

# SWECHA SANJAY

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## Education

<b>Indian Institute of Technology Kharagpur</b> <i>B.Tech (Hons.) in Civil Engineering (CGPA: 8.56/10.0)</i>	<b>2024-2028</b>
<b>Arwachin Bharti Bhawan Sr. Sec. School</b> <i>Central Board of Secondary Education (Percentage: 94.8)</i>	<b>2022-2023</b>
<b>Arwachin Bharti Bhawan Sr. Sec. School</b> <i>Central Board of Secondary Education (Percentage: 96.7)</i>	<b>2020-2021</b>

## Projects

<b>LHC Jet Analysis</b>   <i>NSSC Data Hackathon</i>	<b>Oct. 2025</b>
<ul style="list-style-type: none"><li>Created a custom CNN(ROC-AUC:0.9984) for <b>HLS4ML LHC dataset</b> image classification, surpassing VGG16, DenseNet.</li><li>Conducted multi-modal analysis comparing image CNNs (<b>96.61%</b> accuracy) and tabular MLP models (<b>83.26%</b> accuracy).</li><li>Applied <b>PCA</b> for dimensionality reduction on tabular data; determined the MLP model performed optimally without PCA.</li><li>Designed a CNN <b>Autoencoder</b> and reconstruction error to perform anomaly detection, identifying BSM signals in data.</li></ul>	
<b>Skin Cancer Detection</b>   <i>Kharagpur Data Analytics group</i>	<b>Aug. 2025</b>
<ul style="list-style-type: none"><li>Engineered a <b>Multi-Modal DL Model</b> with Image features (<b>ResNet, EffNet, ViT</b>) &amp; tabular data to predict skin cancer.</li><li>Achieved a <b>25% increase</b> in predictive accuracy over single-modality models by handling multi-modal dataset inputs.</li><li>Leveraged a stacked Ensemble (<b>XGBoost, CatBoost, Meta-Learner</b>) to maximize performance on the given <b>metadata</b>.</li><li>Mitigated Extreme <b>Class Imbalance</b> using a <b>combined resampling strategy</b> and utilized <b>image augmentation</b>.</li></ul>	
<b>Chernobyl Risk Prediction</b>   <i>Kharagpur Data Analytics Group</i>	<b>July 2025</b>
<ul style="list-style-type: none"><li>Developed and fine-tuned stacked <b>LSTM RNNs</b> to forecast critical system risk by analyzing multivariate time-series data.</li><li>Engineered a DL pipeline using <b>Bi-LSTMs, Batch Normalization, and TensorFlow/Keras</b> for a classification task.</li><li>Implemented data pre-processing using <b>mean imputation, standard scaling, and noise-reduction normalization</b>.</li><li>Improved the prediction accuracy by <b>15%</b> over the baseline models through hyperparameter tuning and feature engineering.</li></ul>	
<b>Named Entity Recognition (NER) with BERT</b>   <i>Self-project</i>	<b>Sept. 2025</b>
<ul style="list-style-type: none"><li>Fine-tuned a <b>BERT</b> model using the Hugging Face Transformers Library to achieve a <b>92%</b> F1-score on a custom NER task.</li><li>Developed an NER system capable of automatically identifying and classifying key entities from large unstructured text.</li><li>Engineered data-processing pipeline including <b>sub-word tokenization</b> and dynamic attention mask creation for BERT.</li><li>Demonstrated proficiency in <b>LLM customization</b> and <b>deployment</b> for specialized <b>sequence labeling</b> applications.</li></ul>	

## Relevant Coursework

- Courses:** Advanced Calculus, Probability and Statistics, Programming and Data Structures, PDS Lab, Linear Algebra, Numerical Analysis and Complex Analysis, Applications of IoT in Civil Engineering, Geomatics, Strength of Materials
- MOOCs:** ML Specialization, DL Specialization, Pytorch for Deep Learning, Python for Data Science and ML

## Technical Skills

- Programming Lang/Libraries:** C, C++, Python, R, HTML, CSS, Numpy, Pandas, Matplotlib, Scikit-Learn, Pytorch
- Software and Tools:** Github, Jupyter Notebook, Visual Studio code, Google Colab, Anaconda, Figma, Canva

## Positions Of Responsibility

<b>Student Member</b>   <b>Kharagpur Data Analytics Group</b>	<b>Mar 2025 - Present</b>
<ul style="list-style-type: none"><li>Selected as one of <b>50 members</b> from a pool of <b>1500+</b> applicants based on rigorous analytical, puzzle and coding tests.</li><li>Contributed to intra-society Kaggle competitions, applying advanced ML/DL concepts learned from knowledge sessions.</li></ul>	
<b>Strategist</b>   <b>The KGPIan Game Theory Society</b>	<b>Aug. 2025 - Present</b>
<ul style="list-style-type: none"><li>Delivered analysis and presentations on real-world game theory models in <b>modern economics</b> and high-stakes auctions.</li><li>Organized and moderated competitive simulation games (e.g., Prisoner's Dilemma, Auction Theory) for 50+ members.</li></ul>	

## Awards and Achievements

- Winner, NSSC 2025 Data Hackathon:** Achieved **96.61%** test accuracy and **0.9984** ROC-AUC in using a custom CNN.
- Selected to represent my school in the Open School Volleyball Competition, competing against teams at the **State Level**.
- Achieved **Gold Medal**(Volleyball) in Inter-Hall General Championship at IIT Kharagpur, victorious over all other halls.