

OWAIS MAKROO

 makroo-owais |  MakroOwais

Srinagar, Jammu & Kashmir - 192122, India

EDUCATION

• Indian Institute of Technology, Kharagpur

Mathematics and Computing, Department of Mathematics

Nov' 22 - Present

West Bengal, India

◦ CGPA: 8.65

• Delhi Public School, Anantnag

Secondary Education

Jul' 22

Jammu and Kashmir, India

◦ Grade: 94%

INTERNS/EXPERIENCE

• Amazon

Applied Scientist Intern - Core Search Team

May 2025 - Nov' 2025

Bengaluru, Karnataka

◦ **Objective:** Enhance Amazon's ESCI models to improve search ranking relevance and work on membership attacks and privacy trade-offs in classifiers

◦ Utilized large-scale distributed systems (Hadoop, Spark) to process and experiment on Amazon-scale query and product datasets for model improvements

◦ Conducted comprehensive research on Membership Attacks, demonstrating that generative classifiers are significantly more vulnerable to the attacks

◦ Uncovered critical utility-privacy trade-offs in classifier architectures, with findings submitted to NeurIPS 2025 Workshop on Privacy and Security in ML

◦ Collaborated with applied scientists and engineers to deploy, evaluate, and benchmark ML models in production-like environments at scale

• Department of Mathematics, IIT Kharagpur

Research Intern - Prof. Swanand Khare

Dec' 23 - Apr' 2025

Kharagpur, West Bengal

◦ **Objective:** Develop SALSA, a state-of-the-art machine unlearning method and a source-agnostic transfer learning framework for optimal layer selection

◦ Achieved breakthrough performance with SALSA being at least 150x faster than second fastest method and 12x closer to oracle than second best approach

◦ Benchmarked SALSA across diverse datasets and model architectures, demonstrating superior efficacy in removing data influence efficiently and effectively

◦ Developed transfer learning method applicable to any architecture, conducting extensive experiments across different models, datasets, and metrics

• bhk.ai

Machine Learning Research Intern

May 24 - Oct' 24

Remote

◦ **Objective:** Automate 3D walkthrough generation for real estate properties by developing custom models for room mapping and connection optimization

◦ Revolutionized property visualization workflow, reducing setup time for 3D walkthroughs from 7-8 hours to 50-60 seconds, improving efficiency

◦ Designed custom cross-attention architecture for intelligent room connection, achieving exceptional performance with dice score of 0.95 and 97% accuracy

• School of AI and Data Science, IIT Jodhpur

Research Intern - Prof. Bikash Santra

May 24 - Jul' 24

Jodhpur, Rajasthan

◦ **Objective:** Develop novel deep learning architectures to accurately identify PPGL tumor types from CT scans using custom feature extraction approaches

◦ Designed specialized architectures focused on medical imaging feature learning, achieving 7-14% improvement over existing state-of-the-art benchmarks

◦ Demonstrated significant research contributions with one accepted paper and one paper under review, advancing medical AI diagnostics capabilities

PATENTS AND PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

[C.1] Makroo et al. (2026). **ReSuMe: Retriever-Summarizer Mutual Enhancement via Reinforcement Learning**. Manuscript submitted for publication in *The Web Conference (WWW) 2026*.

[C.2] Makroo et al. (2025). **The Hidden Cost of Modeling p(x): Vulnerability to Membership Inference Attacks in Generative Text Classifiers**. Manuscript published for publication in *Neural Information Processing Systems (NeurIPS) 2025*.

[C.3] Makroo et al. (2025). **SALSA: A Secure, Adaptive and Label-Agnostic Scalable Algorithm for Machine Unlearning**. Manuscript published in *Uncertainty in Artificial Intelligence (UAI) 2025*.

[C.4] Makroo et al. (2025). **Enhanced Identification of Pheochromocytoma and Paragangliomas' Genetic Clusters from CT**. Manuscript published in *Society of Photo-Optical Instrumentation Engineers (SPIE) Medical Imaging 2025*

[J.1] Makroo et al. (2026). **Multi-Headed Deep Feature Learning for Genetic Clusters Identification of Pheochromocytoma and Paraganglioma from CTs**. Manuscript submitted for publication in *Biomedical Signal Processing and Control 2026*.

[J.2] Makroo et al. (2026). **The Hidden Cost of Modeling p(x): Vulnerability to Membership Inference Attacks in Generative Text Classifiers**. Manuscript submitted for publication in *Transactions on Machine Learning Research (TMLR)*.

[S.1] Makroo and Khare (2026). **Detecting Dataset Outliers via Training Dynamics Clustering**. Manuscript submitted for publication in *Uncertainty in Artificial Intelligence (UAI) 2026*

PROJECTS

• SIREN - Explainable AI Framework

Oct' 24 - Dec' 24

◦ Developed SIREN, an interpretability framework for analyzing AI-generated images, winning Gold at InterIIT Tech Meet 13.0 against top IIT teams

◦ Implemented methods to visualize feature importance and identify key prediction factors, demonstrating real-world applications of explainable AI

• Machine Unlearning Library

Jan' 25

◦ Developed comprehensive open-source machine unlearning library featuring SALSA and scripts for all baseline and competing unlearning methods

◦ Created unified framework with standardized implementations of state-of-the-art unlearning algorithms, enabling fair comparison and reproducible research

• Torch Optimizer

Jan' 25

◦ Developed TorchOptimizer, a Bayesian Optimization-based hyperparameter optimizer with multithreaded processing for hyperparameter selection

◦ Improved optimization efficiency across multiple datasets and architectures, open-sourcing with comprehensive documentation for community adoption

• PyPopSim - Population Dynamics Simulator

Feb' 25

◦ Built a stochastic population simulator implementing various growth models (logistic, exponential, predator-prey) for ecological research applications

◦ Created interactive visualizations using Matplotlib to analyze population trends, stability patterns, and long-term ecological dynamics

EXTRA-CURRICULAR ACTIVITIES

• Research Group Member, Perception Team

◦ Contributed to autonomous aerial vehicle research, developing perception algorithms to enhance sensory input processing and decision-making capabilities

• Writer and Reporter

◦ Cover campus events and issues for IIT Kharagpur's student-run media, ensuring accurate and engaging journalism through research and analysis

• Track and Field & Strength Athlete

◦ Represent IIT Kharagpur in throwing and weightlifting at intercollegiate competitions while training rigorously to improve performance and strength