Abhinav Kapavarapu

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Education

University of Florida, Gainesville, FL **Aug 2023 - May 2025**
Masters in Computer and Information Science and Engineering *CGPA: 3.92/4.0*

Anurag Group of Institutions, Hyderabad, India **Aug 2019 - Jun 2023**
Bachelors in Electronics and Communication Engineering *CGPA: 8.06/10*

Experience

The Hackett Group **Mar 2023 - Apr 2023**
Project Trainee Intern *Hyderabad, India*

- Gained practical **Machine Learning** expertise through projects such as **Sentiment Analysis** using around 500 customer reviews to interpret sentiments and **Market Mix Modeling** to analyze around 10 key sales drivers.
- Completed a project analyzing around 100 employee records to identify stress triggers, utilizing data analytic tools to highlight potential stress factors, contributing to ongoing research on workplace wellness.

Projects

Research Paper Summarization and Query Answering System | *Python, T5-small, FAISS, GPT-3.5, spaCy* **Feb 2025**

- Optimized **T5-small** on **75,000 Arxiv documents** for abstractive summarization with a step size of **3e-4**, a batch size of **4**, and **3 epochs**.
- Achieved a **ROUGE-1 score of 16.68** and **ROUGE-2 score of 5.84** in the final epoch, demonstrating effective summary generation.
- Integrated **Retrieval-Augmented Generation (RAG)** with **FAISS** for efficient, context-based summary retrieval and built a **FAISS** index using **Sentence-Transformer** embeddings, significantly improving the relevance and accuracy of generated summaries.
- Used **OpenAI GPT-3.5** to generate context-aware answers from the retrieved summaries, with text preprocessing (lemmatization and tokenization) performed by **spaCy**.

Food Delivery Web Application | *React, HTML, CSS, Node.js, Express, MongoDB* **Oct 2024**

- Designed a responsive frontend using **React, HTML, and CSS**, featuring an engaging **home page**, **menu filtering by category**, and a **checkout page** to enhance the overall experience.
- Developed backend architecture with **Node.js and Express**, creating robust **RESTful API endpoints** for efficient request processing and data retrieval from **MongoDB Atlas**.
- Implemented secure **authentication and authorization** workflows via **JSON Web Tokens (JWT)**, enabling seamless account management and session handling.
- Integrated an **AI chatbot** powered by **OpenAI GPT-3.5 Turbo API** to provide **personalized food recommendations** and handle **queries**, enhancing engagement.

Personalized News Categorization | *Python, Flan-T5-base, spaCy* **Apr 2024**

- Developed a personalized news delivery system based on **Retrieval-Augmented Generation (RAG)**, tailoring content retrieval to individual profiles.
- Enhanced categorization and content distribution by applying **prompt generation** techniques and fine-tuning the **Flan-T5-base model** with a learning rate of 3e-4 over 3 epochs, optimizing performance and engagement.
- Improved retrieval mechanisms through the **BM25 algorithm**, ensuring alignment between preferences and news content while optimizing model performance.

Remote Sensing Image Captioning using Deep Learning | *Python, Pandas, TensorFlow* **Mar 2024**

- Led a deep learning initiative to generate precise and contextually relevant captions for a dataset of 1,680 remote sensing images, improving the interpretability of complex spatial data.
- Implemented **Convolutional Neural Networks (CNN)** featuring the **RESNET 152** architecture for feature extraction and integrated them with **Long Short-Term Memory (LSTM)** units in **Recurrent Neural Networks (RNN)** to produce coherent image captions, leveraging **TensorFlow** for development.
- Assessed the model's performance rigorously with industry-standard metrics, achieving a **BLEU-1 score of 0.7** and **CIDEr score of 2.38**, ensuring both accuracy and contextual relevance in the captions.

Technical Skills

Languages: Python, C, Java, F#, SQL, JavaScript
Web Frameworks and Databases: Node.js, Express, React, Django, HTML, CSS, MongoDB, MySQL
Tools and Cloud Technologies: AWS, IBM Cloud, GitHub, VS Code, Postman, Android Studio, Microsoft Office