

## EDUCATION

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- Indian Institute of Technology, Kharagpur** Kharagpur, West Bengal  
• *M.Tech + B.Tech Dual Degree in Industrial and Systems Engineering; GPA: 8.31/10* July. 2016 – April. 2021  
*Minor in Mathematics and Computing*
- G.M.S.S.S, Manimajra** Chandigarh, India  
• *Central Board of Secondary Education; Standard 12th; Percentage: 85.6* 2016
- Little Flower Convent School** Panchkula, India  
• *Indian Certificate of Secondary Education; Standard 10th; Percentage: 96.6* 2014

## INTERNSHIPS

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- AWL** Sapporo, Hokkaido, Japan  
• *Artificial Intelligence Research Internship* Apr 2020 - Aug 2020
  - **Semi-Supervised Learning: MixMatch:**
    - \* Implemented MixMatch, a semi-supervised learning method to leverage unlabelled data to train classification models.
    - \* Created a pipeline for creating augmentations for unlabeled data, generating guessed labels and sharpening.
    - \* Designed experiments for performance comparison of MixMatch with fully supervised baselines and performed an ablation study. Implemented variants of Mixup algorithm and analyzed loss function behaviour.
    - \* Achieved an F1-score within 3% of a fully supervised model using only one-tenth of the total labels.
    - \* Studied research papers on consistency regularization, entropy minimization, mixup and pseudolabeling.
  - **Age and Gender Estimation:**
    - \* Trained a gender classification model on face images using a VGG16 model and achieved an F1-score of 0.93.
    - \* Studied key dataset attributes for age estimation from face images like pose, lighting, expressions, age range etc and worked on improving dataset quality and model robustness.
    - \* Used two methods, Rank Consistent Ordinal Regression and Two-point Representation for estimating age. Used a classifier importance parameter to penalize large classification inconsistencies.
    - \* Designed experiments to assess model performance with augmentation pipeline and ranking consistency.
  - **Data Labelling:**
    - \* Analyzed model performance decline in age and gender estimation due to use of masks under Covid-19 circumstances and identified need for a new labelled face dataset with masks.
    - \* Used pseudo-labeling, a self-learning method to filter high confidence predictions and label the dataset iteratively.
    - \* Performed outlier detection and used sampling methods for manual checking and correction.
- PredictivEye** Toronto, Ontario, Canada  
• *Data Science Internship* Dec 2019 - Jan 2020
  - **Recommender Systems:**
    - \* Developed product recommendation systems using collaborative filtering and content-based method for a customer-analytics platform. Incorporated user journey information and tracked browsing behaviour.
    - \* Developed an inventory analytics and visualization tool with insights like most-purchased, most-viewed items etc.

## COURSEWORK

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- **Computer Science:** Artificial Intelligence, Deep Learning, Machine Learning, Natural Language Processing, Data Structures and Algorithms, Object Oriented System Design, Symbolic Logic
- **Mathematics:** Linear Algebra, Probability and Statistics, Regression and Time Series, Stochastic Processes, Statistical Decision Modelling, Applied Multivariate Statistics
- **Industrial Engineering:** Operations Research, Optimisation and Heuristic Methods, Simulation, Quality Design and Control, Safety Analytics, Game Theory, Supply Chain, Production Planning, Inventory Systems
- **Miscellaneous:** Recommender Systems, Information Systems, Cognitive Information Processing, Psychology of Learning, Product Development, Economics, Electrical Technology, Basic Electronics

## PROJECTS

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- **Text Classification using CNN** Prof. Sudeshna Sarkar  
*Term Project: Natural Language Processing* Oct 2018 - Jan 2019
  - **Automatic Event Extraction from News documents:**
    - \* Classified documents into predefined event types like 'Heat Wave', 'Earthquake', 'Storm', 'Cyclone' etc, where events depict occurrence of natural or man-made disasters.
    - \* Generated word vectors using SkipGram and C-BOW models and paragraph vectors using the Fasttext library.
    - \* Recognized words which triggered the detection of particular events using a combination of CNN and Bi-LSTM
  - **Sentiment Analysis:**
    - \* Classified reviews from websites like Amazon, IMDB, Yelp into positive and negative sentiments.
    - \* Implemented a single-channel Kim-CNN text classification model with modifications in filter dimensions to handle a sentence feature map. Used static as well as fine-tuned word-vectors as input.
- **Model Fitting and Adequacy Checking** Prof. Buddhananda Banerjee  
*Term Project: Regression and Time Series Analysis* Nov 2018
  - Performed regression analysis on a bicycle sales dataset. Plotted feature correlation values.
  - Calculated and compared adjusted R-squared values after feature selection.
  - Fitted an ARIMA model to capture trend and seasonality information and compared with regression model.
- **Queuing System Simulation of Railway Counters using ARENA Software** Prof. Goutam Sen  
*Term Project: Simulation Lab* Jan 2019 - Apr 2019
  - Identified important process parameters and variables and collected data like inter-arrival time, service time.
  - Performed input analysis to find the best fitting distributions for data collected for the different variables.
  - Built a model in ARENA considering different resources, constraints, process parameters. Compared simulation and theoretical outputs. Suggested changes to improve performance and efficiency.
- **Rash Driving Detection** Prof. Goutam Sen  
*Term Project: Work System Design Lab* Jan 2018 - Apr 2018
  - Collected data such as velocity, acceleration, steering angle etc on a bicycle using SensorLab app on Android.
  - Analyzed and plotted data to verify the reliability of data obtained from sensors.
  - Used machine learning models to classify the driving behaviour of a driver as normal or rash.
- **Unequal Area Facility Layout Modelling** Prof. Manoj Kumar Tiwari  
*Term Project: Optimization and Heuristic Methods* Jan 2019 - Apr 2019
  - Calculated dimensions and located rectangular facilities in an unlimited floor space, without overlap, while minimizing the sum of distances among facilities weighted by "material-handling" flows.
  - Used Genetic Algorithms to model and solve the problem. Studied parameters like facility-type, aspect ratios, material flow, and GA parameters like crossover probability, mutation probability etc.

## COMPETITIONS

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- **NetApp Data Challenge, Kshitij, IIT Kharagpur:** Secured 5th position overall and 3rd in model performance in a text classification problem among 150 teams.
- **Intelligent Ground Vehicle Challenge, Oakland University, Michigan, USA:** Represented IIT Kharagpur at 26th IGVC as a member of Autonomous Ground Vehicle Research Group and secured 2nd position in AutoNav Challenge. Led the mechanical team of the research group.
- **Strategy Storm, International Social Business Case Competition, IIT Guwahati:** Secured 3rd position among 1200 teams. Provided digital solutions for scalability and customer reach.

## SKILLS AND EXPERTISE

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**Languages:** Python, C, C++, SQL, Java

**Frameworks:** Pytorch, Tensorflow, Sklearn, Pandas

**Softwares:** Git, CPLEX, MySQL, Ansys, Solidworks, Excel, Powerpoint