Dibyakanti Kumar

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Education

Jul 2024 – Present **The University of Manchester, UK**
Ph.D in Computer Science
Advisor : Prof. Anirbit Mukherjee, Prof. Alex Frangi

Jul 2018 – Jul 2022 **Indian Institute of Technology, Guwahati**
Bachelor of Technology in Electronics and Electrical Engineering CGPA – 8.31/10
Minor in Computer Science CGPA – 8.80/10

Experience

Dec 2022– July 2024 **Research Intern,** University of Manchester
*Mentored by **Prof. Anirbit Mukherjee***
- Assessing the efficacy of Neural Networks in addressing Partial Differential Equations with finite-time blowups.
- Conducting rigorous **theoretical analysis** on existing frameworks to identify potential points of failure.

Aug 2022– Jun 2024 **Software Developer,** Barclays
- **Market Risk** | C++ Developer | Apr'23 – Jun'24
  - Responsible for maintaining the framework used to compute value-at-risk for various market indices.
  - Enhancing **cache efficiency** through the elimination of redundancy in bulk requests and the implementation of multi-threading.
  - Improving Solace queue efficiency through the **reduction of message redundancy**.
- **Logging and Monitoring** | Python Developer | Aug'22 – Mar'23
  - Improving the architecture for logging and monitoring for all types of logs
  - Utilizing **ML** to detect **anomaly in logs** and trigger alerts for other teams, to reduce the chance of major interruption of service.

Jun 2020– Aug 2022 **Research Intern,** University of Utah
*Mentored by **Dr. Vivek Gupta***
- Semi-automatic rule-based extension of the semi-structured inference dataset **InfoTabS**.
- Introduce **intra-domain counterfactual tables** to discourage **BERT-class models** from learning spurious correlations and recalling pre-train knowledge.
- Incorporated **domain specific constraint** for table validity.
- Improved performance on **InfoTabS** using this dataset as an augmented data.

Jun 2021– July 2021 **Software Developer Intern,** Barclays
- Ever-greening of legacy data ingestion framework and finding viable options for obsolete libraries.
- Utilize multiprocessing libraries like **dask** and **multiprocessing** in python to parallelize data-processing.
- Improved the current data ingestion framework to make them 6 times faster.

Publications

[1] Langevin Monte-Carlo Provably Learns Depth Two Neural Nets at Any Size and Data
D. Kumar, S. Jha and A. Mukherjee **[Paper]**

[2] Towards Size-Independent Generalization Bounds for Deep Operator Nets
P. Gopalani, S. Karmakar, **D. Kumar** and A. Mukherjee
Published at **TMLR 2024** **[Paper]**

[3] Investigating the Ability of PINNs To Solve Burgers' PDE Near Finite-Time BlowUp
D. Kumar and A. Mukherjee
Published at **IOP-MLST journal** and short version at **NeurIPS 2023** ML4PS workshop **[Paper]**

[4] Realistic Data Augmentation Framework for Enhancing Tabular Reasoning. **EMNLP 2022** in Findings.
D. Kumar, V. Gupta, S. Sharma and S. Zhang
Findings of **EMNLP 2022** **[Paper]** **[Website]**

Skills

Languages	Python, C++, Julia
Frameworks	JAX, PyTorch, Tensorflow
Utilities	Docker, Git

Relevant Courses

Mathematics	Linear Algebra, Multi-variable Calculus, Probability and Random processes, Graphs and Matrices
ML	Pattern Recognition and ML, Natural Language Processing, Data-Driven System Theory
CS & Others	Game Theory, Discrete Mathematics, Data Structure and Algorithm, Operating System, Information Theory, Network Coding and Application, Error Correcting Codes

Services

Reviewer	AISTATS, ICML, ICLR, Neurocomputing Journal, IOP-MLST Journal
2020-2021	**IITG.AI,** *Opensource Head* AI and ML community at IIT Guwahati

Achievements

2020	*Recipient of **Silver Medal** at Inter-IIT TechMeet DataScience Competition*
2018	*Ranked among the **top 2%** in JEE Advanced held for 0.15 million candidates*