Kenneth (Kira) H. Chan

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Selected Publications and Project Experience

SafeDriveRL: Combining Non-cooperative Game Theory with RL to Explore and Mitigate Uncertainty for AVs 2024

- Synthesized reinforcement learning and non-cooperative game theory to discover human-induced misbehaviors for autonomous vehicles trained with machine learning, discovering up to 25% failures.

Expound: A black-box approach for generating diversity-driven adversarial examples 2023

- Proposed a novelty search approach to discover diverse adversarial examples for testing, leading to more than 300% increased types of unique failures in image classifier DNNs using the exploration/exploitation paradigm.

EvoAttack: Suppressive adversarial attacks against object detection models using evolutionary search 2022

- Demonstrated that a black-box evolutionary search-based approach can prevent 100% of inputs on state-of-the-art image object detection algorithms (CIFAR10, GTSRB, ImageNet, VisDrone, etc.) from being correctly labeled.

**additional projects and details available on my personal website*

Professional Experience

Graduate Researcher, Michigan State University - East Lansing, MI 2021 - Current

- Developed 6 frameworks and techniques to address / improve the assurance and robustness of DNNs to ensure their correctness in the face of adverse perturbations or uncertainties (human-induced, environmental, etc.).
- Applied technologies from a number of distinct disciplines (e.g., reinforcement learning, evolutionary computing, game theory, goal modeling, etc.) to assess and improve the robustness of DNNs and software by up to 50%.

Software Engineering (Student Capstone Project), Volkswagen - Auburn Hills, MI 2018

- Designed and developed a demo application for Android and iOS which introduces and familiarized new and existing users (100,000+) to VW's connected interactive phone-car services (Car-net) with new features.

Software Engineering (Intern), GeoNexus Technologies - Ann Arbor, MI 2015

- Designed and developed a prototype application in Java for Android to extend GeoNexus's geographic information system to visualize work order services on a map for handheld devices for customers.

Teaching Experience

Graduate Teaching Assistant (Level III), Michigan State University - East Lansing, MI 2019 - Current

- Courses taught include: Software Engineering (8 semesters); Distributed Systems (Graduate-level); Web Development; Mobile App Development; Object-Oriented Software Development; Secure and Efficient C++ Software Development; Discrete Mathematics
- Created 100+ assignments, projects, and exams designed to transform concepts into practical application.
- Presented 30+ guest lectures on machine learning, DNNs, software engineering, and computer security.
- Organized, led, and trained 35+ teaching assistants and undergraduate assistants.
- Assisted, managed, and taught classes with up to 200 students per semester (2,500+ students total).

Education

Michigan State University, Ph.D. in Computer Science and Engineering **Exp. May 2026** - GPA 4.0
Dissertation Title: Assessing the Robustness of AI-based Systems in the face of Exploitive-based Uncertainty
Advisor: Dr. Betty H.C. Cheng

Michigan State University, M.S. in Computer Science and Engineering May 2021 - GPA 4.0

Michigan State University Honors College, B.S. in Computer Science and Engineering May 2022 - GPA 3.76

Selected Honors and Awards

Dr. Delia Koo Global Student Scholarship and Chinese Student Endowment - 2023 $5,000

Blue Oval STEM Scholarship (Ford Motor Company) - 2015-2019 $2,500 - Renewable for 4 Years

Skills and Technologies

Languages: Python, Java, C++, HTML/CSS, Bash, SQL, Latex, Robotic Operating System **Systems**: Linux/Unix, Windows
Tools: PyTorch, pandas, TensorFlow, keras, Git, BigQuery, DNNs, Hugging Face, Scikit-learn, NumPy, Docker, Slurm/HPCC, Large Data Models
Areas of Expertise: Evolutionary Computation, Automated Testing, Computer Vision, Object Detection, Text Processing

**References available upon request*