

Reachsak Ly

+1-540-605-0125 | reachsak@vt.edu | reachsak.github.io | [LinkedIn](#) | [GitHub](#)
Charleston, Illinois, 61920, USA

EDUCATION

Virginia Polytechnic Institute and State University

Doctor of Philosophy in Environmental Design and Planning

[Dissertation](#): "Leveraging Artificial Intelligence and Distributed Ledger Technologies Toward Smart and Autonomous Buildings" Blacksburg, VA

Aug. 2022- May 2025

Zhejiang University

Bachelor of Engineering in Civil Engineering

Hangzhou, China

Sept. 2017- July 2021

PROJECT

AI assistant and AI agent for Autonomous Building operation using Large Language Model

Feb. 2024 - Present

- Designed and implemented an LLM-based [AI assistant](#) for smart building appliance control. [[ACM FSE Paper](#)]
- Developed LLM-based [AI agent for autonomous building operation](#) to enhance occupant comfort. [[Paper](#)]

GenAI-powered chatbot for Detecting Defects and Vulnerabilities in Smart Home Systems

July. 2025 - Present

- Developed [Gen AI powered chatbot for smart home automation risk detection](#) using LLaMA3 and GPT-OSS

AI assistant for Digital twin query using Large Language Model

Dec. 2024 - Present

- Developed [AI-based digital twin data query system](#) using LLM and Autodesk Tandem.

Vision Language Model-based AI agent for Construction Site Progress and Safety Monitoring

June. 2024 - Present

- Developed [Multimodal AI agent](#) using Vision Language Models (VLMs) to autonomously monitor construction site progress and safety conditions.
- Deployed open-sourced Vision Language Models (e.g. MinicpmV, LLaMA 3.2 Vision) locally using llama.cpp.

Small Language Models-based AI assistant for smart building appliance control

May. 2024 - Present

- Developed [AI assistant](#) for building appliance control using small language models (SLMs) and edge devices.
- Deployed open-sourced SLMs such as Phi-3 mini and LLaMA 3.2 on Raspberry Pi 5 using llama.cpp.

Vision Language Model-based AI assistant and AI agents and (XR) Extended Reality application

May. 2024 - Present

- Deployed open-sourced vision language model (e.g. LLaVA), open-sourced Text-to-speech, and Speech-to-Text model (e.g. Whisper, Piper) onto Microsoft HoloLens 2 with Unity 3D.
- Developed [Multimodal AI agent and AI assistant](#) within the XR environment with voice chat and image understanding capabilities.

Retrieval-Augmented Generation (RAG) Chatbot for Construction Safety

Mar. 2024 - Jan. 2025

- Developed a retrieval-augmented generation ([RAG](#)) [chatbot](#) using open-sourced LLM and Vector Database to provide construction personnel information on construction safety protocols and related building codes.

Data-driven Smart Building Facilities Management using AI Assistant and Digital Twin

June 2024 - Present

- Leveraged LLM to develop an [AI assistant-driven decision support system](#) for analyzing historical IoT and digital twin data to provide visualization, insights, and suggestions to optimize building operation performance.

EXPERIENCE

Graduate Research Assistant, Virginia Tech

Aug. 2022 - Present

- Conduct research on emerging technologies such as Blockchain, Deep learning, Large Language Models (LLMs), AR/XR, Digital Twin, and robotics for smart building and built environments.

Undergraduate Research Assistant, Zhejiang University

Mar. 2019 - June. 2021.

- Develop [damage identification](#) and [crack segmentation system](#) using Deep Convolutional Neural Networks.

TECHNICAL SKILLS

Language: Python, C#, JavaScript, C++, Java, HTML/CS, Solidity and MATLAB **Data Science & Machine Learning:** TensorFlow, PyTorch, Scikit-Learn, Pandas, NumPy, Matplotlib, MLX, CUDA, Llama.cpp, Llamaindex, Huggingface, Langchain, Unsloth AI and CrewAI **Database Systems:** MySQL, MongoDB, Qdrant, ChromaDB

HONORS & AWARDS

- [Pratt fellowship](#) for outstanding PhD students | Virginia Tech, Office of Research and Innovation, 2025
- [Excellent Award](#) in the International Project Competition in Structural Health Monitoring UIUC, 2020
- [1st Place in Microsoft Hackathon](#) : Window App Studio Challenge Microsoft, 2016

INTELLECTUAL PROPERTY DISCLOSURES

- Large Language Models-based Autonomous Building Operations and Virtual Assistants for Smart Buildings, Virginia Tech IP Disclosure, Invention Id: [INV2025-121](#) (Approved, April 2025)
- Decentralized Autonomous Building Cyber-Physical System (DAB-CPS), Virginia Tech IP Disclosure, Invention Id: [INV2025-123](#) (Approved, April 2025)