

Konark Jain

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Portfolio: <http://konqr.github.io>

EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY, GUWAHATI

BTECH IN ELECTRONICS AND ELECTRICAL ENGINEERING WITH MINOR IN MATHEMATICS

Grad. Jul 2020 | Guwahati, India

Major GPA: 8.76

Minor GPA: 8.63

MVN SCHOOL, ARAVALI HILLS

Grad. May 2016 | Faridabad, India

Senior Secondary Result: 93.0%

High School Grade: 10.0

SKILLS

Programming Languages:

Python • C++ • MATLAB

Python Libraries:

Tensorflow • Keras • PyTorch • Pandas

Web Technology:

HTML • CSS

Miscellaneous:

LaTeX • MySQL

Operating Systems:

Windows • Linux

COURSEWORK

UNDERGRADUATE

Advanced Probability & Random Process

Mathematical Statistics

Advanced Linear Algebra

Optimization Methods

Functional Analysis

Computer Vision

Genetic Algorithms and Fuzzy Methods

Speech Recognition and Coding

Pattern Recognition & Machine Learning

MOOCS

Mathematics for Finance

Matrix Methods in Data Analysis

Machine Learning

Deep Learning

Convolutional Neural Networks

Natural Language Processing

Bayesian Methods for Machine Learning

Reinforcement Learning

Non-Linear Dynamics and Chaos Theory

Data Structures and Algorithms

EXPERIENCE

JP MORGAN & CHASE | QUANTITATIVE RESEARCH INTERN

May 19 - Jul 19 | Mumbai, India

- Developed Machine Learning models with outlier handling for Market Risk Prediction as a part of the Market Risk team.
- Built various regression algorithms to estimate and replace very expensive services required by the firm for risk calculations like mVaR and VaR in the Commodities LOB.

THE UNIVERSITY OF SYDNEY | RESEARCH INTERN

May 18 - Jul 18 | Sydney, Australia

- Developed the algorithm for Parallel Tempering on Bayesian Neural Nets and implemented it with multi-threading cutting down the running time to half.
- Run time was then further reduced by a factor of two by using surrogate assisted optimization.

DEFENCE RESEARCH AND DEVELOPMENT ORG. | RESEARCH INTERN

Dec 17 - Jan 17 | New Delhi, India

- Developed a Convolutional Neural Network architecture for unconstrained face recognition on multiple datasets for real time applications.
- Performance of the network developed in Tensorflow matched the state of the art methods achieving close to perfect accuracy on some datasets.

DELHI TECHNOLOGICAL UNIVERSITY | RESEARCH INTERN

May 17 - Jul 17 | New Delhi, India

- Classification of 20 activities could be achieved with record 94.22% accuracy for Human Activity Recognition for RGB-D video sequences.
- Developed a novel "Movement Polygon Mapping" technique of dimensionality reduction of 4D RGBD Video Sequences to a 1D vector.

PUBLICATIONS

• R. Chandra, K. Jain, R. Deo, S. Cripps, "Langevin-gradient parallel tempering for Bayesian neural learning", accepted in Neurocomputing Journal 2019

• R. Chandra, K. Jain, A. Kapoor, A. Aman "Surrogate-assisted parallel tempering for Bayesian neural learning", accepted in EAAI Journal 2020

• D.K. Vishwakarma and K. Jain, "Human Activity Recognition using Movement Polygon in 3-D Posture Data", in IEEE Transactions on Human-Machine Systems (Under Review)

POSITIONS OF RESPONSIBILITY

IITG.AI | Co-FOUNDER

Apr 18 - May 20 | Guwahati, India

IITG.ai is the AI community of IIT Guwahati for nurturing talent among the students and to establish collaborative projects with experts all around the world.

CEPSTRUM | GENERAL SECRETARY

July 19 - May 20 | Guwahati, India

CEPSTRUM is the student body of the Department of EEE, IITG. My duties include spearheading a 40 member team to perform various departmental activities.

PROJECTS

PORTFOLIO MANAGEMENT USING REINFORCEMENT LEARNING

Finance and Reinforcement Learning

Self Project - Apr'20 - Ongoing

- Developed a Deep Q-Learning Model along with a portfolio management environment for Reinforcement Learning. The model can learn to maximise either sharpe ratio or returns or minimize volatility.
- The model is able to beat the naive approach of assigning equal weights to all stocks when tested on several holdings of a popular mutual fund.
- Future work includes testing of various other RL models to improve the performance of the model and compare the performance with the performance of various mutual funds.

FINGERPRINT ANTI-SPOOFING USING DEEP LEARNING

Biometrics and Computer Vision

Bachelor's Thesis Project under Dr. K. Karthik - August'19 - June'20

- Developed a differentiating statistic between a spoof fingerprint and of that of a real person. Classification using this statistic was able to match the state of the art with over 90% accuracy.
- Various texture features were extracted and the feature extraction capabilities of Convolutional Neural Networks were also exploited to develop a robust fingerprinting recognition system against modern spoofing techniques.

REINFORCEMENT LEARNING FOR MINECRAFT

Reinforcement Learning

NeurIPS Challenge - July'19 - September'19

- The task was to develop a sample efficient reinforcement learning (RL) algorithm to train an agent on the Minecraft game.
- Researching on various meta-RL methods for this sparse rewards and hierarchical nature of the tasks.
- Developed and tested Options-Critic Algorithm and compared its performance with several baselines like Rainbow and DDQN.

GENERATIVE ADVERSARIAL NETWORKS (GAN) FOR FACE GENERATION

Generative Models

Self Project - January'19 - April'19

- Compared Vanilla GAN and DC-GAN for the task of generating face images from a small dataset.
- Researched on computational expense of GANs for small tasks and ways on how to improve it.

SELF BALANCING CYCLE

Control Systems and Robotics

Design Project Laboratory - January'19 - April'19

- Constructed from scratch a bicycle which was able to balance itself and move along a given path without falling. The project's motivation was the development of unmanned delivery systems for two-wheelers.
- Developed a novel technique of self-weight balancing by using PID Controllers to achieve self-stabilising action in the bicycle.

SIMILARITY MEASURES FOR SHORT TEXT COMPARISON

Natural Language Processing

Freelance Project - August'18 - December'18

- The task was to generate similarity scores between a customer query of a job and hundreds of options of Resumes for finding the perfect match for the job. Challenges included short text nature of the query and scalability.
- Developed a software which uses word embeddings from pretrained word2vec algorithms and various similarity metrics for each option to find the best match. Keyword extraction performed over Resumes text and scraped data from LinkedIn profiles.

BLOOD SMEAR IMAGE ANALYSIS

Computer Vision

Dimension Hackathon - January'18

- Used image processing techniques over images from a blood smear on a glass frame for detection of diseases like Malaria.
- The algorithm was able to report RBC, WBC and Platelet counts and thereafter reported a probability of being ailed by any of the five diseases we trained the model to detect.

**For more details of projects please visit my portfolio: <https://konqr.github.io/>*

AWARDS

2018	2 nd out of 15	Campus Entrepreneur Event, Kriti 2018
2015	Top 1% of the Nation	National Standard Exam in Physics
2015	Top 1% of the State	National Standard Exam in Astronomy
2014	Rank 77/50,000	National Fellowship for Young Scientists (KVPY)
2014	State Rank 1	National Talent Search Examination