REHAN KHAN

ACADEMIC DETAILS

Year	Degree / Board	Institute	GPA / Marks(%)
---	B.Tech in Mechanical Engineering	Indian Institute of Technology Delhi	8.41
2022	Central Board of Secondary Education	VPS School	95.2
2020	Central Board of Secondary Education	St. Anselm North City School	95.4

PROJECTS

- **DSCoin-Cryptocurrency :** *Data Structures and Algorithms Project* (May 2024)
  - Understood about **cryptographic hash functions** and collision resistant functions(CRFs), utilized them in bulding many **Authenticated** data structures such as AuthLinkedList, AuthStack and AuthSortedSet using Merkle Tree.
  - Implemented a balanced Merkle Tree with insertion and deletion, and blockchain using AuthLinkedList and MerkleTree.
  - Extended **Blockchain** to support mining from honest and fraudulent miners and proof of work(nonce) to implement the cryptocurrency.
- **Medical Chatbot using Retrieval Augmented Generation:** (June 2024)
  - Implemented RAG to specialize llama-2-7b-chat model from huggingface to answering only medical-related questions.
  - Used huggingface embeddings model to generate word embeddings and stored it as an index in Pinecone database as long term memory, used the Gale encyclopedia of medicine as the data source.
  - Used langchain to implement the RAG pipeline, flask for basic back-end use, and HTML for front-end.
- **Text Summariser :** (Apr 2024)
  - A structured project that uses the google pegasus model from huggingface transformers library and Samsum dataset to full fine-tune it. Implemented with logging and exceptions modules. Made a simple web app using Flask for back end.
  - Deployable application with working docker image file and GitHub workflow CI/CD pipeline enabled.
- **Volume Gesture Control**: (Dec 2023)
  - Employed OpenCV and the Google's Mediapipe library to identify the count and gestures of hands within the frame.
  - Modularized the code and integrated libraries to facilitate the interaction between gesture changes in hand movements and connected audio-display hardware.
  - Implemented additional real-time features such as FPS monitoring and a volume meter for better user experience.
- **Portfolio Optimization with unsupervised learning**: (Sept 2023)
  - Utilized S&P 500 data from Oct 2016 to Sep 2023 for an optimized portfolio in Oct 2023 for daily returns, employing KMeans Clustering and comparing returns to actual S&P 500 data.
  - Integrated Fama-French Factors and Rolling Factor Betas, optimizing portfolio weights with PyPortfolioOpt (EfficientFrontier) to maximize the Sharpe ratio.
- **Anomaly detection in Wind turbine using drone imagery** : (Nov 2023)
  - Employed the DTU dataset containing images of a wind turbine situated in Denmark, captured between the years 2017 and 2018.
  - Classified the dataset and used a pre-trained VGG19 network on imagenet data for the classification of images.

INTERNSHIPS

- **Feynn Labs Services, Remote** (Dec 2023 - Feb 2024) : *ML/AI Engineer*
  - Presented an AI-driven ideation report for a parking assistance app, encompassing business strategies and code.
  - Also, along with a team of four other members, learned about market segmentation using McDonalds dataset, and highlighted the key points theoretically and practically (using Python) that are vital to Market Segmentation.
  - Performed segmentation on Indian EV market using unsupervised learning, highlighting suitable segments of both manufacturers and consumers.

SCHOLASTIC ACHIEVEMENTS

- **Got selected in top 1.1% of those who got selected in JEE Adv(2022)**
- **Specializations :** Done from Coursera
  - Deep Learning (*DeepLearning.AI*) - Machine Learning (*Stanford Online*) - Algorithmic Toolbox (*UC San Diego*)

TECHNICAL SKILLS

- **Programming Languages :** Python, Java, C++, JavaScript
- **Libraries and FrameWorks :** pandas, numpy, scikit-learn, Tensorflow, flask, langchain, llamaindex, huggingface
- **Software Systems :** AutoDesk Inventor, Solidworks, Jupyter Notebook

EXTRA CURRICULAR ACTIVITIES

- **Axlr8r Formula Racing** : (Apr 2023 - Dec 2023)
  - **Trainee :** Worked with 50+ members and learned about Drivetrain and Control Systems

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IIT COURSE

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B.Tech in Mechanical Engineering	Indian Institute of Technology Delhi	8.41

COURSES DONE

Calculus, Linear Algebra & Diffe. Equa., Intro. To Computer Science, Introduction To Statistics, Data Structures And Algorithms