JINPU CAO

Stanford University

(650) 512-2538

jinpu@stanford.edu

600 Sharon Park Road

Menlo Park, CA 94025

Linkedin profile: linkedin.com/in/jinpu-cao-a003bb1b6

EDUCATION

2022 **M.S. Sustainable Design and Construction in Civil and Environmental Engineering**

Stanford University (GPA: 3.9/4.3)

2020 **GeoSystems in Civil and Environmental Engineering**

University of California, Berkeley (One Year Exchange Student, GPA: 4.0/4.0)

2019 **B.E. in Civil and Environmental Engineering**

Tongji University (GPA: 4.7/5.0)

RESEARCH INTERESTS

Machine Learning Application in: Civil Infrastructure

Data Analysis Application in Urban System

PROFESSIONAL APPOINTMENTS

Department of Strategic Innovation, WSP USA *March 2022-Now*

Research Assistant, and advised by Pooja Jain (V.P. Strategic Innovation in WSP)

Dr. Martin Fischer (Professor at Stanford)

This is a significant exploration of developing the practical workflow of a vision-based automatic pavement crack detection system and software kit, and I am also responsible for discovering the potential business value of the process.

Achievements

Based on the deep learning framework, I have realized the construction and practical deployment of the crack detection system. More importantly, this experience has brought me more growth is to master the skills of applying deep learning to the field of civil engineering and analyzing its business value.

CEE, Stanford University *March 2022-Now*

Research Assistant, and advised by *Derek Ouyang (Research Manager at the RegLab)*

This community-engaged pilot study aims to improve adaptation to wildfire smoke and extreme heat in vulnerable communities. I am responsible for characterizing these communities' air quality and exploring their human-induced and environment-induced influence on it.

Achievements

The team I led characterized the relationship between indoor and outdoor air quality with a spike lag model and verified it by actual monitoring data, which will be a vital contribution to our new journal paper. I also made significant progress in research project management and communication skills in a community-engaged research group.

CEE, Stanford University *Jan 2022-Now*

Research Volunteer, and advised by *Dr. Haeyoung Noh (Professor at Stanford)*

This project introduces the first system to track animals using structural vibrations, and the first system for automated characterization of piglets' group activities, including nursing, sleeping and active times.

Achievements

I have realized the classification of piglet group activities using structural vibration data on machine learning methods and published the results in *ACM journals*. I also strengthened my integrated resources, and independent design skills.

HONORS AWARDS

CEE, Stanford University

2020-2022 Outstanding Project of SFBI

Tongji University

2017-2020 Outstanding Graduates in Shanghai (Top 5% of 220,000 students)

The First Prize Merit-Scholarship of Tongji University (Top 5% of 400 Students)

Shanghai Scholarship (Top 5% of 220,000 students)

Excellent Students of Tongji University (Top 3% of 4000 students)

The Second Prize of Structure Design and Model Competition

National College Students' Mathematics Competition

2016-2017 The Second Prize of Shanghai Division

National College Students' Mathematical Modeling Competition

2016-2017 The Third Prize in the Shanghai Division

PUBLICATIONS

1. " A LSTM-based model for TBM performance prediction and the effect of rock mass grade on prediction accuracy " (*China Civil Engineering Journal*, first author, accepted)

2. "PigSense: Vibration-based Activity and Health Monitoring System for Pigs" (*ACM Journals*, co-author, in review)

3. "Improving adaptation to wildfire smoke and extreme heat in vulnerable communities: Evidence from a pilot study in the San Francisco Bay Area" (*Environmental Research Letters*, contributor, ready to submit)

COMPLETED PROJECTS

CEE, Tongji University *Nov 2018-Aug 2021*

Research Assistant, advised by Dr. Fang Liu (Professor at Tongji University)

1. **Intelligent Water Platform**

   This was a practical and valuable project to build an intelligent diagnosis, risk reasoning and decision support system for municipal facilities. I developed a water consumption interval prediction model based on a deep autoregressive model (DeepAR) independently, and the

model has been partially integrated into the Shanghai Smart Intelligent Platform to predict daily water consumption and provide pipe burst early warning services.

2. **TBM Operation Parameters Prediction**
In this project, I independently developed TBM parameters and geological prediction model based on Long Short Term Memory network (LSTM), and won the National Third Place in the data mining competition organized by the Chinese Society of Rock Mechanics and Engineering.

3. **Concrete Canoe Competition**
The ASCE Concrete Canoe Competition provided me with a unique opportunity to develop a concrete thickness detector for my team participating in the American Society of Civil Engineering (ASCE) Mid-Pacific Student Conference (2018) to simplify construction techniques of concrete canoes. I also rapidly developed project management challenge skills and research practical experience during this adventure.

PRESENTATIONS CONFERENCES

1. 4th International Conference on Information Technology in Geo-Engineering (4ICITG)
organized by Geotechnical Society of Singapore
Speaker for "A Long-term Probabilistic Forecasting Approach of TBM Operating Parameters based on Deep Learning."
(August 2022, online, https://www.4iticg.org/4-august-2022)

2. The II International Geo-science Machine Learning Big Data Seminar
Speaker for "Predicting TBM Performance using Machine Learning: is Surrounding Rock Information Important."
(August 2019, Shanghai)

INTERNSHIPS

Shanghai Shentong Metro Group *Jun 2019-Aug 2019*
Subway Monitoring Intern
This was an interesting practical expedition to assist in monitoring and analyzing the subway deformation and settlement near an ultra-deep foundation pit (Xuhui Center, Shanghai). I processed and visualized the subway deformation monitoring data based on python and proposed corresponding corrective measures to the construction unit.

LEADERSHIPS MEMBERSHIPS

Billiards Club, Tongji University *Sep 2018-Jun 2020*
Former President
Tongji University Branch of American Society of Civil Engineers *Jan 2017-Aug 2019*
Member and Co-organizer of the Structural Design Competition of Tongji University

PROFESSIONAL SKILLS

Programming: Python, MATLAB, R, C#
Machine Learning and Deep learning: Keras, TensorFlow
Software: AutoCAD, Revit, Dynamo, SimaPro (for Life Cycle Assessment)