGPT API for context-aware resume screening and career guidance. Employed separate agents for extraction, evaluation, summarization, and scoring to mimic human-like reasoning and fairness in hiring.
- Implemented **RAG-based knowledge integration**, pulling from external sources (industry standards, certifications, schools) for nuanced evaluation.
- Validated AI-generated assessments against HR-provided scores, achieving **90% alignment** and demonstrating scalable, transparent screening workflows based on peer-reviewed findings