Rajkamal Sah

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Education

- **Indian Institute of Science ,Bangalore** — *Aug 2019 - ongoing*
  PhD — Bangalore, India
- **Indian Institute of Technology** — *Aug 2017-May 2019*
  Master of Technology — Kharagpur, India
- **National Institute of Technology, Manipur** — *July2013-May 2017*
  Bachelor of Technology — Manipur, India
- **Jawahar Navodaya Vidyalaya , Purnia** — *July 2012*
  Intermediate in Science — Bihar, India

Projects

Sentiment Analysis on Social Media Data using DeepSeek-r1 model — *Jan 2024 - Present*
Tools: [Python, DeepSeek r1, Hugging Face Transformers, PyTorch, Pandas, Matplotlib] [ ]

- **Fine-tuned** the DeepSeek r1 7b parameter model on a local compute environment for sentiment analysis, achieving state-of-the-art performance on social media text data.
- Optimized the model for local compute by implementing gradient checkpointing and mixed precision training, reducing memory usage by 40
- Preprocessed and cleaned large-scale unstructured text data using **NLP** techniques such as tokenization, lemmatization, and handling of emojis/slang for improved model input quality.
- Conducted hyperparameter tuning (learning rate, batch size, epochs) to achieve optimal performance, resulting in a 90
- Visualized sentiment trends and model performance using Matplotlib and Seaborn, providing actionable insights for stakeholders.
- Deployed the fine-tuned model as a REST API using FastAPI, enabling real-time sentiment analysis for end-users.

Text Summarization Using Large Language Model (LLM) — *July 2024 - Dec 2024*
Tools: [Python, Hugging Face Transformers, PyTorch, NLTK] [ ]

- Developed a text summarization tool using **Hugging Face Transformers** and **PyTorch** to generate concise summaries of long articles and documents, utilizing **Large Language Models (LLMs)** for advanced **Natural Language Processing (NLP)** tasks.
- Implemented both **extractive** and **abstractive** summarization techniques to enhance the versatility of the tool.
- Utilized **PyTorch** for fine-tuning pre-trained models on a custom dataset, achieving high-quality summaries.

Timeseries OHLC prediction of Nifty Bank — *June 2024 - July 2024*
Tools: [Python, MySQL, Tensorflow, SkLearn, Pandas, Numpy] [ ]

- Implemented **LSTM** using **tensorflow** to predict closing stock price.
- **RandomSearchCV** was used for the **hyper parameter tuning** of the **deep learning** model.
- Model was able to achieve an accuracy of 60 % .

Finding the coherent structures present the fluid flow — *Feb 2024- June 2024*
Tools: [Python, OpenCV, Numpy, Matplotlib] [ ]

- Applied **machine vision** based preprocessing pipeline to the images captured using high speed camera.
- Implemented **Singular Value Decomposition(SVD)** to find the energy modes in the flow.
- Implemented **SPOD** to get **dominant features** at particlar frequency.

Determination of Shock Wave Oscillations using Image Processing *Nov 2023 -Jan 2024*

Tools: [Python, OpenCV, Numpy, Pandas, Matplotlib] [ ]

- Calibrated image capturing parameters for Schlieren experiments.
- Executed **Canny Edge Detection Algorithm** for **edge detection** of the shock wave around spinning cone.
- Utilized available **time series** information and **cross-correlation** to calculate the shock oscillation.

IR based encoder developed to monitor the real time phase of spinning body *Aug 2020-Dec 2020*

Tools: [Python, MySQL, Arduino, IR sensors, Pandas] [ ]

- Established a real time connection among **python**, **arduino** and **MySQL** using available iterfaces.
- Developed an algorithm based on **Digital Signal Processing** methods to calculate the phase of the spinning projectile using the output of IR sensor.

Algo-trading pipeline for stock trading *Aug 2020-Oct 2020*

Tools: [Python, MySQL, Pandas] [ ]

- Performed **API-Calling** from KiteConnect environment to fetch real time stock price data.
- Stock price data was stored in **MySQL** database.
- Developed an **algorithm** for stock trading using **python**.

Skills

- **Programming Languages:** Python, MatLab
- **Database Systems:** MySQL, Excel
- **Data Science & Machine Learning:** Linear & Logistic regression L1 and L2 Regularization,KNN, Random Forest, Bagging , Boosting, Gradient Descent, CNN, RNN, LSTM, Transformer, RAG
- **Cloud Technologies:** Google Cloud Platform (GCP)

Publications

C=Conference

[C.1] Rajkamal Sah,et al. (2023). **Unsteady Numerical Studies on Spinning Cone at Different Flow Regimes**. In *34th International Symposium on Shock Waves (ISSW34)*, pp. XX-XX. Springer Nature. Date, Location. DOI: comming soon

[C.2] Rajkamal Sah and Gopalan Jagadeesh. (2021). **Numerical Studies on the Aerodynamics of a High-Speed Spinning Projectile**. In *24th International Shock Interaction Symposium*, pp. XX-XX. DOI: 10.1007/978-981-97-6099-2_9.

Honors and Awards

- **Prime Minister Research Fellow(PMRF)** *August 2019-July 2024*
  Ministry of Human Resource Development [ ]
- **JNV** *May 2006-May 2012*
  JNV entrance, Navodaya Vidyalaya Samiti (NVS) [ ]