Harsh Maheshwari

Data Science and Deep Learning

Linkedin : linkedin.com/in/harsh-maheshwari
Mail : harshmaheshwari3110@gmail.com
Github : github.com/Harsh-Maheshwari
Contact : +91-9834470295 [WhatsApp Enabled]

May 9, 2020
248 Wardhman Mahavir Ward,
Ganesh Nagar, Gondia, 441601,
Maharashtra, India

Academic Experience

- Pursuing **B.Tech.** in **Chemical Engineering** from **Indian Institute of Technology Bombay, 2017-2021**
- Awarded by **UGAC** & **EnPoWER**, for successfully completing In-Semester **Undergraduate Research** Program 2019
- Awarded **Big Data Certification** demonstrating proficiency in **Hadoop, Spark and Hive** as set by Eckovation
- Selected as **Exchange Scholar** from Chemical department representing IIT Bombay at Denmark Technical University
- Secured **AIR 735** in JEE Mains among 1.3 M candidates & **AIR 1382** in JEE Advanced among 0.2 M candidates in 2017
- Received Letter of appreciation from H.R.D. Minister for excellent performance in Class X CBSE Examinations in 2015

Work Experience

■ **Research Scholar** | **Prof. Bryan Hooi** | School of Computing, NUS, Singapore [Nov '19 - Dec '19]

- Developed a **Temporal Attention Model** for **node classification** and **link prediction tasks** in different graph
- Found efficiency of models like **Attention Walk, TMF, CTDNE, BANE** on different datasets for link prediction
- Understood dependency of graphs on time using dynamic models like **Node2Vec, Temporal Node Embedding**
- Found inefficiencies in the above models and improved them to get AUC of **86%** for **College Messages dataset**

■ **Machine Learning Lead** | **Innovation Cell** | Barcelona Smart Drone Challenge [Aug '19 - Feb '20]

Under guidance of **Prof. Dhwanil Shukla** 15 students from different departments worked as a team to innovate reality

- Designed and developed an **autonomous drone** capable of man-machine interaction customized for the challenge
- Integrated an on-board **Ros** enabled camera system for detection system from a height of **50 meters** on a flying drone
- Developed a **multi-core** zoom in characters recognition model based on **Char74** dataset using **OpenCV** & **Keras**
- Used **transfer learning** on **MobileNet** architecture and trained it on **custom aerial data** to get accuracy of **97%**

■ **Data Analyst** | **PV-Diagnostics** [Nov '18 - Dec '18]

- Designed **SQLite Database** with multiple parameters having large number of solar I-V and power data-points
- Populated the data, derived new insights and detected outliers through **Data Sorting, Cleaning and EDA**
- Developed new parameters of physical significance to a solar plant based on the translation equation
- Classified different type of defects in solar panels using **Logistic Regression** Model, Achieved **85%** accuracy

Technical Projects

■ **Time Series Analysis** | **Modelling of Gas sensor data** | Prof. Sharad Bhartiya [Aug '19 - Nov '19]

- Performed sampling time analysis, correlation analysis, PSD analysis and DFT analysis for the time series sensor data.
- Analysed the system by introducing 1%, 10% & coloured noises using Impulse estimate, Step estimate Plots & ETFE.
- Predicted concentration of dynamic gas mixture from sensor data using ARX, ARMAX, non-linear ARX models.
- Achieved best accuracy of **92.96% & 92.75%** for concentration of CO and Ethylene resp. in the 1 step ahead prediction

■ **Computer Vision** | **Image Classification & Object Detection** | Self Project [May '19 - Feb '20]

- Developed an model for **Parking Spot Detection** from a real time camera feed using OpenCV and RetinaNet
- Developed Emotion recognition, Face detection and recognition models using face_recognition library
- Deployed DenseNet, Dual Path, GoogleNet, MobileNet, RetinaNet, ResNext, SENet on CIFAR10 dataset using PyTorch.
- Scrutinized object-detection models like FastR-CNN, Faster R-CNN with RPN, Yolov3, Tiny-Yolo and Mask RCNN

■ **NLP** | **Hate & Offensive Speech Detection** | Prof. Sunita Sarawagi | Course Project [July '18 - Nov '18]

- Worked in team of 4 students to **ideate** and **develop** a module aimed to identify a tweet as **hate or offensive speech**
- Cleaned unnecessary characters and punctuation using **NLTK** & represented the frequency of words as a word cloud
- Modified Glove Word Embedding for given data and each word in text vocabulary was mapped to vector in **50D**

■ **Data Science** | **Customer Retention Analysis** | Self Project [Mar '18 - May '18]

- Understood the cause and scenario causing attrition of customers using Exploratory Analysis & Feature Engineering
- Deployed logistic regression, k neighbours, random forest classifiers & found recommendations to minimize loss.
- Developed a common Extract, Transform, Load process & a web app on Flask platform for user-server interface.

