RISHABH GUPTA | 16GG20022

APPLIED GEOLOGY (M.Sc. 5Y)
MINOR in COMPUTER SCIENCE & ENGG. (B.Tech 4Y)
MICRO SPL. in ENTREPRENEURSHIP AND INNOVATION

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2021	M.SC(5YR)	IIT Kharagpur	8.02 / 10
2015	Indian School Certificate Examinations	Dr Brij Kishori Dubey Memorial School, Kanpur	94.2%
2013	Indian Certificate of Secondary Education	Mercy Memorial School, Kanpur	93.5%

INTERNSHIPS

Amazon Development Centre Pvt. Ltd. | Bangalore, India | Registration and Core Services Team — Apr '20 - Jul '20
Overview: *Design of an Automated pipeline for the migration of configuration files from a buyer service(.config) to a seller service(.json)*
- Devised the initial step for merging the buyer (COSMOS) and seller (FORTRESS) risk evaluation service to form a **Unified Risk Evaluation Service** (URES)
- Saved **80%** of man-hours wasted in manual conversion through automation; interleaved the interdependent FORTRESS files of intents, ML variables etc.
- Developed a **parser** using Java to read and store data of 73 COSMOS(.config) files and created their respective FORTRESS(.json) configuration files
- Accomplished a successful build of around **5000** FORTRESS files virtually on an **Amazon Web Service**(AWS) cloud server and compiled the results

The University of Sydney | Sydney, Australia | Centre for Translational Data Science — May '19 - Jul '19
Overview: *Optimal Execution of Portfolio Transactions using Deep Reinforcement Learning (RL) via parallel neuro-evolutionary algorithms*
*Received a **Letter Of Recommendation** from Dr. Rohitash Chandra for exemplary performance and surpassing the expected quality of output*
- Implemented a heuristic neuroevolutionary algorithm **G3PCX,** to train a **Deep Q Value Network (DQN)** which reduced the training time by **25%**
- Improved the training time by a factor of **2** by designing a novel architecture for parallelizing evolutionary RL chains using **multiprocessing** library
- Constructed a custom **Stock Trading** environment required in training of RL algorithms for minimizing the **Expected Shortfall** using Python
- Drafted and compared results of the proposed algorithm with various policy-based methods like **REINFORCE**, **Actor Critic**, **A2C**, **PPO** and **DDPG**

mBreath Technologies Private Limited | IIT Kharagpur, India | Machine Learning Division — Aug '17 - Dec '17
Overview: *Development of a deep learning model for intelligent activity classification and sleep detection*
- Assigned with the development of a **human activity recognition** system based on Convolutional Neural Network (CNN) for classifying 5 daily activities
- Improved the accuracy of baseline model by **12%** by optimizing the hyper-parameters and compared the results with KNN, XGBoost &Random Forest

COMPETITION/CONFERENCE

IEEE's 6th International Conference on Control, Automation and Robotics | Singapore — Sep '19 - Apr '20
Paper Title: *A Proposal of FPGA-based Low Cost and Power Efficient Autonomous Fruit Harvester*
- Increased the efficiency of fruit plucking process by **decreasing** the total amount of man-hours and cost of harvesting by **54%** and **48%** respectively
- Integrated computer vision algorithms for fruit detection by training a computationally efficient **Binarized Neural Network (BNN)** on MS COCO dataset
- Extracted real-world coordinates of detected fruits in **3D** using **point cloud estimation** and depth data acquired from a Microsoft X-box Kinect
- Achieved classification accuracy of **95.8%** on the BNN for fruit identification; network gave 30 FPS on a low cost &computationally primitive FPGA board

PROJECTS

IIT Kharagpur | Department of Electrical Engineering — Jan '20 - Feb '20
Overview: *Deep Reinforcement Learning (RL) for variability prediction in latent heat flux from low-cost meteorological parameters*
- Saved **75%** of the equipment cost for Latent Heat Flux variability prediction by developing an RL based classification scheme using costly features (CwCF)
- Implemented a Deep Q value classification network which dynamically finds the **optimal number of features** that provide the highest accuracy
- Increased **18%** accuracy of baseline model by fine tuning the **cost scaling factor**, which penalizes the cost function every time a new feature is chosen
- Co-authored a **paper** which was accepted at the **16th SPIE Photonics Europe 2020** (an acceptance rate of **35%**) which was held in Strasbourg, **France**

The University of New South Wales, Australia | School of Mathematics and Statistics — Jul '20 - Aug '20
Overview: *Long-term multi-step comparison between shallow and deep neural networks for Time-Series analysis*
- Performed a comparative study between Feed Forward NN, LSTM, Bi-Directional LSTM, **attention-based** Encoder Decoder LSTM &1D Convolutional LSTM
- Explored **seven** time series data sets and achieved a minimum RMSE of **0.0165** with Bi-directional LSTM (FNN giving **0.0203**) for the ACI Finance data set
- **Improved** the study by extending it to multi-step univariate analysis and submitted a comprehensive **paper** to the **Journal of Neurocomputing**

IIT Kanpur | Smart Materials and Structures Laboratory — May '18 - Jul '18
Overview: *Design and development of a pipeline Health Monitoring Robot based on smart sensor and rotating probes*
- **Initiated** the utilization of photodiodes over LDR & comprehensively studied electromagnetic (EM) waves &their interaction with corrosive metal pipes
- Enhanced the data quality by **30%** by conceptualizing a novel data acquisition system which uses the max. no. of photodiodes (giving min. interference)
- Observed **38%** reflectance of the infrared rays from the surface through simulation of the EM waves and corrosive steel pipe surface model on COMSOL

SKILLS AND EXPERTISE

Programming: C++, C, Python, Java, Matlab   **Libraries/Tools:** OpenCV, PyTorch, Tensorflow, Scikit-learn, Scipy, Keras, Git, STL, Spyder, Arduino

POSITIONS OF RESPONSIBILITY

Captain, Dramatics Cup | Lala Lajpat Rai Hall of Residence | IIT Kharagpur — Jul '19 - Mar '20
- Conceptualized and **directed** the stage play 'Satyasheel' which secured a **Bronze** medal out of 16 halls in the 'Inter-hall Hindi Stage Play' event
- Designed innovative workshops to inculcate creativity and confidence among **100+** junior and sophomores, nurturing them for General Championship
- Solely managed the casting, design of sets and a budget of over **INR 1.5 Lacs** which was utilized for the logistics and procurement of stage props

Captain, Hardware Modelling | Lala Lajpat Rai Hall of Residence | IIT Kharagpur — Jul '19 - Mar '20
- Organized two weeks of classes for **60+** sophomores to impart them with the basics of computer vision, machine learning, and embedded systems
- Spearheaded a team of **20 members** to come up with a novel design of an "Autonomous Beach Cleaning Ground Vehicle"

EXTRA CURRICULAR ACTIVITIES

Stand-Up Comedy	• Represented IIT Kharagpur at the **3rd** and **4th Inter IIT Cultural Meet** in the event of 'Stand-Up Comedy'	**2019, '20**
	• Secured **5th** position among 42 contestants at the Stand-Up Comedy Competition, 'Hilarity Ensues' held at Spring Fest	**2018**
Dramatics	• Directed and acted in the **Gold**-winning Stage Play in Inter Hall; Secured **Silver** medal for Open IIT Street Play	**2019**
Technology	• Selected to represent IIT Kharagpur at the **7th Inter IIT Technology Meet** in the event of 'Intelligent Farm Robots'	**2019**