

Anup Shakya

ML Research | PhD Candidate

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SUMMARY

- Research and development experience with proficiency in Python, Java, statistical modeling, and Machine Learning libraries evidenced by the completion of **3 research projects** on **Educational Data Mining** and **Neural Network Verification** funded by **NSF**
- Able to design and conduct experiments, process data, analyze/evaluate results, and build deep learning models and pipelines demonstrated by **6 peer-reviewed publications** in venues like **IEEE ICDM** and **EDM**
- Strong communication and collaboration skills with strong interest in Generative AI and Large Language Models (LLM) resulting in **6 conference presentations** and **3 collaborations** including a collaboration with **Adobe Research**

EDUCATION

Ph.D., Computer Science | *The University of Memphis* | (GPA 3.99)

Jan 2020 – Dec 2024

M.S., Computer Science | *The University of Memphis* | (GPA 3.98)

Jan 2020 – Aug 2022

WORK EXPERIENCE

Software Engineering Intern | *Rivian Automotive (Palo Alto, CA)*

May 2024 – Aug 2024

- Researched tools and techniques to optimize large language models such as LLaMa and OpenAI Whisper for deployment in edge devices
- Worked to enhance the throughput of Rivian voice assistant framework by testing the optimization strategies like quantization, knowledge distillation and utilizing Deep Learning Accelerators (DLA) on NVIDIA Jetson AGX Orin

Graduate Research Assistant | *The University of Memphis*

Jan 2020 - Present

- Developed the ability to effectively contribute in a collaborative team-oriented environment leading to **3 successful research collaborations**
- Solved the student strategy prediction problem leading **3 research projects** funded by **NSF, Bill & Melinda Gates Foundation, and Learning Academy**
- Exhibited ability to investigate, evaluate, and progress solutions with an ability to write scientific articles as evidenced by **6 peer-reviewed publications**

Software Engineer Lead | *Deerwalk Services*

Dec 2015 – Jan 2020

- Highlighted ability to maintain high coding standards with expertise in building web applications leading to the development of **4 in-house web application** products
- Led software development and enhanced the agile development process resulting in **25% improvement** in efficiency evidenced by lead development role in **2 web application projects**

RELEVANT PROJECTS | ([Link to Full Projects List](#))

- **Scalable Student Strategy Prediction in Math Learning | ([Link to Project](#))**
Relevant Skills : Python, TensorFlow, Transformers, LSTM, Learning Science, ML Optimization
 - Developed an innovative embedding, MVec, and employed a non-parametric clustering to build a scalable and fair ML model to predict (assess) student strategies/performance on Math problems in K-12 students
- **Probabilistic Verification of Neural Networks | ([Link to Project](#))**
Relevant Skills : Python, PyTorch, scikit-learn, Hybrid Markov Logic Network, MILP Optimization, Statistical Learning
 - Proposed a novel approach to verify representations in Deep Neural Networks with a probabilistic framework using Hybrid Markov Logic and Mixed Integer Linear Programming optimization

RESEARCH AREAS

- **Big Data Educational Technology** – This area focuses on leveraging big data analytics to enhance educational outcomes by predicting student performance, providing personalized recommendations, and discovering learning strategies. My work in this field includes developing scalable algorithms for understanding and predicting student behavior based on large datasets from educational platforms.
- **Machine Learning in Education** – My research integrates machine learning into educational technologies, as demonstrated in my work on *Student Strategy Prediction using a Neuro-Symbolic Approach* (EDM 2021), where I introduced novel frameworks combining neural networks and symbolic reasoning. These techniques enable educators to better understand student performance in real time, offering opportunities to tailor learning experiences to individual needs.
- **Statistical Relational Learning** – This field combines probabilistic models with logic-based reasoning to manage uncertainty and represent complex relationships in data. In my research, I have utilized SRL to verify relational explanations in large datasets, particularly in the context of embedding verification and probabilistic reasoning. This area allows for sophisticated decision-making and inference in systems where data is noisy or incomplete, an essential requirement in both educational and AI applications.

RESEARCH PUBLICATIONS

- **Anup Shakya**, Abisha Thapa Magar, Somdeb Sarkhel and Deepak Venugopal, **On the verification of Embeddings using Hybrid Markov Logic**, In Proceedings of 23rd IEEE International Conference on Data Mining (ICDM) 2023 Dec. ([Link to Paper](#))
- **Anup Shakya**, Vasile Rus and Deepak Venugopal, **Scalable and Equitable Math Problem Solving Strategy Prediction in Big Educational Data**, In Proceedings of 16th International Conference on Educational Data Mining (EDM) 2023. ([Link to Paper](#))
- **Anup Shakya**, Vasile Rus and Deepak Venugopal, **Student Strategy Prediction using a Neuro-Symbolic approach**, In Proceedings of 14th International Conference on Educational Data Mining (EDM) 2021. ([Link to Paper](#))
- **Anup Shakya**, Vasile Rus and Deepak Venugopal, **Mastery Guided Non-parametric Clustering to Scale-up Strategy Prediction**, In AAAI Workshop on AI4ED, 2023 Feb. ([Link to Paper](#))
- Abisha Thapa Magar, **Anup Shakya**, Somdeb Sarkhel and Deepak Venugopal, **Verifying Relational Explanations: A Probabilistic Approach**, In proceedings of IEEE International Conference on Big Data 2023, Sorrento, Italy. ([Link to Paper](#))
- **Anup Shakya**, Vasile Rus, Stephen Fancsali, Steve Ritter and Deepak Venugopal, **NeTra: A Neuro-Symbolic System to discover strategies in Math Learning**, In Proceedings of The Third Workshop of Learner Data Institute in conjunction with International Conference on Educational Data Mining 2022. ([Link to Paper](#))

SKILLS LIST

Python, PyTorch, Transformers, TensorFlow, MySQL, Java, Learning-Science, Large Language Models, Fine-Tuning, ElasticSearch, Data Science, scikit-learn, JavaScript, Computer Vision, AWS, Google Cloud, Reinforcement Learning, Supervised-Learning, Statistical Analysis, Pandas, Hypothesis Testing

HONORS AND AWARDS

- Student Success Award 2024 at the University of Memphis
- Graduate Student Association 20 Under 35 Award 2024 at the University of Memphis
- 2nd position in 18th Annual CS Research Symposium 2023 at the University of Memphis
- Peter I Neathery Fellowship 2021

AFFILIATIONS AND HOBBIES

- Active Member of Nepali Student Association at University of Memphis
- Senior Member of the University of Memphis Machine Learning and AI Research Lab
- Soccer
- Listening to Music and Playing Guitar