

SAURABH PUROHIT

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EDUCATION

BS (Distinction) in Mathematics and Scientific Computing, Indian Institute of Technology Kanpur. July'14 – June'18

CONFERENCE PUBLICATION

Generalized Zero-Shot Extreme Multi-label learning. (co-author) May'21

Special Interest Group on Knowledge Discovery in Data (**SIGKDD**), 2021

ARTICLE

[On Artificial Intelligence and Open-Endedness](#) (Saurabh Purohit) Feb'21

- Investigating the role of Open-Endedness in creating AGI from first principles thinking.

EXPERIENCE

Microsoft Research (Research Fellow, ML and optimization group) July'19 – June'21

Generalized Zero Shot Learning (ZSL) for extreme classification (Publication)

Supervisor: Dr. Manik Varma | MSRI

- Experimented and developed a **novel information retrieval based ZSL paradigm** for extreme scale classification.
- **Created datasets** like **Wikipedia**, **Amazon**, Bing Ads recommendation which address real world challenges in extreme classification scenarios.
- **Evaluated other baseline algorithms** to show huge efficiency gains with the new algorithm.

Mathematical Reasoning using AI

Supervisor: Dr. Navin Goyal | MSRI

- Carried out research in automated theorem proving on Lean prover using AI tools.

Goldman Sachs (Analyst) June'18 – June'19

- Improved scalability and performance of **mathematical finance models**.
- Used machine learning techniques to improve accuracy of a regression based model drastically, which had **an impact of millions of dollars**.

INTERNSHIPS

Goldman Sachs (Summer analyst) May '17 – July '17

- **Improving quality of raw data used for risk modelling**
 - Modified and granularized the raw data input to models used for estimating various risk metrics.
- **Risk analysis using modified data**
 - Worked extensively with models used for pricing derivatives, estimating risk and different market factors.

Supervisor: Prof. Krishanu Maulik

- **Simulating probabilistic urn models with infinite colours**
 - Studied Polya Urn model and extended its probability theoretic results to infinite coloured urns.
 - Developed and implemented a finite space algorithm for simulating infinite colours by sampling using random process
- **Analysis of distributional convergence**
 - Estimated the empirical asymptotic behaviour of urn by fitting appropriate distributions.

MAJOR PROJECTS

Deep Q-learning Bot for tentacle wars, a real time strategy game | IIT Kanpur

Course Project

Supervisor: Prof. Purushottam Kar

- **Led this project** where we used Q-learning to develop an agent for tentacle wars.
- Divided the game into sub-games which drastically stabilized learning for the agent resulting in a high winning rate.
- Achieved a winning rate of more than 90% by training only 50-100 matches on a 3 layer neural network

Differential Geometry and Manifolds | IIT Kanpur

Undergraduate Project

Supervisor: Prof. Debasis Sen

- Studied metric spaces, functional spaces, differential forms which is an approach to multivariable calculus independent of coordinates.
- Learnt various theorems like Arzela–Ascoli theorem, Baire Category theorem and Stokes theorem.

Harmonic Analysis on Poincare Disc | IIT Kanpur

Undergraduate Project

Supervisor: Prof. Rama Rawat

- Used Euclidean Harmonic Analysis as analogy for Fourier Analysis on Poincare Disc.
- Studied Poincare disc, properties, various representations and measures defined on it and Laplace-Beltrami operator, its eigenfunctions and eigenvalues, and their asymptotic properties.

SCHOLASTIC ACHIEVEMENTS

- Achieved **99.45** percentile in JEE Advanced 2014 and **99.88** percentile in JEE Mains '14.
- Received **A*** grade in the courses **Probability and Statistics** and **Complex Analysis** for exceptional performance.
- Secured **AIR 5** in the prestigious KVPY 2014 and was a recipient of the scholarship.
- Selected for **ACM-ICPC** regionals and represented IIT Kanpur at onsite round.

TECHNICAL SKILLS

Programming Languages: Python, C, C++, Perl, Cython, R, LaTeX

Softwares and Utilities: SQL, MATLAB, GNU Octave

RELEVANT COURSES

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|------------------------------------|---|
| • Introduction to Machine Learning | • Probability and Statistics |
| • Data Structures and Algorithms | • Applied Stochastic Processes |
| • Linear Algebra and ODE | • Inference I |
| • Partial Differential Equations | • Numerical Analysis and Scientific Computing |
| • Analysis II | • Fourier Analysis |

VOLUNTEERING

- Organised several events for awareness about the environmental crisis.
- Secretary | Programming Club, IIT Kanpur

- Helped in carrying out the functioning of the club and expanding its reach.
- Conducted workshops and various institute level events to encourage freshers towards programming.
- Academic Mentor | Counselling Service, IIT Kanpur
 - Mentored academically weak students by conducting institute level and hall level remedial classes.