Saransh Gupta

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2022	M.TECH Dual Degree 5Y	Indian Institute of Technology, Kharagpur	7.51/10
2016	XII(RBSE)	Rajasthan Board	85.4%

Research Experience

Research Assistant | N.I.B.I.O.H.N, Osaka, Japan | Guided by Dr. Kenji Mizuguchi ***Duration: Jan 2020 - present***

- Worked with a high-dimensional data containing 10077 gene expressions with an objective to predict **The Non-small cell lung cancer** (**NSCLC**) using Machine Learning along with estimating the key features (genes) whose content affects the most for this type of lung cancer.
- Programmed **CUDA** enabled ML & DL algorithms like **CATBOOST**, **DBN** to predict the cancer with an accuracy **99% on validation & 100% test**.
- Implemented **Boruta Feature selection** technique to sample out 412 crucial genes out of all which are mainly responsible for this cancer.
- Used **Optuna** to fine tune the various parameters of the models, tSNE, PCA for dimensionality reduction to check the usability of the dataset.
- Deployed **SMOTE** and **ADASYN** oversampling techniques to balance the data-set and **Z-test to remove the outliers** out of the data-set.
- Used **R tools like WGCNA** for hierarchical clustering to examine the contributions of genes and **TargetMine** for the enrichment analysis of the genes in different pathways for the potential drug target discovery using the selected genes and the obtained enriched pathways.
- **Tools & Softwares:** Python, Optuna, Boruta, **WGCNA**, PCA, tSNE, R, TargetMine, Reactome, scikit-learn, SMOTE, ADASYN, Jupyter Notebook.

Research Assistant | S.A.V.R, IIT Kharagpur, India | Guided by Dr. J. Maiti ***Duration: May - July 2019***

- Worked on the Development of a **virtual reality** based fire training simulator and Machine Learning based path guidance system with an objective to build a virtual environment to train people for safe evacuation from a hospital building in case of fire.
- Created virtual environment of a hospital building in **Unity3D**, tested in **oculus-rift** to collect data from human behavior in case of fire.
- Programmed the oculus rift controlled player along with the **AI-Bots** which will be following the player during the time of fire exit using **C#**.
- **Tools and Softwares:** Programming with C#, VR box, oculus rift, Unity3D, SolidWorks, python, numpy, pandas, MS-Excel.

Internship Experience

Lead Data Analyst | COVID-19 Indian National Supermodel (INS) | Sapio Analytics, India ***Duration: May - July 2020***

- Worked directly under the patronage of Mr. Ashwin Srivastava, the CEO of the Sapio Analytics and Forbes 30 Under 30 Asia 2017.
- The project is being mentored by **The Noble Laureate Dr. Michael Levitt , Colonel H R Naidu Gade and other data analysts from USA, UK.**
- Led a team of ten data analysts at Sapio Analytics with an objective to predict the pandemic COVID-19 at the hyperlocal level.
- Successfully deployed **Susceptible - Exposed - Infectious – Recovered – Died (SEIRD)** model for the Indian states of NCT of Delhi, Telangana.
- The model is capable to predict the peak of first wave of the virus, and the infections per day at a **RMSE of ~105 for Rajasthan**.
- Implemented **Genetic Algorithm** to optimize the different parameters like **N (epidemic size), beta (infection rate)** of the SEIRD model.
- The **G.A. Optimized SEIRD model** will be used by the Govt. of Telangana to plan their lockdown and unlock processes accordingly.
- Proposed a methodology to predict the second wave of corona-virus based on the lockdown conditions which is the extension of this project.
- **Tools & Software:** Python, Genetic Algorithm, scipy, numpy, plotly, pandas, Ordinary Differential equations, SQLite.

Deep Learning & Computer Vision Software Development Intern | Swaayatt Robots, India ***Duration: April – July 2020***

- Worked with large data-sets of images to build a pipeline which can automate the points tracking, segments the road to extract path.
- Programmed **SuperPoint algorithm**, a deep learning approach to extract the features of an image for Point tracking & Visual Odometry.
- Implemented Road segmentation using **PSPU-NET**, a deep learning approach to extract the road out of a path for an autonomous car.
- Trained & tested the **Linear Style Transfer** algorithm using tensorflow to change the semantics of the road & convert day-night in images.
- Incorporated Visual Odometry, Point tracking, road segmentation and style transfer into a single pipeline to directly deploy on the system.
- **Tools & Softwares:** Python, VGG, opencv, pytorch, tensorflow, numpy, pandas, github, Convolutional Neural Networks, Image processing.

