PARTH SINGHAL

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EDUCATION

Bachelor of Technology, Chemical Engineering July, 2018 - July, 2022
Indian Institute of Technology Delhi : CGPA **8.102**

CBSE, Class XII March 2018
Cambridge Court High School, Jaipur : Percentage **90.8**%

SCHOLASTIC ACHIEVEMENTS

- **Foreign Exchange** 2020: Cleared interview; among 1 in 3 students selected to represent IITD at IMT Ales, France
- **Global Engg. Leadership Scholar** 2020: 1 in 30 students globally selected for internship at NTHU, Taiwan
- **JEE Advanced** 2018: Ranked in the Top 1% among 164,000 students in Indian common engineering entrance exam
- **National Talent Search Examination** 2016: Awarded fellowship from the NCERT, Government of India
- **State Talent Search Examination** 2015: Awarded Certificate of Merit by the RBSE, Government of Rajasthan
- **National Mathematics Talent Contest** 2015: Awarded Certificate of Excellence by AMTI, Government of India

INTERNSHIPS

- **National Tsing Hua University, Taiwan**: *Thermographic Image Data Analysis for NDT* *(May-July, 2020)*
  Guide: Prof. Yuan Yao, Department of Chemical Engineering, NTHU Taiwan
  – Implemented Machine Learning models for identification of defects from infrared images of Composite Materials
  – Used **Slow Feature Analysis** to extract slow varying features from temporally & spatially varying image data
  – Generated SFA feature images using the multivariate slow varying features & identified defect locations in the images
  – Used **Penalized Least Square** algorithms for post-processing of SFA images, reduced disturbances from the images
  – Computed **Signal-to-Noise Ratio (SNR)** values to compare results obtained using Slow Feature Analysis & **PCA**
  Working on the first draft of the research paper based on this project, which will be submitted in a reputed journal
  Received a Letter of Recommendation from the project supervisor for outstanding contribution during the internship
- **Rajasthan Patrika Pvt. Ltd., Jaipur, Rajasthan, India**: *(June-July, 2019)*
  – Designed and created a **database management service** in python that can store RSS data to dynamic CSV files
  – Used **Asynchronous I/O** on multiple threads of the program and reduced the compilation time of the whole process

TECHNICAL SKILLS

- Proficiency in **Python** (including various data science libraries), **C++**, **Java**, and **R** programming languages
- Software Modules:- **Linux**, **MATLAB**, **Excel**, **LaTex**, **Autodesk Inventor**, **ANSYS (SpaceClaim)**, **Blender**

PROJECTS

- **Twitter Fake News Detection through Propagation Path Classification** *(Ongoing)*
  Guide: Prof. Hariprasad Kodamana, Department of Chemical Engineering, IIT Delhi
  – Implemented propagation path based **Deep Neural Network** for fake news classification; by **Liu et al., 2018**
  – Numerically represented user characteristics as vectors for **multivariate time series** modeling of propagation path
  – Applied **Gated Recurrent Unit (RNN)**; captured **global variations** in user characteristics as a vector
  – Used **Convolutional Neural Network (CNN)**; captured **local variations** in user characteristics as a vector
  – Implemented Multi-Layer **Feedforward Neural Network** for classification using RNN & CNN based output vectors
- **Recommendation System for Spotify's Million Playlist Dataset Challenge** *(November, 2020-January, 2021)*
  Guide: Prof. Srikanta Bedathur, Computer Science Department, IIT Delhi
  – Implemented playlist-based **collaborative filtering** (CF) algorithm over the Spotify's Million Playlist dataset
  – Researched the impact of **BM25**, **BM25+** & **tfidf** normalizations for the pre-processing of the playlist-track matrix
  – Implemented the **doc2vec** algorithm, to find the similarity between the playlist titles, for the Cold Start Problem
  – Ensembled doc2vec and CF models to achieve a **NDCG** & **R-prec** score of **0.3312** & **0.1835** respectively
- **Vector Space Retrieval (VSM) Model** *(October, 2020)*
  Guide: Prof. Srikanta Bedathur, Computer Science Department, IIT Delhi
  – Developed an end-to-end Vector Space Retrieval Model incorporating **Prefix Search** & **Named Entity Restriction**
  – Achieved a **NDCG** and **F1 score** of **0.2322** and **0.1527** respectively, on the TREC dataset

