Zhiquan Wang

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EDUCATION

Purdue University — **West Lafayette, IN, USA**
Ph.D. Student in Computer Science — 08/2019 - Present
University of California, Davis — **Davis, CA, USA**
Exchange Student in Computer Science — 08/2018 - 01/2019
Nanjing Tech University — **JiangSu, China**
Bachelor of Science in Computer Science — 09/2015 - 05/2019

PUBLICATIONS

• **Wang, Z.**, Benes, B., Qureshi, A. H., & Mousas, C. (2022). Co-design of Embodied Neural Intelligence via Constrained Evolution. arXiv preprint arXiv:2205.10688.
• Mousas, C., Krogmeier, C., & **Wang, Z.** (2021). Photo Sequences of Varying Emotion: Optimization with a Valence-Arousal Annotated Dataset. ACM Transactions on Interactive Intelligent Systems (**TiiS**), 11(2), 1-19.
• Liu, H., **Wang, Z.**, Mazumdar, A., & Mousas, C. (2021). Virtual reality game level layout design for real environment constraints. Graphics and Visual Computing, 4, 200020.
• Liu, H., **Wang, Z.**, Mousas, C., & Kao, D. (2020, November). Virtual reality racket sports: Virtual drills for exercise and training. In 2020 IEEE International Symposium on Mixed and Augmented Reality (**ISMAR**) (pp. 566-576). IEEE.

RESEARCH EXPERIENCE

Virtual Agent Editor — West Lafayette, IN, USA
Software Development — **2022**

• Developed a virtual creature editor for fast robot prototyping and interactive motion planning with **OpenGL** and **C++**.
• Designed a novel robot description with pre-defined body parts for rapid crafting and compatibility with URDF and MJCF.

Co-design of Virtual Creatures via Evolution — West Lafayette, IN, USA
Research Assistant — **Purdue Research Foundation Graduate Fellowship Grant, 2022**

• Developed a virtual creature generator supporting random generation based on input rules and user constraints with **Python**.
• Implemented a **reinforcement learning** algorithm (**PPO**) on **Pytorch** for parallel training of arbitrary creatures' locomotion.
• Proposed a novel pipeline for the parallel co-design of large-scale population creatures with evolution methods.
• **Doubled the performance** of creatures in locomotion while **significantly reducing computational resources**.

Gait Analysis Using Transformers and Reinforcement Learning — West Lafayette, IN, USA
Research Assistant — **2021**

• Designed and Developed robot locomotion task environments based on **Isaac Gym** with real-time attention visualization.
• Implemented a reinforcement learning algorithm PPO aims at **large-scale experience sampling** from parallel environments.
• Designed an **Transformer-based** policy net with **self-attention** mechanisms that capture the relationship between joints
• Analyzed the importance of joints and their relationships in a locomotion task with self-attention matrix from policy net.

Bird Retina Droplet Detection — West Lafayette, IN, USA
Research Assistant — **Purdue Polytechnic Institute, 2020**

• Developed a tool for data cleaning for an unorganized dataset with different resolutions, backgrounds, and formats.
• Designed and implemented a bird retina droplet VGG - based detection model with high accuracy (**86%**) on average.
• Deployed the detection model on a local machine, integrating it into an application for easy real-time result editing.

Emotion Recognition and Classification From Real-Time Video — West Lafayette, IN, USA
Research Assistant — **Purdue Polytechnic Institute, 2019**

• Designed and Implemented a VGG - based model for classification on Russell's model with accuracy up to **87.5%** on average.
• Develop a real-time emotion recognition system to capture the emotion of audiences in a virtual classroom.

Virtual Racket Sports Study in VR — West Lafayette, IN, USA
Research Assistant — **Purdue Polytechnic Institute, 2019**

• Designed and Implemented different virtual Racket Sports (e.g., ping-pong, tennis ball) on VR device with **Unity3D**.
• Proposed a novel optimization method for game-level control in racket sports with **Markov chain Monte Carlo (MCMC)**.

ADDITIONAL INFORMATION

• Programming: C/C++, CUDA, Python
• Development: Pytorch, OpenGL, Unity3D, Git, Linux