

Ritvik Mahapatra

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EDUCATION

University of Maryland

Expected Graduation: December 2026

Bachelor of Science, Computer Science | Minor in Economics | Dean's List

Relevant Coursework: Data Science, Elementary Theory of Computation, Machine Learning, Human-Computer Interaction

EXPERIENCE

Minnodi LLC

Frederick, Maryland

AI/ML Engineer Intern

June 2025- Present

- Designed a natural language-driven assistant for users with disabilities to complete complex online tasks, using **LangChain**, **Browser Use**, and **Gemini** agents to automate **16–28 step** workflows across **~20 sites** like Amazon, Expedia, and UberEats.
- Developed task planning strategies to dynamically identify and interact with UI elements; tuned agent behaviors for **~30 different** task types including flight booking, food ordering, and multi-item cart addition, decreasing average steps by **~45%**.
- Implemented a planner agent within the assistant's multi-agent architecture to coordinate Browser Use and Gemini agents, boosting overall task throughput by 20%
- Integrated **Monte Carlo Tree Search**-based **reinforcement learning** into agent planning, enabling adaptive long-horizon task execution and improving task success rates on multi-page workflows by **~12%**.
- Collaborated on frontend integration using **React.js** and **ElevenLabs TTS** for accessibility and improved user experience.

Booz-Allen Hamilton – App Dev Club

College Park, Maryland

Full Stack Developer

January 2025-May 2025

- Collaborated on a **10-person** Agile team to architect a containerized **TypeScript + Next.js** application that automates insurance policy auditing, saving Booz-Allen Hamilton an estimated **\$50,000**.
- Designed and implemented backend search and filter APIs leveraging **PostgreSQL** full-text search, enabling efficient partial and fuzzy text matching for rapid policy retrieval and improved user experience.
- Engineered an OCR pipeline with **Tesseract-OCR** and **OpenCV**, preprocessing scanned insurance documents and extracting structured data with high accuracy for downstream processing.
- Built a scalable, event-driven data processing pipeline using **AWS Lambda**, **EC2**, **SQS**, and **S3 buckets**, orchestrating the queuing of **500+** sample policy documents from an **RDS instance** for automated extraction, storage, and summarization
- Presented our application in a final demo to **~30 Booz-Allen employees** across underwriting, IT, and executive teams, gathering cross-functional feedback that directly shaped our last sprint's feature set.

PROJECTS & ACTIVITIES

Personal Portfolio Site:

Github Repository

Angular | TypeScript | FastAPI | LangChain | FAISS | Tailwind

- Built and deployed an **Angular**-based portfolio site, featuring an interactive timeline of **17** technical projects and experiences
- Built VibeMatch, an AI-powered feature where users input 5 favorite artists and receive a compatibility score from 0-100 based on alignment with my music taste, using fine-tuned embeddings and a **FastAPI** backend.
- Integrated a **RAG-based chatbot** to let users query my resume and project data with real-time responses.

Author Classification:

Github Repository

NLTK | TensorFlow | BERT

- Built a complete NLP pipeline across **80+** texts from **11** authors, cleaned and split into **~5,000** analysis samples.
- Compared **three** embedding strategies (Bag-of-Words, TF-IDF, Word2Vec) using **six** classifiers (Logistic Regression, XGBoost, Random Forest, Gradient Boosting and KNN), attaining peak accuracy of **97%**.
- Designed a stacked Bi-LSTM with attention (**94% accuracy**) and fine-tuned a BERT-base model (**92.5% accuracy**)

TuneTonic (Lyrics Sentiment Analysis):

Github Repository

Python | Flask | React.js | Node | Chart.js

- Developed a web application that predicts the emotional content of songs by training a sentiment analysis model on **150k+** lyrics to estimate Spotify Valence scores (0–1) with a **loss of 0.025**, using **TensorFlow**, **scikit-learn**, and **Pandas**
- Implemented a back-end system with **Node.js**, **Express**, and **Flask** and utilized **React.js** and **Chart.js** for frontend

SQuAD QA Analysis:

Github Repository

FAISS | BM25 | BERT | GPT | LangChain

- Engineered an end-to-end **RAG-A** pipeline with over **500 Wikipedia topics** by combining **DPR/FAISS** and **BM25 hybrid retrieval** with cross-encoder re-ranking
- Built **BERT-large** extractive and **GPT-3.5** generative QA systems with answer aggregation, achieving **>65% EM**
- Automated multi-metric evaluation (EM, F1, recall, relevancy, faithfulness) using **LangChain & FAISS**

SKILLS

Programming Languages: Python, Java, Dart, JavaScript, SQL, C, R

Frameworks/Databases/Tools: Flutter, React.js, Next.js, Angular, FastAPI, Flask, Node.js, Express, PostgreSQL, SQLite, SQLAlchemy, OpenCV, MongoDB, Git, Linux, Kaggle, Lambda, EC2, SQS, S3 Buckets, RDS, Ollama, BERT, LangChain, NLTK

Certifications: IBM Full Stack Developer Certification (React.js, Node.js, MongoDB, Docker, Kubernetes, DevOps, Agile/Scrum Methodologies, Microservices courses), Minnodi LLC Computer Vision, NLP, and AI Agent Course