

Mainak Chain

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Education

Indian Institute of Technology (IIT), Kharagpur	2015-2020
DUAL DEGREE (B.TECH AND M.TECH.) IN METALLURGICAL AND MATERIALS ENGINEERING	8.34/10
Delhi Public School, Bokaro	2015
GRADE XII, ALL INDIA SENIOR SCHOOL CERTIFICATE EXAMINATION (CBSE)	92.8%
De Nobili School, Sindri	2013
GRADE X, INDIAN CERTIFICATE OF SECONDARY EDUCATION (ICSE)	95.6%

Publications and Conferences

SIGReCom 2019 Special Interest Group on Information Retrieval (eCommerce)	July, 2019
CO-AUTHOR	Paris, France
<ul style="list-style-type: none">Gourab Chowdhury¹, Madiraju Srilakshmi¹, Mainak Chain¹, Sudeshna Sarkar¹, "Neural factorization for Offer Recommendation using Knowledge Graph Embeddings", Special Interest Group on Information Retrieval Workshop on eCommerce, Paris, France, 2019	
EMIS 2018 International Conference on Emerging Technologies in Data Mining and Information Security	Feb, 2018
CO-AUTHOR	Kolkata, India
<ul style="list-style-type: none">Sobhan Sarkar¹, Mainak Chain¹, Sohit Nayak¹, Jhareswar Maiti¹, "Decision Support System for Prediction of Occupational Accident: A Case study on Steel Plant", Emerging Technologies in Data Mining and Information Security, pp 787-796, Advances in Intelligent Systems and Computing, vol 813. Springer, Singapore	
IISE 2018 Institute of Industrial and Systems Engineers Annual Conference	Feb, 2018
CO-PRESENTER	Orlando, Florida, US
<ul style="list-style-type: none">Sobhan Sarkar¹, Jhareswar Maiti¹, Mainak Chain¹, Sohit Nayak¹, "Data-driven Decision Support System for Prediction of Occupational Accidents", presentation at Institute of Industrial and Systems Engineers Annual Conference, Orlando, Florida, USA	
¹ Indian Institute of Technology, Kharagpur	

Experience

Google	May 2022 - Present
SOFTWARE ENGINEER (MACHINE LEARNING), GOOGLE ASSISTANT TEAM	Bengaluru, IN
<ul style="list-style-type: none">Working towards improving Google Assistant for it to serve more people and make lives easier	
Ola Cabs	Sept 2020 - May 2022
DATA SCIENTIST / RESEARCH ENGINEER, OLA MOBILITY TEAM	Bengaluru, IN
<ul style="list-style-type: none">Digitization: Developed scalable and fast API services in Django for 46 documents across 25 countries. Created text and image based document classifiers with 99% mean accuracy. Built and tuned transfer-learning models with VGG16 for document classification with 99% precisionAllocation Optimisation: Implemented spatio-temporal city-level filters for cab allocation. Engineered and optimised a pipeline using Convexman, HDBSCAN, Spark and Amazon S3, handling 1.5 PB of GPS data. Resulted in truer ETA, reduced API calls and annual savings of \$0.8MTraffic Lights Optimisation: Simulated the traffic scenario using SUMO framework and in-house GPS data. Devised algorithms to reduce congestion locally and globally. Developed an RL agent on the sumo environment with various policies to decrease wait-time by 18.3%Semantic Search Development: Implented a scalable food search auto-complete engine using Apache Solr. Dockerized the engine for production deployment. Developed contextual-embeddings for food items using FastText and IndicBERT. Improved search accuracy@3 by 21%	
Ola Cabs	May 2019 - Jul 2019
RESEARCH ENGINEER INTERN, OLA MOBILITY TEAM	Bengaluru, IN
<ul style="list-style-type: none">Built a gradient-boosted tree based drop-suggestion model adding better engineered time-based features (recency & frequency) using PySpark and SQL. Carried out model performance comparison and analysis. Improved on the earlier model by reducing error by 19% with lower latencyCoupled drop-suggestion model with category prediction model outputs to develop a template-based novel one-touch booking system, to facilitate hassle-free bookings. Offered a full-time data scientist position for showcasing excellence in performance and project results	
Innoplexus Consulting Services	May 2018 - Jul 2018
DATA SCIENCE INTERN, INNOVATION TEAM	Pune, IN
<ul style="list-style-type: none">Biomedical Text Summarization: Built a graphical sentence ranking algorithm like TextRank for extractive summarization of clinical trial documents. Designed Unified Medical Language System (UMLS) based biomedical-tokenizer and encoder for transformer model in TensorFlow.	
Dipper Technologies	Nov 2017 - Dec 2017
DATA SCIENCE INTERN, CORE TECHNOLOGY TEAM	New Delhi, IN
<ul style="list-style-type: none">Constructed pipeline to fetch GPS-timestamp data for over 800 trucks to engineer features for modelling using shell scripting, SQL and pythonEstimated time of arrival (ETA) prediction: Constructed a neural-network model for real-time predictions of ETA on subsequent toll booths using Keras. Added seasonal, weather and public holiday data to improve the model performance by 9%. The model achieved MAPE of 3.7%Road Logistics Optimization: Analyzed 30 routes and optimized road logistics for 280 trucks by stoppage clustering using DBSCAN and plotly	

