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
- Spearheaded a project (with 4 co-authors) to synthesized reinforcement learning and non-cooperative game theory to discover human-induced failures for machine learning AVs, leading up to a 95% reduction in undesired behavior.

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 98% of inputs on state-of-the-art image object detection algorithms (CIFAR10, GTSRB, ImageNet, VisDrone, etc.) from being correctly labeled.

MoDALAS: Addressing Assurance for Learning-Enabled Autonomous Systems in the Face of Uncertainty 2022
- Collaborated with 4 co-authors to assess the performance of machine learning against environmental uncertainty.

**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 (Kotlin/Java) 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 with 3 other interns 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 applications.
- Presented 50+ guest lectures on various topics, such as machine learning, software engineering, security, etc.
- 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).
- Supervised the operations of up to 20 teams (5+ members each) per semester and managed Git admin duties.

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
Awards and Honors: Dr. Delia Koo Global Student Scholarship and Chinese Student Endowment - 2023

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
Awards and Honors: Blue Oval STEM Scholarship (Ford Motor Company) - 2015-2019

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, PCA, t-SNE
Areas of Expertise: Evolutionary Computation, Automated Testing, Computer Vision, Object Detection, Text Processing

**References available upon request*