- **Query Expansion and Language Modelling for Information Retrieval** *(November, 2020)*
  Guide: Prof. Srikanta Bedathur, Computer Science Department, IIT Delhi
  – Used probabilistic query expansion & pseudo relevance feedback to re-rank the BM25 results of MS-MARCO dataset
  – Applied Lavrenko & Croft's **relevance model** using Unigram model with **Dirichlet Smoothing** for re-ranking
  – Also applied relevance model using Bigram model with Dirichlet Smoothing & **Unigram Backoff** for re-ranking
- **Numerical Analysis of The Graetz Fluid** *(October-November, 2019)*
  Guide: Prof. Jayati Sarkar, Department of Chemical Engineering, IIT Delhi
  – Analyzed thermal boundary layer model at entrance region of a circular tube, using The **Leveque's Approximation**
  – Implemented **Similarity Solutions** & **Sturm-Liouville** properties to determine the temperature profile of the fluid
  – Validated the numerical solutions obtained using **Runge-Kutta 4th order** method against the analytical solutions
  Received a Letter of Recommendation from Course Coordinator for an outstanding performance in the course project
- **Computational Generation of a Packed Bed & Measurements of Fluid Flow** *(Ongoing)*
  Guide: Prof. Vivek Buwa, Department of Chemical Engineering, IIT Delhi
  – Prepared python scripts for **computational simulation** of spherical shaped catalyst packed beds in Blender
  – Performed **porosity analysis** over packed bed of 1000 spherical particles using **ANSYS (SpaceClaim)** & MATLAB
  – Developed models of **foam catalyst particles** using SpaceClaim; modeled an ensemble of 15k spherical particles
- **Calculation of Accumulator properties for stable boiler operation** *(August, 2020)*
  Guide: Prof. Gaurav Goel, Department of Chemical Engineering, IIT Delhi
  – Used **numerical methods** to compute material and energy balance equations for a boiler/accumulator closed system
  – Calculated the accumulator volume & final pressure using linear interpolation & **false point** algorithms using C++

RELEVANT COURSEWORK

Linear Algebra | Differential Equations | Calculus | Numerical Methods | Introduction to Computer Science | Data Structures and Algorithms | Probability and Statistics | Machine Learning and Deep Learning | Information Retrieval and Web Search | Macroeconomics

EXTRA CURRICULAR ACTIVITIES

- **Case Study Competitions & Innovation Challenges**: *Represented IIT Delhi at various Pan India events*
  – Winner, The Data Doyen: Data Science and Business Case Study Competition, organized by IMT Ghaziabad *(2020)*
  – Runner up, WIEmpower: 2-tier Case Study Competition Business Quiz, organized by IEEE IGDTUW, Delhi *(2020)*
  – Second Runner up, Projectile: Case Study Competition, organized by Delhi Technological University *(2020)*
  – National Top 10, Chanakya Neeti: Case Study Competition, organized by Delhi Technological University *(2020)*
  – Finalist, The Case Chronicles: Case Study Competition, organized by Daulat Ram College, Delhi *(2020)*
  – Finalist, Adhyayan: Case Study Competition organized by Faculty of Management Studies & Research, AMU *(2020)*
- **Sustainable Development for the Rural Artisan Clusters of Rajasthan** *(May, 2019)*
  Eco Craft Development Society, Jaipur, Rajasthan
  – Led a team of **5** to increase online outreach of Developmental Programs initiated for the upliftment of poor artisans
  – Designed **promotional strategies** for Economic Reform programs concerning entrepreneurial development
  – Managed the website renovation program to digitize the Need of Sustainable development in the Non-Farming Sectors
- **Student Mentor**: *Board for Student Welfare, IIT Delhi* *(2020-2021)*
  – Guiding **5** freshmen into a smooth transition in IIT Delhi, by ensuring comfort and stress management
- **Research Facilitation Coordinator**: *Chemical Engineering Society, IIT Delhi* *(2020-2021)*
  – Organization & management of events for promotion of ongoing research activities in the field of Chemical Engineering
  – Spearheading a **5** membered team for the development of first of a kind research database relevant for PhD applicants
- **Journalist**: *Board for Student Publication, IIT Delhi* *(2019-2020)*
  – Contributed towards publication of annual magazines, newsletter & article series in creative & journalistic factions
  – Managed scheduling, logistics, public outreach, back and front stage management of Net'19; with **200+** participants
  – **Activity Head, Literati**: Content development for creative publicity of the fest across various social media domains