Projects

Offer recommendation using Retailer Sales data

July 2017 - July 2020

BACHELOR THESIS PROJECT, AI RESEARCH GROUP

- **Advisor:** Prof. Sudeshna Sarkar, Dept. of Computer Science and Engineering, IIT Kharagpur
- Represented users and offers with Knowledge Graph Embeddings using TransE technique. Built a neural factorization machine model to learn user-offer interactions generate probability score for a given user-item pair. Ranking on the scores, top k offers are recommended for the user
- Improved the model by adding temporal features using LSTM with attention framework, boosting recall@5 and MRR@5 by over 90% each

Development of an Early Warning System

SAFETY ANALYTICS AND VIRTUAL REALITY RESEARCH LAB

- **Advisor:** Prof. Jhareswar Maiti, Dept. of Industrial and Systems Engineering, IIT Kharagpur
- Developed a real-time health monitoring and prediction app, that notifies of imminent threat to site-worker's health to the concerned manager
- Trained a SVM classifier for workers' health prediction using environment's wet-bulb globe temperature (WBGT) and Respirable Suspended Particulate Matter (RSPM) values and worker's blood oxygen-level and heart-rate as input signals. Tuned hyper-parameters with genetic algorithm

Development of a Decision Support System

SAFETY ANALYTICS AND VIRTUAL REALITY RESEARCH LAB

- **Advisor:** Prof. Jhareswar Maiti, Dept. of Industrial and Systems Engineering, IIT Kharagpur
- Built a Decision Support System using Kivy to help decision-maker alleviate potential hazards, by predicting severity of possible accidents
- Integrated pipeline with feature selection, descriptive analysis and automatic model evaluation, hyper-parameter tuning and model selection
- Optimised the training and genetic-algorithm based tuning step by parallelizing tasks across multiple cores, making it faster by 40%

Coursework

Computer Science

Programming and Data Structure, Software Engineering, Machine Learning, Deep Learning Foundations and Applications, Speech and Natural Language Processing

Mathematics

Linear Algebra, Probability and Stochastic Processes, Operation Research, Theory of Operating Systems, Design and Analysis of Algorithms, Partial Differential Equations

Technical Skills

Languages

Python, R, C, C++, Java, Shell Scripting, SQL, PySpark, Apache Solr, Apache Hive, HTML

Modelling

CNNs, RNNs, LSTM, GRU, GAN, Gradient Boosting, Attention/Transformer/BERT, Regression (Linear, Beta, Quantile), Support Vector Machines, Time Series Analysis, Training models on GPU/TPU

Libraries and Tools

TensorFlow, Keras, Git, scikit-learn, LightGBM/XGBoost, NLTK, OpenCV, Plotly, Solidworks, RabbitMQ, Django, Windows, Linux, Matlab, Octave

Position of Responsibilities

Vice Captain, Captain and Advisor

July 2017 - Apr 2020

FINE ARTS TEAM, PATEL HALL OF RESIDENCE

IIT Kharagpur

- Accountable for the administration of 30 members in the team, representing our hall in 4 events of Social and Cultural General Championship
- Successfully coordinated and led the team to win the Fine Arts Cup after 4 years, by securing 1st position among all other 22 halls in campus

Core Team Head

July 2018 - Mar 2019

COMPOSIT 2018, METALLURGICAL AND MATERIALS ENGINEERING DEPT. FEST, IIT KHARAGPUR

IIT Kharagpur

- Spearheaded conduction of Excavate, the Data Analytics Competition in 25th edition of the fest, garnering the biggest participation till date
- Shouldered management of around 200 participants during the fest and mentored a team of 20 core team members and 15 associate members

Honors & Achievements

2015-2018	Volunteer, National Service Scheme (NSS) , Mentored and worked for the development of the schools in remote areas near campus for the socio-economic upliftment of the underprivileged students, successfully conducted surveys, health camps, blood donation and cloth distribution drives
2020	Department Rank 4 , Ranked 4th in 30 students in Metallurgical and Materials Engineering Dept. IIT Kharagpur
2018	Best paper award , Awarded at International Conference on Emerging Technologies in Data Mining and Information Security, 2018
2021	Spotlight Award Winner , Received for impact created on business by enhancing customer-experience in Ola
2016	Prime Minister's Scholarship Scheme , awarded under National Defence Fund, Indian Government
2019	Fine Arts Cup Winner , Captained my team to win the cup in SoCult General Championships, IIT Kharagpur
2017	81st position among 2000+ teams , Bagged in Analyze This 2017, conducted by American Express
2017-2019	Multiple Gold medals , Procured in Inter-Hall and Open-IIT Fine Arts Competitions at IIT Kharagpur