Jie (Tony) WANG

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EDUCATION

Zhejiang University *(ZJU-UIUC Institute)* Haining, China
BEng. Electronic and Computer Engineering (GPA: 3.81/4.0) Aug 2020 – Jun 2024

University of Illinois at Urbana-Champaign *(The Grainger College of Engineering)* Urbana, IL
BSc. Computer Engineering (GPA: 3.46/4.0) Aug 2020 – May 2024

Skills: Python, C/C++, MATLAB, LC-3, x86, ChatGPT API, Langchain, ROS, Carla, Markdown, Latex

RESEARCH EXPERIENCE

Intelligent Vehicle Risk Warning System Integrated with Large-Language Models
College of Computer Science and Technology, Zhejiang University Hangzhou, China
Summer Research Intern, Advisor: Prof. Wei Xiang Jul 2023 – Sep 2023

- Developed a LLM framework for human-machine co-driving scenario using state-of-the-art computer vision models including Bytetrack, Segment Anything, and Grounding DINO, to generate potential risk analytics from monocular visual data, forming the basis for a dynamic risk warning system interface.
- Proposed a hybrid frame analysis method to interpret complex driving environment, which could estimate the intentions of pedestrians and offer real-time adaptive warnings based on multi-object tracking and eye-tracking technology.
- Refined HCI design and the eye-movement technology and risk alert design; completed a 41-person user experience experiment based on a simulated cockpit and handled the result data processing.
- Wrote, edited, proofread the manuscript the paper, **"Visionary Co-Driver: LLMs Enhance Driver Risk Perception with ARHUD", as the third author,** which is submitted to the CHI 2024 conference in the Computational Interaction.

Open-source Software Community Practice and Effectiveness Research
School of Software Technology, Zhejiang University Hangzhou, China
Summer Research Assistant, Advisor: Prof. Zhiyuan Wan Jun 2022 – Oct 2022

- Analyzed 40+ open-source projects using tools like Designite and SonarQube, identifying common architectural anti-patterns: Cyclic Dependency, Ambiguous Interface, Scattered Functionality. Then proposing code refactoring strategies.
- Constructed datasets of 20 Java and 20 C/C++ projects, covering big data, network services, network framework and embedded systems for tool efficacy analysis.
- Mapped version history against source code evolution to assess architectural improvement and technique debt reduction, benchmarking tool efficiency analysis.
- Created an academic poster **"Architectural Antipatterns Research Based on Software Engineering"**, wining first prize for an undergraduate-research competition presentation.

ZJU SRTP, Simulation and modeling of unmanned vehicle safety test based on Apollo D-kit
Transport Systems & Environment Lab, ZJU-UIUC Institute Haining, China
SRTP *Assistant,* Advisor: Prof. Simon Hu Mar 2021 – May 2022

- Used Python to deal with Waymo Data set, data cleaning and RNN network construct to gather the real-road statistic information, analyzed and recorded the common traffic states of unmanned vehicles.
- Constructed the high-solution Lidar map of ZJU international campus via Baidu Apollo D-kit Self-driving Car.
- Proposed a more realistic perception range model for Connected and automated vehicles in traffic state Estimation Based on present data and previous research.

SELECTED COURSEWORK

CS438: Communication Networks Wireless Project Urbana, IL
Group leader of Three-member Team Apr 2023 – May 2023

- Developed an open-source Python tool for comprehensive wireless network analysis, focusing on Wi-Fi access points roaming mechanisms and signal strength heatmap generation.
- Designed a procedure-oriented data pipeline architecture including coordinate construction, data collection, data preprocessing, heatmap generation, and individual AP analysis.
- Analyzed campus AP roaming machanisms and generated heatmap of UIUC Thomas M. Siebel Center, and proposed a report for UIUC real-world network environment via collaborating with UIUC IT Network team.

ECE391: Computer Systems Engineering Implementation Urbana, IL
Group member of Four-member Team Oct 2022 – Dec 2022

- Constructed a Linux-like operating system kernel with C, having basic function such as paging virtual memory, fully functional IDT, GDT and i8259-based interrupt controller, etc.
- Constructed a read-only file system, operating device driver such as Real Time Clock, keyboard and Programmable Interval Timer.
- Used x86 to establish the system call linkage between user-level program and kernel, passing all test cases provided by the course. Furthermore, realized single CPU task scheduling and multiple terminals switching.
- Received 99.5/100 for the overall 5-checkpoints project.

CS225: Data Structure Practice - Simplified Vaccination Registration System with C++ Haining, China
Group leader of Three-member Team Mar 2022 – May 2022

- Developed the system database featuring key data structures including doubly linked list, Fibonacci heap, B tree, B+ tree, and hash table; realized CRUD (create, read, update, delete) operations, equipped with a command-line interface, and generate requisite weekly and monthly reports in Markdown format.
- Ensured data integrity by masking and shuffling input data from an existing database to maintain high credibility and ethic requirement.
- Architected the system's framework and developed APIs for teamwork cooperation. Received full mark on the two checkpoints project.

SELECTED ACADEMIC CONTEST

2023 Shell Eco-marathon Autonomous Programming Competition Urbana, IL
Group Member of Ten-member Team Mar 2023

- Developed path planning, perception, and control modules for simulation autonomous vehicles using the Robot Operating System (ROS) stack provided by the competition.
- Utilized the CARLA simulator with the Unreal Engine to test our vehicle in a simulated environment, with the goal of achieving the most efficient path planning according to the competition's ranking criteria.
- Main contributor to the Path Planning Subsystem

2022 International Mathematical Contest in Modeling (Honorable Mention) Haining, China
Group Leader of Three-member Team Feb 2022

- Addressed the issue of water scarcity in the Colorado River in the United States by constructing a mathematical model for water-to-electricity supply using dynamic programming principles.
- Considered dimensions such as agriculture, industry, energy, mining, wildlife, and tribal, and formulated a hydropower distribution plan using the Monte Carlo method.
- Used SPSS time series analysis tools to predict water demand for each state, generated a demand matrix for the water system, and, through sensitivity analysis, demonstrated strategies for addressing conditions such as rapid depletion of water resources, involvement of renewable energy technologies, and application of conservation measures.

TEACHING EXPERIENCE

Teaching Assistant in MATH213: Introduction to Discrete Mathematics ZJU-UIUC Institute
Instructor: Prof. Meng Zhang **Course Syllabus:** math213_fa23.pdf Fall 2023

- Design weekly homework assignment and exam questions using Latex, held weekly offline office hour, review section and discussions for 137 students, grading assignments on Gradescope.
- Incorporated Python coding problems into the assignment to help student reinforce their knowledge.
- Introduced Campuswire and Gradescope in optimizing the TA team's working efficiency and enhancing student's learning experience.

EXTRACURRICULAR ACTIVITIES

Member, Propaganda Department, Student Union at ZJU International Campus	Oct 2020 – Present
Class Organizer, ECE2001 Class at ZJU International Campus	Sep 2020 – Present
Member, Meta Robomaster Team at ZJU International Campus	Oct 2020 – Oct 2021
Director of Academy, ZJUICMUN at ZJU International Campus	Feb 2021 – Jun 2022
Member, Aroma Coffee Club at ZJU International Campus	Oct 2021 – Jun 2022
Member, Illini EV Concept at UIUC	Feb 2023 – Jun 2023
President, PhiloCoffee Club at ZJU International Campus	Aug 2023 – Present