Kartikeya Aneja

+1(608) 982-7607 • kaneja@wisc.edu • kartikeyaaneja.github.io
kartikeyaaneja • kartikeyaaneja

Experience

Ansyst Consulting **May 2025–Present**
AI/ML Intern
Designed and implemented a Retrieval-Augmented Generation (RAG) system for PDFs containing text, tables, and images. Converted PDFs to markdown format, preserving structure and metadata such as page numbers for citation. Engineered context-aware chunking, used BAAI/bge-large-en for embeddings, and stored the chunks and embeddings in MongoDB. Used cosine similarity for top-k retrieval and reranked results to enhance relevance. Integrated GPT-3.5, Lllma3.2 and DeepSeek for LLM-based responses and evaluated outputs using BLEU and ROUGE scores. Enhanced performance through query rewriting and expansion techniques.

Virginia Tech **May 2025–Present**
Research Intern
Conducting research on malware detection using Graph Neural Networks (GNNs) under the supervision of Dr. Murat Kantarcioglu. Preparing a dataset comprising function call graphs, and process graphs of malware and benignware using tools such as Ghidra, Any.Run, and Python. The objective is to train a GNN model for robust and accurate malware classification.

Honor Education **May 2025–Present**
Research Intern
Collaborating on the development of a dataset for the 1Cademy AI Assistant, aimed at enhancing educational AI capabilities. Contributing to a research publication based on this dataset.

University of Wisconsin-Madison, Madison, WI **Sep 2023–Till date**
Peer Mentor, CS 220, Data Science Programming
- Supported students during lab sessions by guiding them through coding exercises, debugging, and applying data science concepts in Python.
- Held regular office hours to assist with coursework, clarify project requirements, and explain theoretical concepts in data science and programming.

Education

B.S. Computer Engineering (Machine Learning and Data Science) **Anticipated May 2026**
University of Wisconsin-Madison, Madison, WI
- GPA: 3.47
- Dean's Honor List 3x: Spring 23, Spring 24, Fall 24
- Awarded Paul H Thiele Scholarship from College of Engineering for the 2024-2025 year

Relevant Courses: Data Science Programming, Programming III, DBMS, Operating System

General Certificate of Education (GCE) and International Advanced Level **2020-2022**
Jerudong International School, Brunei
Computer Science (A*); Mathematics (A*); Further Mathematics (A), Physics (A)

Patent

Kartikeya Aneja "Shopping Platform and Advertisement Revenue Sharing" US 19/075,947, Filed 3/11/2025
The patent discloses a method to generate advertisement by artificial intelligence and sharing the revenue with viewers

Skills

Programming languages: Python, Java, C, MATLAB, Verilog
Computer software/frameworks: NumPy, Pandas, Scikit-learn, OpenAI, LangChain, PyTorch, MongoDB, Knowledge Graph, GraphRAG, Neo4j, Cypher Query Language

Certification

General HAM Radio License by American Radio Relay League (ARRL-VEC)
`https://exam.tools/validate/eb503e2`

Projects

- **GraphRAG for Meeting Notes Using Neo4j**: Developed a hybrid RAG system for Zoom meeting notes by integrating a knowledge graph using Neo4j and OpenAI gpt-3.5-turbo. Stored chunk embeddings in Neo4j and combined vector similarity with graph traversal for accurate query responses.
- **RAG for PDF**[1]: Developed a Retrieval-Augmented Generation (RAG) system for complex PDFs by converting them into structured Markdown, generating context-aware chunks with metadata, and storing embeddings in MongoDB using `BAAI/bge-large-en`. Enhanced performance through query rewriting and evaluation with BLEU and ROUGE scores.
- **Applying Lightweight Fine Tuning to a Foundational Model**: Applied parameter-efficient fine-tuning techniques to a pre-trained DistilBERT classifier using the IMDB dataset on Hugging Face, achieving a 35% improvement in accuracy.
- **Custom ChatBot using RAG**: Enhanced a chatbot with a custom dataset using RAG techniques. Evaluated performance with tailored Q&A examples and demonstrated improvements through comparative analysis.
- **Deploying a Flask App to Kubernetes Using EKS**: Containerized a Flask web application using Docker and deployed it to a Kubernetes cluster on Amazon EKS. Implemented automated testing and monitoring via AWS tools to ensure code quality and reliability.
- **Identity Access Management**: Designed and implemented a backend for a coffee shop application with user authentication and role-based access control to manage feature access based on user roles.
- **Trivia API**: Created a RESTful API to retrieve trivia questions based on category and difficulty. Enabled users to contribute new questions and adjust difficulty ratings dynamically.

Course Projects

- **C Language**: Programming a PSoC6 Hardware Dev Board (Joystick, LEDs, Buttons, Display, Timer, etc.) Sudoku Checker; Magic Square Builder; Building a custom heap
- **Java**: Implemented RedBlack Tree data structure; Dijkstra's Algorithm; Developed a hash table data structure; Hospital priority queue system functionality; Simple GUI project game; Twitter feed functionality: create tweets, like, retweet, maintain chronological order using linked list; Password cracking: implementation with min/max heap of common passwords prioritized for cracking
- **Python**: Machine Learning and Data Science; Data Cleaning; Standardizing Data; K-Means; PCA Analysis; K-Nearest Neighbor; Decision Tree; Linear and Multiple variable Regression; Polynomial Regression.
- **Verilog**: Implemented Full Adder, Ripple Carry Adder, Encoders, Decoders, Comparator, Waveform Detectors; (Ongoing Design Project)

Leadership Experience

- **Ivy House Award**
  Leadership development program which helps students develop essential life and leadership skills such as confidence, resilience, self-leadership, and communication through a series of structured sessions.

[1] `https://github.com/kartikeyaaneja/RAGforPDF`