SNEHAL PAL | 23CH10094

Indian Institute of Technology Kharagpur

EDUCATION

Year	Degree/Exam	Institute	CGPA/Percentage
2027	B.Tech, Chemical Engineering	Indian Institute of Technology Kharagpur	8.92
2023	Class XII, CBSE	Sri Krishna Mission School, Agartala	95.4%
2021	Class X, CBSE	Sri Krishna Mission School, Agartala	97.8%

INTERNSHIPS AND PROJECTS

Flight Delay Prediction | Open-IIT Data Analytics | IIT Kharagpur *Oct'24 - Nov'24*

- Co-developed a flight delay prediction system leveraging multiple machine learning techniques. Conducted detailed exploratory data analysis **(EDA)** and **feature engineering**, developing **new predictive features** to achieve high model accuracy.
- Utilized **IBM's U.S. flight delay dataset**, spanning data from 1987 to 2020, with over **8,000 entries** across **10 key features**. This required extensive **data preprocessing** to handle real-world variability and prepare the data for accurate modeling.
- Conducted extensive feature engineering to create new predictors, including **FTD (Flight Time Delay)** and **PFD (Predictive Flight Delay).**
- Implemented a variety of machine learning models such as **Decision Tree**, **XGBoost**, **Linear Regression**, **AdaBoost, Gradient Boost,** and **Random Forest** to identify optimal prediction models.
- Achieved a robust **R^2 score of 0.92** with the XGBoost model, reflecting the model's high predictive accuracy and effectiveness in capturing patterns within the flight delay data.

Driver Drowsiness Detector | Self-Project *Oct'24*

- Developed a drowsiness detection system using a **convolutional neural network (CNN)** to classify images of eyes and yawns.
- Leveraged a Kagglehub dataset of **1925 images categorized into four** drowsiness levels: "eyes closed," "eyes open," "no yawn," and "yawn." **Augmentation using Keras ImageDataGenerator** to improve model generalization.
- The preprocessing steps include resizing images to **150x150 pixels** to ensure consistent input, detecting faces using the **Haar Cascade classifier** for targeted yawning analysis, and normalizing pixel values to stabilize training.
- The model uses deep convolutional layers for feature extraction, max-pooling for spatial down-sampling, and fully connected layers for classification. **Dropout is applied to reduce overfitting**, and it is trained with **categorical cross-entropy loss** using the **Adam optimizer.**
- The model achieves **92% accuracy**, with high precision and recall for eyes_open and eyes_closed. No_yawn and yawn have **lower f1-scores (0.86 and 0.83, respectively),** due to lower recall for yawn. Overall, balanced performance is shown across classes.

Image Compression |Self-Project *Oct'24*

- Developed an image compressor that effectively reduces file size by limiting color variety, while minimizing storage requirements.
- Applied **K-means** clustering to identify and group similar colors within the image, and selected **16 color cluster points** as representative colors to minimize the image's color complexity.
- Successfully **reduced image size** while maintaining visual clarity, demonstrating **efficient compression** using a limited color palette.

SKILLS AND EXPERTISE

- **Programming Languages:** Python| C++ | C **Tools:** MS Excel | MS Word | VSCode | Canva| Jupyter | Google Colab | Kaggle
- **Frameworks and Libraries:** TensorFlow| Keras| Scikit-lear| Pandas| NumPy| Matplotlib| OpenCV

COURSEWORK INFORMATION

- Linear Algebra, Numerical, and Complex Analysis (MA11004)
- Advanced Calculus (MA11003)
- Programming and Data Structures (CS10003)
- Physics of Waves (PH11003)
- Programming and Data Structures (CS19003)
- Basic Engineering Mechanics (ME11003)

POSITIONS OF RESPONSIBILITY

SubHead|Finance and Economics Club IIT Kharagpur Apr'24 - Present

- Led a team of 4 in creating an equity research report on Adani Power, providing in-depth analysis and valuation insights.
- Organized an onsite workshop on trading that focused on technical analysis, enhancing participants' practical skills in trading strategies.
- Coordinated an online workshop hosted by our club, featuring a quant finance firm, which provided members with exposure to quantitative finance concepts and industry insights.

AWARDS AND ACHIEVEMENTS

- Secured All India Rank of **7326** in **JEE Advanced 2023** (out of 1,80,372 candidates).
- Secured All India Rank of **7731** in **JEE Mains 2023** (out of 12,00,000 candidates) and achieved a **perfect score of 100** in physics.
- Secured All India Rank of **465** in **WBJEE** (out of 1,24,919 candidates).
- Ranked among the **top 10%** in my university, which facilitated a successful transition to a new department, enhancing my academic growth.

EXTRA CURRICULAR ACTIVITIES

- **Led** a team of four to secure the **Bronze medal** in the Open IIT Supply Chain competition from Patel Hall of Residence.
- Participated in the **Open IIT Data Analytics 2024** competition from Patel Hall of Residence.
- Participated in the **Open IIT Product Management 2024** competition from Patel Hall of Residence.
- Member of **NSO (National Sports Organization) Table Tennis** Team of IIT Kharagpur.