Krishna Raketla

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EDUCATION

Northeastern University — Boston, USA
Master's in Computer Science — *Jan 2023 – Present*

Vellore Institute of Technology — Vellore, India
Bachelor of Technology in Computer Science and Engineering — *May 2019*

PROJECTS

MyBookShelf | *React, Node, Express, Mongoose, MongoDB, JWT, Locust* — *May 2024 – Present*

- Engineered a responsive and intuitive user interface using React, implementing dynamic components for seamless user interactions, achieving an average page load time of 1s.
- Designed a scalable MongoDB database with comprehensive schemas for users, bookshelves, and books, capable of handling high volume data with peak loads of up to 10,000 concurrent users.
- Implemented secure user authentication and session management using JSON Web Tokens, ensuring robust protection and continuous verification of user-specific access.
- Developed RESTful APIs using Express.js and Node.js to facilitate efficient communication between the frontend and backend systems, ensuring response times maintained under 200 milliseconds, laying the groundwork for a reliable and responsive application.
- Implemented automated testing using React Testing Library and Jest, achieving 90% coverage.

Book Recommendation System | *ML, Python, Docker, GCP, Kubernetes, FastAPI, SciPy* — *May 2024 – Present*

- Processed and refined a dataset of approximately 2.3 million books and over 228 million user interactions, providing a robust foundation for developing book recommendation algorithms.
- Engineered a sophisticated hybrid collaborative filtering system, integrating user-user and item-item, and SVD achieving 85% personalization accuracy.
- Orchestrated Docker containerization of the model and engineered RESTful APIs using FastAPI, boosting deployment efficiency and facilitating seamless integration with front-end applications.
- Developing an advanced neural collaborative filtering model to address critical challenges like targeting data sparsity and scalability issues, while enhancing overall prediction accuracy.

Advanced Image Captioning | *ML, Python, TensorFlow, Pandas, Keras* — *Jan 2024 – April 2024*

- Developed and compared advanced image captioning models (ResNet50-LSTM and DenseNet201-LSTM) using the Flickr8k dataset, enhancing automated description capabilities.
- Implemented transfer learning with pre-trained CNNs and LSTM networks, employing techniques like gradient clipping, learning rate scheduling, and early stopping to optimize model performance.
- Optimized image captioning model using DenseNet201-LSTM architecture, achieving superior performance with ROUGE-1 F1-score of 0.208, ROUGE-2 F1-score of 0.052, and ROUGE-L F1-score of 0.196, outperforming the baseline ResNet50-LSTM model by an average of 15% across all metrics.

Vertical Search Engine | *NLP, ML, Python, RocksDB, Elasticsearch, Algorithms, ETL* — *Jan 2024 – April 2024*

- Developed a vertical search engine for hurricane/tropical storm data, implementing TF-IDF, BM25, and LM-Laplace retrieval models. Crawled and indexed 40,000 documents, improving search efficiency by 10% over baseline.
- Architected a custom indexing system and an ETL pipeline using RocksDB and gzip compression to replace Elasticsearch.
- Designed a frontier management system with min-heap, optimizing crawling efficiency by 40% and reducing query response times by 30%.
- Computed PageRank for all crawled pages to enhance search result relevance and quality.

Text Summarisation of Research Papers | *NLP, ML, Python, LLM, Transformers, OCR* *Sept 2023 – Dec 2023*

- Engineered an abstractive text summarization framework by fine-tuning a BERT-based sequence-to-sequence model for generating concise and accurate summaries.
- Processed and cleaned the CNN/Daily Mail dataset to ensure high-quality training data.
- Developed an algorithm to extract reading order from PDF documents using OCR, leveraging layoutparser and pdfplumber, which enhanced the retrieval of query relevant sections.
- Achieved a ROUGE-2 score of 16.10, validating model performance, integrated MiniLM-L6-v2 for advanced text processing.

Image Processing Application | *Object Oriented Design, Java, Junit* *Jan 2023 – April 2023*

- Developed a Java based image processing application with Java 8 and Swing, supporting multiple formats such as PPM, JPEG, BMP, and PNG, emphasizing clean, modular OOD for enhanced maintainability.
- Implemented MVC (Model-View-Controller) patterns, encapsulation, and dynamic dispatch techniques to optimize the application's scalability and performance.
- Directed continuous unit testing efforts utilizing JUnit 4 to ensure reliable software development and efficient debugging processes.

WORK EXPERIENCE

Graduate Teaching Assistant *Jan 2024 – April 2024*

Northeastern University *Boston, MA*

- Mentored and guided 68 students in Natural Language Processing, enhancing their understanding by addressing queries and providing detailed evaluations of their work.

Intermediate Software Engineer *Jan 2022 – Nov 2022*

HP Inc *Bangalore, India*

- Administered Fax UI workflow development using QML and JavaScript, developing over 50 feature specifications and facilitating cross functional team collaboration for design and API integration, achieving a 20% faster development cycle.
- Pioneered critical features: Schedule Fax, Forward Fax, Fax UI for enterprise models, by integrating Agile development practices and computer engineering principles to streamline development and ensure high reliability through rigorous unit testing.
- Guided two interns through robust microservice development for the Job layer, meticulously overseeing code quality and integration, culminating in the seamless delivery of enhanced UI features.

Software Engineer *Aug 2019 – Dec 2021*

HP Inc *Bangalore, India*

- Revamped fax system data management from XML to Google FlatBuffers, catering to a new microservices architecture, which streamlined storage efficiency. Significantly boosting system performance and reducing memory overhead by 65.12%.
- Designed a modular data collection interface across the network and job layers of the protocol stack in C++, leveraging abstract factory patterns and interfaces to ensure component decoupling, reducing issue debugging time by 35%.
- Implemented the Common Data Model (CDM) adapters for Receive Fax job ticket microservice to enable seamless communication between the firmware resource and application microservices.
- Architected and built the Synaptics Build Server using advanced bash scripting to automate modem firmware builds, enhancing productivity and compliance with legal restrictions on code sharing.
- Enhanced fax components' reliability by increasing unit test coverage by 40% through comprehensive Google Test suites for FaxControl, AnalogFax, and SendFax components.

Research and Development Intern *Jan 2019 – July 2019*
HP Inc *Bangalore, India*

- Identified failure commits by automating the testing process using a binary search algorithm to efficiently sift through last known pass and most recent fail, expediting the process from 3-man days to 20 minutes.
- Engineered a model of firmware architecture using C# .NET framework for printer's native code to expedite the integration of a performance profiling tool with the firmware, thereby uncovering issues in advance.

SKILLS

Languages: Python, Java, C++, JavaScript, SQL.
Frameworks & Libraries: React, Node.js, Express, MongoDB, TensorFlow, PyTorch, Scikit-learn, FastAPI, Flask.
Tools & Technologies: Docker, Kubernetes, Git, RESTful APIs, GCP, Elasticsearch, RocksDB
Concepts: Machine Learning, Natural Language Processing, Data Structures, Algorithms, Microservices.
Soft Skills: Communication, cross-team collaboration, conflict resolution, problem-solving.
Other: Agile Methodologies, CI/CD, Object-Oriented Design, Unit Testing, Performance Optimization.