Self-Projects

Optimization of Machine Learning Models using Particle Swarm Optimization (An O.H.M. based approach) (GitHub link)

- Programmed an optimization heuristic method based approach called particle swarm optimization for global maxima/minima.
- Implemented the PSO algorithm for finding the global optimal parameters of various machine learning models to improve their accuracy.
- The algorithm is best known for its velocity optimization based approach which reaches to the global maxima/minima in minimal iterations.
- **Tools & Software:** Python, Optimization Heuristic methods, scikit-learn, numpy, pandas, programming and data-structures.

Detection of Malaria using blood smears images with Deep Learning | Kaggle | (GitHub link)

- Trained a Deep Learning model using **CNN** on Malarial and Non-Malarial Pathological Slides to predict the Disease with an accuracy of **96**%.
- Used **Image processing** to blur, rotate, resize the image to increase the data-set content and improve the robustness of the model.
- **Tools and Softwares:** Python, pandas, numPy, tensorflow, Convolutional Neural Networks, Opencv, Image Processing.

Predict the type of Network Congestion | Data Analytics Event, IIT Kharagpur (Link) ***Duration: Jan - Feb 2019***

- Implemented SVM, Random-Forest Classifier, Regression, Decision Tree Classifier, **XGBOOST,** and Bayesian Optimization.
- Implemented Feature Engineering on the train data. Obtained **82.55%** train accuracy, **80.66%** test accuracy, MCC score of **0.742.**
- **Tools and Softwares:** Python, Statistics, Tableau, MS-EXCEL, Scikit-learn, MATPLOTLIB, seaborn, Pandas, numPy.

SKILLS & EXPERTISE

- Programming & applications: Python, C++, R, C, Arduino, Image Processing, Video Analytics, Machine Learning, Deep Learning.
- Software and Tools: Tableau, MATLAB, ANSYS, Solid works, Unity3D, R-Studio, MATLAB, SOLIDWORKS, Visual Studio, MS-EXCEL

COMPETITIONS/SCHOLARSHIPS/Conferences

- **Selected for The A*Midex foundation scholarship from Aix-Marseille University worth around 2200 euros for the summer internship at Turning Center for Living Systems, Marseille, France.** ***Duration: May-July 2020***
- Invited to attend a **Global conference on Data Analytics** organized by Kaggle at **Dubai World Trade Centre**. ***Duration: March 2020***
- Guidance and Innovation Seminar | Make India Proud | Webinar ***Duration: June 8-23, 2020***
- My Team of three Data science enthusiasts Awarded with **Silver** for the Data-Analytics event at IIT Madras. ***Duration: Jan 2020***
- My Team of twenty Data science enthusiasts awarded with **BRONZE** for the Data-Analytics event at IIT Kharagpur. ***Duration: Feb 2019***

POSITIONS OF RESPONSIBILITY

COVID-19 Decision Support System Lead Intern | Sapio Analytics, India **Duration: May-July, 2020**

- Led a team of ten motivated data analyst interns at the company for the project Indian National Supermodel.

IIT KGP Student Mentorship Program | Student Welfare Group | Technology Students Gymkhana | IIT Kharagpur | From July 2019

- Mentoring four undergraduate students of the same branch under the shade of Student Welfare Group, IIT Kharagpur.

CERTIFICATIONS & COURSES

- Department Courses: Probability Statistics, Operations and Research, Programming and Data Structures, Optimization Heuristic Methods.
- Mooc Courses: Machine Learning, Data Analytics, Algorithms in programming, Deep Learning, 3D Simulations and Virtual Reality.
- Online Deep Learning, non-credit specialization by deeplearning.ai | coursera

EXTRA CURRICULAR ACTIVITIES

- Swimmer at water-polo team of Azad-hall of residence, Inter-hall general championship events, TSG - IIT Kharagpur during March 2018.
- Presentation team member of Inter-Hall Gardening competition team at Azad-hall of residence, TSG - IIT Kharagpur during March 2019.
- Manager at KHOJ, the annual treasure hunt event conducted by The Azad hall of residence and TSG, IIT Kharagpur during August 2018.