# **Kunal Rathore**

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### Summary

I'm a third-year Ph.D. student at Oregon State University, specializing in Environmental Sciences and AI. My research focuses on developing Symbolic Explainable AI methods for Computer Vision. Additionally, I contribute to Scientific ML projects, including predicting Harmful Algal Blooms. I am passionate to explore predictive/ data-driven methods for dynamical systems in interdisciplinary Sciences. My goal is to develop trustworthy, reliable, and sustainable AI solutions for real-world problems.

### Education

**Oregon State University** January 2022 - December 2025 PhD, Environmental Science & Artificial Intelligence **Centre for Modeling & Simulation, Pune University** July 2017 - May 2019 Master's, Mathematical Modeling and Simulation Savitribai Phule Pune University July 2013 - May 2017 Bachelor's, Automotive Engineering

### Certifications

AWS Cloud Practitioner, Foundation of GIS, AgAID Digital AgAth0n 2023 - Participant, Responsible AI Algorithms Design, Al for Marketing,

### **Professional Experience**

#### **Oregon State University**

Graduate Research / Teaching Assistant

- Explainable AI for Computer Vision DL models and LLMs, Scientific Machine Learning
- Predicting Critical transition via hybrid data-driven model in Socio-Economic Ecological models.
- Working with Socio-Environmental Analysis (SEA) Lab on data-driven ecology.

#### Seagate Technology LLC

AI / ML Intern

- Led the integration of Generative AI and Large Language Model (LLM) technologies into enterprise applications.
- Developed and optimized LLM models by prompt engineering to convert natural language inquiries into structured and unstructured database gueries. This implementation significantly reduced guery time, enhanced usability for users unfamiliar with SQL databases, and minimized human errors.
- Played a key role in the exploration, design, evaluation and implementation of efficient data processing pipelines, thereby improving overall system performance.

#### **Persistent Systems**

Senior ML Engineer

- Time-Series Forecasting and Anomaly Detection: I developed and implemented algorithms for analyzing network traffic across the organization. This involved the use of time-series forecasting and anomaly detection techniques.
- Data Exploration for Machine Learning Models: I conducted extensive data exploration to assess the feasibility of machine learning models for privilege access management applications. This initiative significantly enhanced our network security protocols.
- Entity and Link Extraction Models: As part of a large-scale team, I developed models for entity and link extraction. This enabled us to create structured and graphical representations of entertainment news.
- Real-Time Sentiment Analysis Platform: I created a state-of-the-art text summarization streaming platform. This platform was used for real-time sentiment analysis, leveraging the latest technology.

#### Remote, OR, USA

July 2023 - September 2023

### Corvallis, OR, USA

2022 - Present

Pune, Maharashtra, India

2019 - 2021

#### **Persistent Systems**

ML Intern

### Pune, Maharashtra, India

- January 2019 July 2019
- Organizational Network and Data Analytics Tool: I conducted research and development for a tool designed to analyze organizational network and data. This project involved visualizing the network and interaction of 10k+ employees.
- Feedback Summarization and Analytics Tool: I developed a machine learning-based tool for summarizing and analyzing survey feedback. This tool was designed to extract key insights from large volumes of survey data, enabling efficient decision-making for human resources.
- Chatbot Performance Enhancement: I designed, reconstructed, and implemented a framework to enhance chatbot performance. This involved the use of human feedback learning to continuously improve the chatbot's responses and overall user experience.
- Explanation for Deep learning: Implemented and evaluated explainable AI techniques for deep learning models trained on medical image data.

## **Projects**

#### Hybrid modeling for HABs

Graduate Research Assistant

- Building hybrid model for predicting Harmful Algal Blooms (HABs).
- This involves Watershed model, Hydrological and Water quality monitoring model coupling with ML techniques.

#### Explainable Al

Graduate Research Assistant

- Evaluation of Graduated Assignment algorithm for Multi-Graph Matching: applied for image correspondence.
- Generating post-hoc explanations (Vision-based DNN models).

#### SciML in Ecology

Graduate Research Assistant

• Critical transition prediction using data-driven equations and Neural Nets in socio-economic ecological models.

### Skills

- Programming & Tools: AWS, Apache Kafka, Computer Vision, Confluence, CUDA, Data Analysis, Flask, Git, Airflow, Linux/Unix, Microsoft Azure, R, MongoDB, MySQL, NumPy, Postgres, Postman, Pytorch, Natural Language Processing (NLP), Python, MATLAB, Operations Research, HTML/CSS, Excel/Numbers/Sheets, Tensorflow, SQL, Pyspark, Jupyter Notebook, REST APIs, API handling, Pytorch, Microsoft Azure AI studio, OpenAI API, LangChain, Statistics
- Soft Skills: Inter-Disciplinary Research background, Strong problem solving & computational skills, Advanced engineering and modeling skills, Software project management, Excellent writing and communication skills, Experience in conducting research, Writing peer-reviewed publications, Monitoring & maintaining deployed models, ensuring scalability, reliability, and performance in production environments
- Languages: Hindi, Marathi, English
- **Interests:** Data-driven modeling, Quantitative Finance, Scientific Simulations, Machine Learning, CV, NLP, Software Engineering, Mathematical Modeling, Environmental Sciences..

## **Publications**

- Generating Part-Based Global Explanations Via Correspondence, IJCAI 2024 Workshop on Explainable Artificial Intelligence (XAI) Kunal Rathore; Prasad Tadepalli;
- A Simple Method of Solution For Multi-label Feature Selection 2019 IEEE International Conference on Electrical, Computer and Communication Technologies, Jayaraman K Valadi, Prasad T Ovhal, Kunal J Rathore;
- RA2Vec: Distributed Representation of Protein Sequences with Reduced Alphabet Embedding, ACM Conference on Bioinformatics 2020, Rajitha Yasas Wijesekara, Ashwin Lahorkar, Kunal Rathore, Jayaraman Valadi

Corvallis, OR, USA

April 2024 - Present

Corvallis, OR, USA January 2022 - Present

#### Corvallis, OR, USA