Sina Tayebati

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RESEARCH INTERESTS

- Computer Vision
- LLM
- Generative AI
- Deep Learning
- Algorithms

EDUCATION

University of Illinois Chicago **2023 – Present**
Ph.D in Electrical and Computer Engineering *Chicago, IL*

Northern Illinois University **2020 – 2022**
M.S. in Mechanical Engineering *Dekalb, IL*

TECHNICAL SKILLS

Deep Learning	Fontend	Backend	Database	Technologies
• Pytorch	• React.JS	• Python	• MongoDB	• Git
• Pyro		• Node.JS		
• Scikit-Learn	• Vue.JS	• Express.JS	• MySQL	• Docker

EXPERIENCE

Data Science R&D Intern **Jan 2024 - Present**
CCC Intelligent Solutions *Chicago, IL*

- Working on **Workflow Digital Analyzer**, a digital twin software simulating CCC AI soltuions in customer workflows.
- Contributing to **DocumentAI**, a **Large Language Model (LLM)** based software for document understanding and complex interaction aiming to increase the document processing volume by more than **10%**.
- Led a **Computer Vision** project, exploiting **deep LiDAR** and **AI models** to detect and measure vehicle damages, thereby enhancing damage estimation accuracy by **15%**.
- Led the deployment of a **Large Language Model** agent for automated claim generation in auto insurance.
- Contributed in **Speech Recognition** and **NLP** R&D, enabling voice-based auto-generation of crash claims.

Research Scholar **August 2023 - Present**
SRC Research Scholars Program joint with the University of Illinois Chicago *Chicago, IL*

- Leading research on **Large Multimodal models** with focus on edge autonomy.
- Led research on **Masked Auto Encoders (MAEs)** for ultrafrugal **edge sensing** and **object detection** for edge autonomy via **generative AI**.
- Developed **STARNet**, a **deep learning** framework for **anomaly recognition** in LiDAR-Camera data pipelines, enhancing reliability of downstream tasks such as **object detection and classification** for edge **autonomous vehicles**.

Full-stack Developer **November 2022 – Present**
Self-employed Freelancing *Chicago, IL*

- Developed a **MERN** finance dashboard web app integrated with **ML predictie models**, using **MongoDB, Express, React, NodeJS**.
- Designed a fully responsive **React** ecommerce app with dedicated **NodeJS+MongoDB** backend and features such as **Stripe payment, inventory management, etc.**, delivering a seamless shopping experience.
- Developed various front-end projects, and contributed in designing a wide range of web apps spanning **Enterprise SAAS product, ecommerce platforms**, etc.

R&D Engineer **August 2022 – August 2023**
SUNSTAR Inc. *Chicago, IL*

- Designed a versatile framework/dashboard using **gradio** integrating **data manipulation** and **machine learning** tools for in-depth analysis of product characteristics and consumer data, supporting **informed decision-making**. This framework helped the R&D team reducing the time for data analysis by **20%**.

- Collaborated in development of a **deep learning-based** oral hygiene monitoring model integrated with edge hardware on a device, demonstrating **AI techniques** for healthcare and wellness solutions. This AI-on-device product was estimated to reduce the oral hygiene cost for consumers up-to **30%**.

Advance Technology Engineer **August 2021 – July 2022**
TRUMPF Inc. *Schaumburg, IL*

- Developed a framework with versatile **machine learning-based** tools for addressing various autonomous manufacturing challenges including **real-time analytics** and **process optimization**, reducing **system variability**.
- Developed a state-of-the-art **machine learning** tool for enhancing reliability of autonomous systems by forecasting **anomalies** and **system failures**, ultimately reducing unexpected system failure up-to **10%**.

Technology Intern **May 2021 – July 2021**
TRUMPF Inc. *Schaumburg, IL*

- Designed a proof-of-concept supervised **machine learning** model to predict and optimize the performance of technical instruments.

PUBLICATIONS

- **Tayebati, Sina**, Theja Tulabandhula, and Amit R. Trivedi. "Sense Less, Generate More: Pre-training LiDAR Perception with Masked Autoencoders for Ultra-Efficient 3D Sensing" **Conference on Robot Learning CoRL 2024, Under Review.** **arXiv** .
- Darabi, Nastaran, **Tayebati, Sina**, Sathya Ravi, Theja Tulabandhula, and Amit R. Trivedi. "STARNet: Sensor Trustworthiness and Anomaly Recognition via Approximated Likelihood Regret for Robust Edge Autonomy" **IEEE WCCI 2024, Accepted.** **arXiv**
- Darabi, Nastaran, **Tayebati, Sina**, Theja Tulabandhula, and Amit R. Trivedi. "INTACT: Inducing Noise Tolerance through Adversarial Curriculum Training" **IEEE ICASP, Under Submission.**
- **Sina Tayebati**, and Kyu Taek Cho. "A hybrid machine learning framework for clad characteristics prediction in metal additive manufacturing" **Additive Manufacturing Frontiers, Under Review.** **arXiv**

Projects

C-VAE | *Python, Pytorch, Pyro*

- Implemented the paper "learning structured output representation using deep conditional generative models" using Pyro, a Pytorch based probabilistic language.
- Implement their proof of concept: an artificial experimental setting for structured output prediction using MNIST database.

Tracking Unknown Number of Objects | *Python, Pytorch, Pyro*

- Implemented an efficient inference algorithm to estimate assignments and tracking unknown number of objects.
- Implemented a smart assignment solver using "guide" concept and a Kalman filter-smoother for smart state estimation.

Volunteering

Chicago4Iran **2022 – 2023**
Website admin

- Designed, deployed, and managed the website for non-profit organization.

Network of Nations **2020 – 2023**
Contributer

- Contributed to the Network of Nations, a non-profit organization dedicated to assisting new international students arriving in the U.S.