Akash Saha

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Career Objective

A researcher with 5+ years of experience in working with machine learning models seeking a position to utilize my knowledge and gain professional experience while being resourceful, innovative and analytical. My primary research theme is to develop efficient optimization methods and algorithms for machine learning problems. This involves investigation of both the theoretical and practical aspects of optimization methodologies. I am also interested in looking into applications of machine learning and deep learning in relatively less explored directions.

Education

- **PhD** — Mumbai, India
  Industrial Engineering and Operations Research (IEOR), IIT Bombay — *January 2018 – Ongoing*
- **Master of Science** — Roorkee, India
  Industrial Mathematics & Informatics, IIT Roorkee; CGPA: 9.104/10 — *July 2012 – May 2014*
- **Bachelor of Science** — Kolkata, India
  Mathematics Honours, Jadavpur University; Percentage: 78.25% — *July 2009 – June 2012*
- **Higher Secondary Examination (10+2)** — West Bengal, India
  Julien Day School, ISC Examination, New Delhi; Percentage: 91.14% — *June 2007 – May 2009*
- **Secondary Examination (10)** — West Bengal, India
  Julien Day School, ICSE Examination, New Delhi; Percentage: 94.71% — *May 2007*

Research Interests

- Deep Learning, Machine Learning, Explainability of learning models, Optimization Techniques.

Research Area

Learning with Functional Data via Operator-valued Kernel Methods, Deep Neural Network Models: Theory, Techniques and Algorithms

Supervisor : Prof. P. Balamurugan

- Machine learning methods which can handle functional features can open up plenty of new areas of application, where the flexibility of functional and infinite-dimensional spaces would enable us to achieve significantly better performance while managing huge amounts of training data.

- Kernel based leaning algorithms have been a popular tool in supervised learning problems, we are working on an extension to operator-valued kernels for learning problems in a functional setting.

- Future work involves establishing connections to deep learning in various aspects of the algorithm.

Publications

- Saha, A. and Balamurugan, P., "*Learning Sparse Graphs for Functional Regression using Graph-induced Operator-valued Kernels.*" Transactions on Machine Learning Research (TMLR), 2024.

- Saha, A. and Balamurugan, P., "*Learning with Operator-valued Kernels in Reproducing Kernel Krein Spaces.*" Advances in Neural Information Processing Systems (NeurIPS), vol. 33, 2020. Accepted for Oral Presentation with acceptance rate: 1.1% (105/9454).

Summer School/Workshops

- Attended "Research Week with Google 2023" organized by Google Research India in Bengaluru from January 29 -31, 2023.

- Participated in the LinkedIn-MSR-IISc Workshop on "Fairness, Accountability, Transparency and Ethics in Machine Learning" at IISc, Bangalore from January 9 - 10, 2020.

- Attended International Centre for Theoretical Sciences (ICTS) program on "Statistical Physics of Machine Learning" held in ICTS, Bangalore from January 6 - 10, 2020.

- Attended "Indo-French Centre for Applied Mathematics (IFCAM) summer school workshop on Mathematics for Data Science" at IISc, Bangalore from July 15 - 27, 2019.

Research Internship

Research Intern   Bengaluru, India
Computational and Statistical Physics Lab, Indian Institute of Science   *May 2013 – July 2013*
- Worked on spectral distribution of random matrices under the supervision of Prof. V. Murugesan

Key Courses

Machine Learning, Optimization Techniques, Stochastic Models, Deep Learning, Decision Analysis and Game Theory, IEOR for Health Care, Integer Programming, OR Applications in Infrastructural and Service Sectors, Real & Complex Analysis..

Projects

- Generating images from CIFAR10.
- Using deep learning for PAN & AADHAR card identification.
- Implementing various heuristics for TSP vs Concorde Solver.
- A heuristic for Wavelength Division Multiplexing Problem.

Teaching Experience

Teaching Assistant   IIT Bombay
IEOR Department Courses   *January 2018 – Ongoing*
- IE 663: Advanced Topics in Deep Learning.
- IE 643: Deep Learning - Theory and Practice.
- IE 614: Linear Systems.
- IE 503: Operation Analysis.

Assistant Professor   Telangana, India
Rajiv Gandhi University of Knowledge Technologies, Basar   *July 2014 – December 2017*
- Courses taught: Discrete Mathematics, Numerical Methods, Probability & Statistics, Probability and Stochastic Processes, Engineering Mathematics.

Skill set

- **Programming Languages**: Python, C++, C
- **Optimization Solvers**: CPLEX, AMPL, Gurobi
- **Analytical Tools**: Microsoft Excel
- **Computaional/Utility Tools**: MATLAB, R, LaTeX

MOOC Certifications

NPTEL Online Certification:
- Introduction to Data Analytics
- Introduction to Cryptology

Extra Curricular Activities

- Won Table Tennis PG General Championship for IEOR Department [2019 - 20].
- Placement Representative of Mathematics Department, IIT Roorkee [2013-14].

REFERENCES

Prof. P. Balamurugan   IEOR, IIT Bombay

balamurugan.palaniappan@iitb.ac.in   *(More references can be provided on request.)*