Sahil Manchanda

PhD Scholar
Computer Science and Engineering
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EDUCATION

Ph.D, *Computer Science*, **Indian Institute of Technology Delhi**, *CGPA 8.73 / 10* **2019-Cont**
Area: Learning Algorithms over Graphs

M.Tech, *Computer Science*, **Indian Institute of Technology Guwahati**, *CGPA 9.14 / 10* **2015-2017**

B.Tech, *Information Technology,* **Indraprastha University**, *New Delhi, 78.4%* **2010-2014**

Senior Secondary, *Central Board of Secondary Education, New Delhi, 97 %* **2010**

Secondary, *Central Board of Secondary Education, New Delhi*, *91.8 %* **2008**

EXPERIENCE

NAVER Labs, France **Sep 2020- Mar 2021**
Research Intern, Machine learning and Optimization
Area: Deep Reinforcement Learning for Combinatorial Optimization
Worked on learning heuristics to solve TSP and CVRP.

Conduent Labs (Formerly Xerox Research Center), Bangalore, India **2017-2019**
Research Engineer, Machine learning and Statistics
Area: AI for Transportation and Scheduling

Adobe Systems, Delhi, India **2014-2015**
Software Engineer, Adobe Acrobat team

SKILLS

- Graph Neural Networks, Mixed Integer Programming, Graph Generative Modelling, Recommendation Systems, Combinatorial Optimization, Few-Shot Learning, Continual Learning.
- **Tools:** Python, PyTorch, CPLEX, SCIP, DGL, PyTorch Geometric

PUBLICATIONS

- **TIGGER: Scalable Generative Modelling for Temporal Interaction Graphs :** Link **2022**
  Shubham Gupta, Sahil Manchanda, Srikanta Bedathur and Sayan Ranu
  Association for the Advancement of Artificial Intelligence **(AAAI)**, 2022

- **NeuroMLR: Robust & Reliable Route Recommendation on Road Networks:** Link **2021**
  Jayant Jain, Vrittika Bagadia, Sahil Manchanda and Sayan Ranu,
  Advances in Neural Information Processing Systems (**NeurIPS**), 2021

- **GCOMB: Learning Budget-constrained Combinatorial Algorithms over Billion-sized Graphs:** Link **2020**
  Sahil Manchanda, Akash Mittal, Anuj Dhawan, Sourav Medya, Sayan Ranu and Ambuj Singh
  Advances in Neural Information Processing Systems (**NeurIPS**), 2020

- **Representation learning of drug and disease terms for drug repositioning** Link **2017**
  Sahil Manchanda and Ashish Anand
  3rd IEEE International Conference on Cybernetics (CYBCONF), Exeter, United Kingdom

PATENT

- **Trained pattern analyzer for roll out decision** **2019**
  Status: Filed in USPTO - Link
  Inventors: Sahil Manchanda, Arun Rajkumar, Simarjot Kaur and Narayanan Unny

PROJECTS

- **Learning to solve Mixed Integer Programs** **Current**
  - Developing Reinforcement learning based technique to generate efficient cut-selection policies for certain classes of MIPs.
  - Learning to discover efficient heuristics for Learning to select Branching variables for MIP.

- **Learning to generate labeled graphs under constraints** **Current**

- Focus on learning to generate graphs under various constraints such as generating molecules satisfying valency constraints, low resource datasets etc.

➢ **Robust and reliable route recommendation in road networks** **2020-2021**
Guide: Dr. Sayan ranu, IIT Delhi
- Developed an inductive model using Lipschitz embeddings on GCN to learn road embeddings.
- Model improved over existing work by 25% in terms of accuracy 25% in and 20% in terms of reachability. More effective in terms of answering queries over unseen data.

➢ **Learning Budget-constrained Combinatorial Algorithms over Billion-sized Graphs** **2019-2020**
Guide: Dr. Sayan Ranu, IIT Delhi
- Predict individual quality of nodes using Graph convolution network(GCN) and identify potential nodes.
- Deep Q network to predict nodes that collectively form a good solution by using GCN scores and locality of nodes as features. Importance Sampling for fast locality computation.
- Achieved quality similar to the state of the art while being more than 2 orders of magnitude faster.

