ABHISHEK RANGI

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EDUCATION

Master of Science, Computer Science Aug 2023 - May 2025(Expected)
Towson University, Towson, MD CGPA - 4.0/4.0
Advisor: Dr. Yeong-Tae Song
Thesis: On-device AI on medical data

Bachelor of Technology, Computer Science & Engineering July 2018 - July 2022
Keshav Memorial Institute of Technology, Hyderabad (Affiliated to JNTUH, India) CGPA - 7.52/10

SKILLS

Programming Languages	Python, C/C++, Java
AI/ML	LLMs, LangChain, RAG, TensorFlow, scikit-learn, OpenCV, Data Processing
Databases	SQL, SQL Server, SQLite, MongoDB, PostgreSQL
Web Technologies	TypeScript, AngularJS, React, NextJS, Node JS, jQuery
Tools	GitHub, Bitbucket, JIRA, Jenkins, Google Suite, Microsoft Office Suite

RESEARCH AND PUBLICATIONS

On-Device AI for Secure Patient Health Monitoring 2025
Abhishek Rangi, Yeong-Tae Song
The 23rd IEEE/ACIS International Conference on Software Engineering, Management and Applications (SERA 2025)

An Evaluation of the Security of Bare Machine Computing (BMC) Systems against Cybersecurity Attacks 2024
Fahad Alotaibi, Ramesh K. Karne, Alexander L. Wijesinha, Nirmala Soundararajan, **Abhishek Rangi** [Paper]
Journal of Cybersecurity and Privacy. 2024; 4(3):678-730.

A Chat Application on a Bare Internet 2024
Fahad Alotaibi, Ramesh K. Karne, Alexander L. Wijesinha, Nirmala Soundararajan, **Abhishek Rangi** [Paper]
2024 IEEE 48th Annual Computers, Software, and Applications Conference (COMPSAC)

PROJECTS

Smart Library Assistant

- Identified limitations with traditional fine-tuning methods when developing a library chatbot and pivoted to Retrieval-Augmented Generation (RAG), ensuring more accurate, context-aware, and personalized responses.
- Integrated FAISS vector storage for efficient semantic retrieval and leveraged HuggingFaceEmbeddings to significantly boost document matching accuracy, enhancing user satisfaction.
- Optimized chatbot responsiveness by implementing Redis for caching, while orchestrating conversational flows and dynamic deployment using Chainlit, improving interaction quality and scalability.
- Built a robust ConversationalRetrievalChain architecture with a large language model, ensuring seamless context maintenance across user interactions and delivering a highly adaptive user experience.

Analysis of 911 Calls for Detroit and New York City

- Launched a data-driven project analyzing emergency 911 calls from two major cities, aiming to predict hotspots and improve urban public safety operations.
- Applied advanced modeling techniques such as SARIMAX for time-series forecasting, DBSCAN for anomaly detection, and K-Means clustering to uncover spatial and temporal incident patterns.
- Devised a methodology combining predictive modeling and spatial analysis, generating insights on call frequency and distribution to inform strategic emergency resource allocation.
- Delivered actionable findings expected to aid public agencies in implementing targeted interventions, ultimately supporting safer urban environments and optimized emergency response systems.

Inventory Management System

- Designed and developed an advanced inventory management solution for a simulated retail business ("Bharat Ki Saree"), aimed at improving operational visibility and stock control.
- Built a relational database using SQL and Node.js, integrating real-time inventory tracking, client management, and automated ordering features tailored for business growth.

- Automated key processes through SQL triggers, ensuring immediate and error-free updates for inventory changes and order fulfillment, thus reducing operational overhead.
- Created a user-friendly Angular interface for administrative users, enhancing the system's usability and enabling effective inventory and order management with minimal technical training.

Secure Cloud Storage using Cryptography

- Addressed critical cloud security challenges by designing a secure file storage system integrating Flask, AWS S3, and hybrid cryptographic techniques for high-stakes environments like military and industry.
- Implemented a hybrid encryption mechanism combining AES, DES, RSA, along with steganography, ensuring robust multi-layered protection for sensitive data.
- Devised a file-slicing encryption strategy to maximize throughput while minimizing encryption time, while LSB steganography was used for secure key management.
- Enabled highly secure cloud file storage and retrieval via AWS Lambda automation, boosting system reliability and strengthening user trust in cloud-based data solutions.

WORK EXPERIENCE

Graduate Research Assistant

Towson University, Bare Machine Computing (BMC) Research — Aug 2023 - Present

- Assisted in developing a chat application utilizing C, C++, and assembly language, contributing to complex software solution engineering.
- Surveyed over 100 research publications to identify cybersecurity vulnerabilities and attacks in machines with operating systems. Compared these findings with Bare Machine Computing, which lacks an OS and is immune to such attacks, highlighting the security benefits of this architecture.
- Supervise students during semesters, enhancing course delivery and student engagement through improved educational techniques and interaction strategies.

Full Stack Developer

DBS Tech India, Consumer Banking & Core. Engines Technology (C2E) — Aug 2022 - July 2023

- Engineered robust backend services using Java and developed dynamic front-end interfaces with Angular, enhancing system architecture across multiple projects.
- Led the integration and management of PostgreSQL databases and Java APIs, significantly improving data interaction and server performance.
- Implemented microservices architecture to ensure scalable and efficient application deployments, alongside continuous integration and deployment (CI/CD) using Jenkins.
- Conducted comprehensive testing with Jasmine and JUnit, maintaining high standards of software quality and reliability.
- Streamlined code management and version control using Bitbucket, facilitating effective team collaboration and project tracking.

Blockchain Intern

Virtusa, Technology — July 2021 - April 2022

- Implemented over 30 user stories within an Agile framework using JIRA, significantly improving project tracking and team collaboration.
- Developed and managed 13 REST API endpoints using Express and Node.js, enhancing backend functionality and frontend integration.
- Generated and managed large datasets in MongoDB, facilitating effective testing and database operations.
- Enhanced supply chain management solutions by integrating blockchain technologies, focusing on data security and operational efficiency.

LEADERSHIP & ACTIVITIES

Lab Administrator, CIS TECH HUB, Towson University — Jan 2024 - Present

Member, TU Software Engineering Club, Towson University — Aug 2023 - Present

Member, International Students Association, Towson University — Aug 2023 - Present