Nilesh Gupta

PhD Student
Department of Computer Science
University of Texas at Austin

✉ nileshgupta2797@gmail.com
🏠 nilesh2797.github.io
🎓 Google Scholar

RESEARCH INTERESTS

Large-scale Machine Learning, Deep Learning, Web Search & Recommendation

EDUCATION

University of Texas at Austin   *2021 - present*
PhD student in Computer Science and Engineering
Advisor: Prof. Inderjit Dhillon

Indian Institute of Technology Bombay   *2015 - 2019*
B.Tech (Honours) in Computer Science and Engineering
Advisor: Prof. Shivaram Kalyanakrishnan

WORK EXPERIENCE

Microsoft Research India   *2019 - 2021*
Research Fellow in Machine Learning and Optimization Group
Advisor: Dr. Manik Varma
Worked on algorithms of Extreme Classification leading to multiple top-tier publications and impact across Microsoft products

PUBLICATIONS

- **Generalized Zero-Shot Extreme Multi-Label Learning**
  Nilesh Gupta, Sakina Bohra, Yashoteja Prabhu, Saurabh Purohit and Manik Varma
  *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**), 2021*

- **Extreme Regression for Dynamic Search Advertising**
  Yashoteja Prabhu, Aditya Kusupati, **Nilesh Gupta** and Manik Varma
  *International Conference on Web Search and Data Mining (**WSDM**), 2020* (**Long Oral**)
  *Workshop on eXtreme Classification: Theory and Applications @ **ICML**, 2020*

RESEARCH EXPERIENCE

Generalized Zero-Shot Extreme Multi-Label Learning
Advisor: Dr. Manik Varma, *Microsoft Research India*   *2020*

- Introduces generalized extreme multi-label learning paradigm where both seen and unseen labels need to be predicted
- Proposed *ZestXML* algorithm efficiently solves the generalized XML problem and achieves higher accuracy than baselines
- Deploying *ZestXML* in Sponsored Search Advertising on Bing improved Click Yield of IR-based system by 17%

XReg: Extreme Regression for Dynamic Search Advertising   *2019*
Advisor: Dr. Manik Varma, *Microsoft Research India*

- Extends scalable tree-based extreme classifiers to regress onto the accurate numerical relevance between query and item
- Deployment of *XReg* in Bing resulted in massive relative gain of 58% in revenue and 27% in query coverage

Scalable Parabel: Optimizing Parabel to scale on 50M labels   *2019*
Advisor: Dr. Manik Varma, *Microsoft Research India*

- Optimized implementation of Parabel extreme classifier which got used in multiple deployments across Bing and MSN
- Resulted in $10\times$ less RAM consumption and enabled Parabel to train on 50M dataset in few hours on commodity CPU

Learning Complex Behaviours and Keepaway in Robocup 3D   *2018*
Advisor: Prof. Shivaram Kalyanakrishnan, *Undergraduate Thesis, IIT Bombay*

- Developed NEAT based optimization framework for learning complex behaviours of agents in Robocup 3D environment
- Learned agents consistently outperformed benchmark policies on the challenging Keepaway task of simulated soccer

Verification of Concurrent Programs under Weak Memory Model   *2017*
Advisor: Prof. Parosh Aziz Abdulla, *Internship, Uppsala Universitet*

- Studied context bound analysis for concurrent programs under Release and Acquire semantics of memory model
- Implemented modular, efficient and scalable version of stateless partial order reduction model checking algorithm in C++

Selected Awards and Honors

- Ranked 4th in ACM-ICPC Asia Regionals and 6th in ACM-ICPC India Online *2017*
- All India Rank 384 in JEE Advanced (IIT-JEE) 2015 among 150,000 candidates *2015*
- Awarded the prestigious KVPY Fellowship from Government of India *2015*
- Ranked 2nd in Regional Mathematics Olympiad (RMO) and among top 300 students in INMO *2014*

Teaching & Responsibilities

- *Undergraduate Teaching Assistantship* - Computer Science and Engineering, IIT Bombay
    - Computer Programming and Utilisation - *Prof. Ganesh Ramakrishnan* *Autumn 2018*
    - Computer Programming and Utilisation - *Prof. Krishna S.* *Autumn 2017*
    - Basic Calculus - *Prof. Amiya K. Pani* *Autumn 2016*
- *MOOC Teaching Assistantship* - IITBombayX, edX
    - Data Structures and Algorithms - *Prof. Deepak B. Phatak* *Spring & Autumn 2017*
- *Managing Extreme Classification Reading Group* - Microsoft Research India *2020 - 2021*

Relevant Courses & electives

Machine Learning

- **Specialized**: Deep Learning Seminar, Natural Language Processing, Advanced Machine Learning, Organization of Web Information, Foundations of Intelligent Learning agents, Fundamentals of Image Processing
- **Fundamentals**: Fundamentals of Machine Learning, Artificial Intelligence, Calculus, Linear Algebra, Numerical Analysis

Others

- **Theory**: Applied Algorithms, Data Structures & Algorithms, Design & Analysis of Algorithms, Logic for Computer Science, Discrete Structures, Automata Theory
- **System**: Digital Logic Design, Computer Networks, Computer Architecture, Operating Systems, Database Systems, Implementation of Programming Languages

Academic Research Projects

Robust Lane Detection for SeDriCa *Spring 2016*
Innovation Cell, IIT Bombay

- Developed and implemented lane detection algorithm for autonomous ground vehicle SeDriCa (Self Driving Car).
- Our submission at Intelligent Ground Vehicle Competition 2016 bagged 5th position in Advanced Auto-Nav Challenge

Automated Music Transcription *Spring 2018*
Advisor: Prof. Ajit Rajwade, *IIT Bombay*

- Developed online tool for real time transcription of music played on piano to MIDI notation.
- Solution based on background subtraction for detection of pressed keys after normalizing the frame for illumination and transformations

Deep Reinforcement Learning in Mario *Autumn 2018*
Foundation of Intelligent Learning Agents, Prof. Shivaram Kalyanakrishnan

- Explored applications of NEAT algorithm on learning controls for agent in MARIO environment having no prior domain knowledge about the environment