SAURABH PUROHIT

saurabh purohit

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 – Present*

Mathematical Reasoning using AI

Supervisor: Dr. Navin Goyal | MSRI

- Carrying out research in automated theorem proving and generation of formal language using machine learning.

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

Supervisor: Dr. Manik Varma | MSRI

- Conducted research 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.

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

- Improved scalability and performance of **mathematical finance models**.
- Used machine learning techniques to improve accuracy of a 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.

ISI Kolkata | Infinite coloured urn models *Dec '16 – Jan '16*

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

- Introduction to Machine Learning
- Data Structures and Algorithms
- Linear Algebra and ODE
- Probability and Statistics
- Applied Stochastic Processes
- Numerical Analysis and Scientific Computing

VOLUNTEERING

- Secretary | Programming Club, IIT Kanpur
  - 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.