

PRATIK KARMAKAR

PhD Student, School of Computing, NUS | MSc in Big Data Analytics | BE in Electrical Engineering

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RESEARCH INTERESTS

Data Quality Management & Data Valuation in Databases and Machine Learning; Provenance in Probabilistic Databases; Privacy-Preserving Artificial Intelligence; Optimization for Machine Learning and Deep Learning

PUBLICATIONS

- **Expected Shapley Value is Shapley Value for Expected Utility Game (EC-SQARU 2025)**
 - Proving equality between expected Shapley Value and Shapley Value of expected utility
 - Proving the same does not hold for Banzhaf values, but for Normalized Banzhaf values.
- **Discovering Voting Power for Ensemble Methods (DEXA 2025)**
 - Proposes new methods to measure voting power of models in ensemble learning.
- **Using a Probabilistic Database in an Image Retrieval Application (EDBT 2025) [Paper]**
 - Uses probabilistic data generated by YOLOv5 for improved explainability.
 - Employs ProvSQL for probability and Shapley value computations.
- **Expected Shapley-Like Scores of Boolean Functions: Complexity and Applications to Probabilistic Databases (PODS 2024)**
 - Defines expected Shapley-like scores (incl. Banzhaf index) for probabilistic databases.
 - Demonstrates polynomial-time computation, implemented in ProvSQL.
- **Marich: A Query-efficient Max-Information Model Extraction Attack (NeurIPS 2023)**
 - Efficient model extraction attack using min-max optimization.
 - Active sampling minimizes query budget while maximizing information gain.

EDUCATION

PhD in Computer Science
School of Computing, National University of Singapore
📅 Jan 2023 – Present 📍 Singapore

- CGPA: 4.0/5.0

MSc in Big Data Analytics
Ramakrishna Mission Vivekananda Educational and Research Institute
📅 Sep 2020 – Jul 2022 📍 Belur, India

- CGPA: 9.25/10

BE in Electrical Engineering
Jadavpur University
📅 Aug 2014 – Jun 2018 📍 Kolkata, India

- CGPA: 8.58/10

TECHNICAL SKILLS

Python R PostgreSQL Neo4j

GRADUATE COURSEWORK

- Optimization for Machine Learning
- Data Structures and Algorithms
- Probability and Stochastic Process
- Multivariate Statistics
- Machine Learning, Computer Vision, Deep Learning
- Optimization Algorithms, Online Learning
- Artificial Intelligence
- Uncertainty Modeling in AI

TEACHING EXPERIENCE

- TA for BT5110: Data Management and Warehousing
- TA for CS4221: Database Applications Design and Tuning
- TA for IT2002: Database Technology and Management
- TA for IT5008: Database Design and Programming

AWARDS

- Teaching Fellowship Scheme (SoC, NUS, 2024/25 Sem 1)
- Research Achievement Award (SoC, NUS, 2023/24)

WORK EXPERIENCE

Trainee Data Scientist
Abzooba India Infotech Pvt. Ltd.
📅 Jul 2022 – Dec 2022 📍 Kolkata, India

- Developed a reusable data imputation framework for business cases.
- Mentored interns on Explainable AI projects.

Graduate Engineer Trainee
Vedanta Aluminium Ltd.
📅 Sep 2018 – Feb 2019 📍 Odisha, India

- Led operations and maintenance of Ash & Coal Handling Plants (Power Division).

Summer Intern
Defence Research and Development Organization
📅 May 2017 – Jun 2017 📍 Hyderabad, India

- Designed Brushless DC Motors for tactical aerospace vehicles.