■ **Blockchain for Supply chain** | Prof. Sarthak Gaurav | SJMSOM IIT Bombay [Sept '19 - Dec '19]

- Analysed difficulties with current supply chain systems in reference to value of information and bullwhip effect
- Did a comprehensive research on uses, opportunities and advantages of blockchain in supply chain industry
- Analysed economics of the supply chain industry w.r.t types of blockchain networks, consensus and security

■ **Big Data** | **Movie Lens Data Analysis** | Eckovation Project [Jun '19 - Jul '19]

- Used **Hive** and **RegEx SerDe** to analyse data containing **10M** ratings, **95k** tags applied to **10k** movies by **71k** users
- Performed **Exploratory Analysis** like Genre Distribution, Ratings Distribution, Users analysis using **HiveQL**

■ **Exchange Scholar** | **Chemical Engineering** | Denmark Technical University [Jan '19 - June '19]

Chemical Unit Operations, Pilot Plant Lab Work, Guide- Prof. Ivan Hundebøl

- **Liquid Liquid Extraction** **Report** : Found efficiency of the mixer settler in 4 conditions based on 2 kinds of emulsion. Analysed mass balance and mass transfer coefficients in all 4 conditions. Compared results with funnel test.
- **Gas Flow in Pipes** **Report** : Investigated fan properties like Characteristic curve, power consumption and efficiency. Verified Bernoulli's equation, measured gas flow rate using the venturi, the orifice and the Pitot tube.
- **Batch Distillation** **Report** : Performed separation of water and ethanol with constant reflux ratio. Performed heat analysis on the system, used Rayleigh's modified equation & simplified relative volatility procedure for mass balance.
- **Filtration in a Filterpress** **Report** : Performed filtration of solid $Mg_3\,(PO_4)_2$ particles through a horizontal plate and frame filter press, produced after reacting $MgSO_4$ and Na_3PO_4 in an aqueous suspension.

Technical Skills

Python | Matlab | R | bash | SQL | HiveQL | HTML | CSS | Matplotlib | Numpy | Pandas | SciPy | OpenCV | Ggplot2 | dplyr | PIL | Pytorch | Keras | Tensorflow | Scikit Learn | NLTK | spaCy | FastText | SysID ToolBox | LSTMs | CNNs | GANs | Naive Bayes | Decision trees | Regression models | Random Forests | K-means | PCA | SVM | Apache Spark | SparkML | MySQL | Sqlite | Hive | MongoDB | Excel | Pig | Docker | Git | Google Cloud Platform | Google Analytics | Jupyter | R Studio | Spyder | Aspen | DWSIM | Android Studio| Communication | Collaboration | Problem Solving | Creative Critical Thinking | Active Learning | Hypotheses Generation | Googling skill

Courses Undertaken

Introduction to Machine Learning |

Positions of Responsibility

Finance & Infrastructure Manager | Innovation Cell [Aug '18 - Nov '18]

Finance	• Handled Accounts and analysed Finances as part of the 1st ever Finance team of Innovation Cell • Part of a team of 3 to maintain and manage the budget required by UMIC for technical projects • Managed finances of the team for various global competitions like Mahindra-RISE, ASME & IGVC
Management	• Conceptualized & organised Induction Program and Recruitment Tests for Innovation Cell • Managed infrastructure, inventory and technical requirements of the Innovation Cell Laboratory • Managed visibility of UMICs activities and wide-spread presence of our sponsors contributions

Extracurricular Activities

Hackathons	• Secured 2nd position among all students in Chemical Process Simulation hackathon using ASPEN • Developed an food ordering android app for canteens, secured 3rd position in Andro-NG hackathon
Cultural	• Secured 1st position in Literary Arts General Championship for Hostel 2 • Secured 3rd position in Street Play Arcade for Hostel 2 in the Inter hostel competition • Planned and travelled across 10+ countries on a short string budget, experienced rich culture • Published a Blog Series consisting of 8 blogs about Culture & Food, Denmark, Europe travel & DTU
Sports	• Successfully completed yearlong Volleyball training under NSO program of IITB • Won Gold in the Tug of War General Championship for Hostel 2 in 2nd year Semester 1
Volunteer	• Worked with team of volunteers to enhance experience of student guests at Mood Indigo