➢ **Labeled Graph generative modeling** **2019**
Data mining course project at IIT Delhi
- Extended GraphRNN(NeurIPS 2018) for graph generative modeling for handling node and edge labels.
- Domain agnostic implementation.

➢ **Vehicle Health Monitoring** **2017-2018**
Conduent Labs, Bangalore, India
- Developed item-set mining based model for recommending rollout of vehicles for a US based fleet agency.
- The method mines defect patterns which led to failures in the past when fleet supervisors made rollout decision.

➢ **Mobility Analytics Platform - Descriptive platform for transportation network** **2017-2018**
Conduent Labs, Bangalore, India
- Developed algorithms for estimating passenger alighting in bus/metro network using check-in data in a flat fare environment.
- Designed solution to support heterogeneous data -fare collection(paper ticket /smart card) and vehicle location data.
- Developed various functionalities using fare collection data and GTFS(vehicle schedule) such as estimating direction of vehicles, identification of missing vehicle stop times, alignment of real trips to scheduled trips.

➢ **Representation learning of drug and disease terms for drug repositioning** **2017**
Guide: Dr. Ashish Anand, Indian Institute of Technology Guwahati
- Learned word vector representation of drug and disease terms from unstructured bio-medical text(PubMed).
- Enhanced vector representations using similarity information from structured data such as side-effect based drug similarity and gene based disease similarity etc.
- Used matrix completion approach to predict drug-disease associations.

KEY COURSES

➢ **Data Structures and Algorithms**	➢ **Intelligent Systems**	➢ **Database Management Systems**
➢ **Data Mining**	➢ **Artificial Intelligence**	➢ **Mobile robotics**
➢ **Mathematics for Computer Science**	➢ **Numerical methods**	➢ **Operating Systems**
➢ **Linear Algebra**	➢ **Probability**	➢ **Cryptography**

ACHIEVEMENTS

➢ **Graduate Aptitude Test in Engineering :** All India rank 273 among 115425 candidates. **2015**

➢ **CBSE Merit certificate :** Received Merit Certificates for Computer Science and Mathematics for being in **top 0.1 %** of the successful candidates all over India. **2010**

- **Merit certificate-National Cyber Olympiad:** Secured All India Rank 224. **2009**

MISCELLANEOUS

- Student member, PhD interviews organizing team, CSE, IIT Delhi **2020-2021**
- Teaching assistant at IIT Delhi - Computer networks, Data Structures and Algorithms, Database systems **2019 - cont**
- **PC Chair :** KDD Applied Data Science Track
  Reviewer: ECML-PKDD, AutoML, AISTATS, TKDD, KDD, TKDE, and WSDM
  Subreviewer: VLDB, EDBT, AAAI, WSDM, ICLR, CODS-COMAD,ICDM, KDD, ICDE, TKDE, CODS-COMAD.
- Student representative (M.Tech) - Department Post Graduate Programme Committee, Dept. of CSE, IIT, Guwahati. **2016-2017**
- Teaching assistant at IIT Guwahati - Mathematics for Computer Science and Introduction to programming. **2015-2017**
- Android application developer intern at School of Information Technology, Indraprastha University, Delhi. **2013**

REFERENCES

- **Prof. Sayan Ranu, Associate Professor, IIT Delhi**
  sayanranu@iitd.ac.in
- **Prof.Srikanta Bedathur, Associate Professor, IIT Delhi**
  srikanta@iitd.ac.in
- **Dr. Jean-Marc Andreoli, Principal Scientist, NAVER Labs, Europe**
  jean-marc.andreoli@naverlabs.com
- **Dr. Narayanan Unny, Director, Big Data Labs, American Express, Bengaluru**
  narayanan.unny@gmail.com
- **Prof. Ashish Anand, Associate professor, IIT Guwahati**
  anand.ashish@iitg.ernet.in
- **Dr. Sourav Medya, Post-doctoral fellow, Northwestern University**
  sourav.medya@kellogg.northwestern.edu