

Ashitabh Misra

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Urbana, IL

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EDUCATION

University of Illinois at Urbana-Champaign

Candidate for PhD in Computer Science

Advisor: Prof. Tarek Abdelzaher

Urbana, IL

August 2021 – May 2026 (Expected)

Indian Institute of Technology Bhilai

Bachelor of Technology in Computer Science and Engineering

GPA: 9.2/10

Chhattisgarh, India

August 2016 – May 2020

Publications

Latency-Constrained Input-Aware Quantization of Time Series Inference Workflows at the Edge

July 2024

Under Review at *IEEE International Conference on Computer Communications (INFOCOM)*

Ashitabh Misra, Nurani Saoda, and Tarek Abdelzaher

ViX: Analysis-driven Compiler for Efficient Low-Precision Variational Inference

April 2023

Design, Automation, and Test in Europe Conference (DATE)

Ashitabh Misra, Jacob Laurel, and Sasa Misailovic

BullsEye: Scalable and Accurate Approximation Framework for Cache Miss Calculation

August 2022

ACM Transactions on Architecture and Code Optimization (TACO)

Nilesh Rajendra Shah, Ashitabh Misra, Antoine Miné, Rakesh Venkat, and Ramakrishna Upadrasta

Network Based Framework to Compare Vaccination Strategies

November 2021

Computational Data and Social Networks

Rishi Ranjan Singh, Amit Kumar Dhar, Arzad Alam Kherani, Naveen Varghese Jacob, Ashitabh Misra, and Devansh Bajpai

Research Experience

Dept. of Computer Science, University of Illinois at Urbana-Champaign

Urbana, IL

Research Assistant, Guide: Prof. Tarek Abdelzaher

January 2022 - Present

Research focus: Design algorithms for adaptive compression of neural networks and probabilistic programs

Constrained Input-aware Compression of Neural Networks on the Edge

- Design novel quantization techniques for neural network inference that adapt based on input variations and changing operational environments
- Implement end-to-end compilation pipelines to easily deploy complex dynamically quantized NNs on microcontroller-grade devices like Raspberry Pi Pico
- Current experiments show up to $4\times$ speed-up and up to 30% additive increase in accuracy compared to existing state-of-the-art techniques on vehicular target detection benchmarks

Quantized Variational Inference for Probabilistic Programs on the Edge

- Designed novel static analysis techniques for probabilistic programs to perform Variational Inference (VI) using integer arithmetic with minimal overflows
- Implemented ViX, a probabilistic programming language that performs VI in integer arithmetic
- ViX achieves up to $15\times$ speed-up compared to its high precision counterpart on Arduino Due. ViX performs inference on $100\times$ more data than existing state-of-the-art accurately

Work Experience

Dept. of Computer Science, Indian Institute of Technology Hyderabad

Hyderabad, India

Research Associate

August 2019 - August 2021

- Developed cache-optimized neural network compression algorithms, achieving $40\times$ compression for VGG-16 and AlexNet with competitive accuracy against existing state-of-the-art
- Designed cardinality estimation approximate algorithms for octagon abstract domain, that achieved $50\times$ speedup with $< 5\%$ accuracy loss relative to conventional techniques

Egnyte

Poznan, Poland

Machine Learning Intern

May 2018 - July 2018

- Initiated and deployed a hybrid probabilistic-ML event detection pipeline for smart data caching in Egnyte's macOS app
- The solution surpassed and replaced established solutions by capturing $12\times$ more target events

Trading Projects

Backtesting HFT market-making strategies

Urbana, IL

Guide: Prof. David Lariviere

August 2023 – December 2023

- Lead a team of 4 to backtest high-frequency trading (HFT) market-making strategies, utilizing Level 2/Level 3 data for cash equities and cryptocurrencies
- Setup and managed linux servers to download and parse scripts from crypto-exchanges and Polygon API for backtesting on Strategy Studio.
- Backtested Ichimoku, Moving Average, and Volume-weighted moving average strategies over 1 month period producing net losses ([Gitlab repo](#))

Skills

Languages: C, C++, Python, Shell Scripting **OS:** Linux

Frameworks: PyTorch, Numpy, Pandas, Flask, Selenium(Web Scraping), Integer Set Library, Barvinok Library, Clang, LLVM,

Miscellaneous: Public Speaking, Teaching

Relevant Courses

Compilers: Compilers(CS426), CS526: Advanced Compilers(CS526), Machine Learning for Compilers(CS598)

Robotics: Mobile Robotics for CS (GC 498)

Approximate Computing: Topics in Programming Languages: Approximate And Probabilistic Programming Systems(CS521)

Machine Learning: Data Mining Principles(CS512), Machine Learning, Reinforcement Learning, Math for Machine Learning

Cryptography: Introduction to Cryptography, Blockchain Technology, and Lightweight Cryptography

Trading: Algorithmic Market Microstructure (FIN 556)

Achievements

2020 **First Prize** in Health and Technology Category, Smart India Hackathon (SIH)

2020 **Exemplary Alumni Award** Mahatma Hansraj Modern School, India

2013 **Best Delegate** MUNOG (Model United Nations of Goldsberg, Germany) as Delegate of Afghanistan, UNESCO

2013 **Youngest Recipient of the Wazir Balichand Trophy** Mayo College Ajmer for excellence in Chess, India

Teaching Experience

Dept. of Computer Science, University of Illinois at Urbana-Champaign

Urbana, IL

Teaching Assistant, CS427: Software Engineering

August 2021 - December 2021

Dept. of Computer Science, Indian Institute of Technology Bhilai

Chhattisgarh, India

Teaching Assistant, CS200: Software Tools and Technology

August 2019 - November 2019