

# Zhixun “Jason” He

Career Objective: **Software Engineer, IOS/WatchOS Developer, Machine Learning Engineer (Intern or Full-time)**

h.zhixun@gmail.com | <https://inspirepassion.github.io/> | Merced, CA, 95340

## SKILLS

- Python (8 years) · Swift (1 year) · C/C++ (3 years) · Java · Git · Docker · K8s · SQL · Algorithm Design · Data Structure
- Tensorflow(7 years) · Keras · PyTorch · Computer Vision(CV) · Natural Language Processing(NLP) · Reinforcement Learning (RL) · Transfer Learning · Model Fine-tuning · Distillation · Object Detection · Quantitative Analysis · Prototyping · Modeling

## EDUCATION

<b>Ph.D. (2024)</b> Electronic Engineering & Computer Science (GPA: 3.8/4.0)	<b>University of California, Merced</b>	<b>Merced, CA</b>
<b>B.E. (2013)</b> Composite Material Science & Engineering (GPA: 3.8/4.0)	<b>Nanjing Tech University</b>	<b>Nanjing, China</b>

## INDEPENDENT DEVELOPMENT & PROJECTS

### **Tennis Match/Score Tracker, Performance Analyzer (WatchOS & IOS)** *June 2024 - present*

- Designed thoughtful UX/UI using WatchKit and SwiftUI, aligning with industry standards for wearable device interfaces, achieving significant ease of use, reducing finger gesture error by **34%** through optimized touch targets, minimizing user memory recall mistake by **65%** via intuitive workflows, enhancing finger gesture error tolerance by **46%** with predictive input fields, and accelerating data input time by **23%** with intuitive shape and color information.
- Developed scalable architecture and reusable APIs using Swift, such as file manager, data visualization utilities, device communication, and data models. Maintained well-documented codebase for future scalability and collaboration.
- Utilized MySQL for efficient storage and retrieval of match metrics in Python. Investigated and integrated emerging technologies to balance scalability, complexity, and maintainability, such as managing backend development pipelines with GitLab CI/CD.
- Experimented and architected microservices for high concurrency, reliability, and scalability for large user bases, leveraging containerization with Docker and orchestration with Kubernetes.

## WORK EXPERIENCE

### **University of California, Merced** **Merced, CA**

#### **Research Assistant** | *School of Engineering* *August 2020 - Jan 2024*

- Published **3 first-author** publications in computer vision conferences (ICMVA 2024, PRML 2022, MVA 2021), contributing novel methodologies and advancing state-of-the-art performance in adversarial defense by **36%**.
- Designed, implemented, and fine-tuned **50+** deep learning models using Python and TensorFlow, achieving an extra **12%** accuracy in adversarial defense classification accuracy compared to contemporary methods.
- Developed end-to-end machine learning pipelines, including data preprocessing, model prototyping, testing, and optimization, reducing model deployment time by **33%**.
- Built reusable Python libraries and tools to streamline development workflows, resulting in a **43%** reduction in development time and improved team productivity.
- Collaborated with cross-functional teams to deliver high-quality software solutions, adhering to best practices in version control (Git), code documentation, and agile methodologies.
- Automated report generation for model performance metrics, saving **10+** hours per week in manual analysis.

### **Digital Media Academy** **Stanford, CA**

#### **Instructor** | *Artificial Intelligence(AI), Machine Learning(ML) and Data Science* *June 2019 - Sep, 2019*

- Developed **15+** advanced machine learning projects in Python that include:
- Computer Vision (CV): designed a real-time object detection system using YOLO and OpenCV, image style transformation using a transfer learning model, custom scene understanding, and semantic segmentation projects.
- Natural Language Processing (NLP): led projects on sentiment analysis and text summarization using unsupervised algorithms such as TextRank and Latent Dirichlet Allocation (LDA) and using supervised algorithms like Seq2Seq.
- Reinforcement Learning (RL): created game-playing agents using Deep Q-Networks (DQN) to master environments like Atari games, teaching students about reward optimization and policy gradients.
- Multi-modal AI: developed text-to-audio and text-to-image models using GANs and VAEs frameworks.
- Received a **96%** satisfaction rating, highlighting the clarity of instruction and real-world applicability of projects.

- Collaborated with faculty to create engaging course materials, integrating algorithm design, data structures, and software engineering best practices into the projects, such as git collaboration, comments, and separation of concerns.
- Designed and implemented robust coding exercises and real-world programming projects, enhancing students' proficiency in Object-Oriented Programming (C++, Python, Java). Delivered engaging lectures and hands-on workshops, providing technical guidance and debugging support to ensure a strong grasp of programming fundamentals and problem-solving techniques, improving student retention rate by **10%** and satisfaction rate by **13%**.

## CONFERENCE & PUBLICATIONS

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**Z. He, M. Singhal, "VQUNet: Vector Quantization U-Net for Defending Adversarial Attacks by Regularizing Unwanted Noise", 7th International Conference on Machine Vision and Applications (ICMVA), Mar. 2024.**

- Improved the SoTA adversarial defense classification accuracy by **32%** and minimized accuracy degradation on noise-reduced images to **1%** through innovative design of Vector Quantization U-Net with Python and Tensorflow.
- Presented research findings at ICMVA 2024 through oral presentation, followed by facilitating an interactive Q&A session to address audience inquiries and engage in technical discussions.

**Z. He, M. Singhal, "Defense-CycleGAN: A Defense Mechanism Against Adversarial Attacks Using CycleGAN to Reconstruct Clean Images", 3rd International Conference on Pattern Recognition and Machine Learning, Jul. 2022.**

- Boosted the SoTA ML models' robustness against adversarial attacks on images by **13%** on average, leveraging cycle-consistency and combining primitive and abstract features for high-fidelity image reconstruction using GANs models.
- Delivered a formal oral presentation at PRML 2022, followed by leading a dynamic Q&A session to engage with the audience and address

**Z. He, M. Singhal, "Adversarial Defense Through High-Frequency Loss Variational Autoencoder Decoder and Bayesian Update With Collective Voting", 17th International Conference on Machine Vision Applications, Jun. 2021.**

- Developed an add-on tool to consistently enhance image classifier's accuracy by **5%**, by utilizing randomization and Bayesian Update leveraging statistics inherent in the data. Designed 10+ VAE-based neural networks using Python and Tensorflow, with one of which surpassed the SoTA results by **12%** on average.
- Presented research findings through an oral presentation at MVA 2021 and facilitated an interactive Q&A session to address audience inquiries

C. Basu, E. Biyik, **Z. He**, M. Singhal, and D. Sadigh, "Active Learning of Reward Dynamics from Hierarchical Queries", *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, Nov. 2019.

- Implemented and fine-tuned a conditional probability model based on Bayesian inference to analyze driver behavior and infer hidden reward functions from driving preferences and trajectory data.
- Optimized and debugged a Python-based car interaction simulator, reducing runtime errors by **30%** and improving simulation speed by **20%**, facilitating smoother experimentation and analysis workflows.
- Managed user studies involving **20+** participants, ensuring **100%** data collection completion and delivering clean, high-quality data for analysis. Coordinated experiment schedules, improving participant attendance rates by **25%**.

## REFERENCES

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Upon request