PENGZHI YANG

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EDUCATION

University of Electronic Science and Technology of China (UESTC)   **Chengdu, China**
B. Eng. of Computer Science, Yingcai Honors College (Elite School of Top 2% Student), GPA: 3.9/4.0   *Sep. 2016 – Jun. 2020*

University of California, Santa Barbara (UCSB)   **Santa Barbara, US**
Extension Program in Computer Science, GPA: 4.0/4.0   *Mar. – Jun. 2019*

Programming: Python, C/C++/C#, Matlab, XML, Shell, Verilog, SQL
Skills: Pytorch, Tensorflow; Git, Docker, Jupyter Notebook; ROS, Gazebo, Unity, Pybullet, VizDoom, SolidWorks; Adobe Softwares
GRE: Verbal 156/ Quantity 170/ AW 4.0 | **TOEFL:** Reading 29/ Listening 26/ Speaking 25/ Writing 25/ Total 105

PUBLICATION

Pengzhi Yang, Jiahao Liu, Hongchun Yang, Shaoyi Wu, Baohua Teng. **Magnetic Field Energy of Two Parallel Current-carrying Straight Wires[J]**. Physics Bulletin. 2019, 38(7): 9-13.

Pengzhi Yang, Monika Roznere, Zhe Tang, Wen Li, Alberto Quattrini Li, **Underwater Monocular-Based Collision Free Navigation using Deep Reinforcement Learning**. Paper in Preparation.

RESEARCH EXPERIENCE

Robotics X, Tencent   **Dec. 2020 – Aug. 2021**
Machine Learning Intern   *Shenzhen, China*

- **End-to-End Control for Quadruped Robot with Learning-based Methods**
  - ➢ Trained a deep reinforcement learning (PPO) model with reference motions to control a quadruped robot, *Max*, to walk in Pybullet.
  - ➢ Applied Domain Randomization by randomizing dynamic parameters (friction, robot's mass and etc.) during training. Successfully transferred the model to **Gazebo and real-world environments**.
  - ➢ Introduced domain adaptation: predicting dynamic parameters using sequences of *Max*'s *state*, *action* data in Pybullet. Fed the predicted parameters for the PPO network and computed more adaptable control policies for *Max*'s locomotion. Obtained a **5.09%** higher average reward in various environments in Gazebo compared with Robust DRL controller.
  - ➢ Deployed the code in **Tencent TLeague Framework** (a high-performance distributed RL framework), and nearly **five times** accelerated the training speed. During testing, realized a faster real-time control with **C++ deep learning codes (Eigen)**.

Dartmouth Reality and Robotics Lab, Dartmouth College   **Jun. 2019 - Present**
Research Assistant   *Hanover, US*

- **Underwater Robot Navigation**
  - ➢ Synthesized *NYU Depth Dataset*'s RGB images with **underwater features**. Retrained the depth (RGB-D) prediction network with the rendered images and better estimated single-view underwater distance information with a **monocular camera**.
  - ➢ Proposed **a novel end-to-end DRL (PPO) navigation controller**: integrating predicted depth images, single-beam sonar's readings, and GPS for an Autonomous Underwater Vehicle (AUV) to navigate to goal positions while avoiding nearby obstacles. Applied Domain Adaptation to transfer the navigation model from simulation to various real underwater worlds.
  - ➢ Compared existing depth estimation methods and adopted MegaDepth-trained Hourglass Network which averagely saved **28.27%** of the navigation time. Equipped with only a cheap monocular camera and single beam sonar, our approach achieved **30.97%** higher efficiency than traditional navigators using a multibeam echosounder (like Bug2).
  - ➢ Conducted **field experiments** in a swimming pool and showed its robustness and adaptability in real world.

Center for Robotics, UESTC   **Nov. 2019 – Jun. 2020**
Undergraduate Research Assistant   *Chengdu, China*

- **Robot Indoor Localization**
  - ➢ Modified ACS files to create VizDoom Mazes with required behaviors: discretized agent's actions and built APIs for interaction.
  - ➢ Implemented *Active Neural Localizer* with A3C algorithm in the created mazes based on Bayesian Filter.
  - ➢ Adjusted the Perception Model in the 3D environments (used distances as inputs rather than images) and facilitated the system's **practical application**.

SELECTED PROJECTS

- **Compiler for Simplified C++, UCSB**   **Apr. – Jun. 2019**
  - ➢ Completed a simplified compiler using C++, including Scanner, Parser, Abstract Syntax Tree, Type Checking, and Code Generation.
  - ➢ Got an **A+** at last.
- **Development of an Eight-Stage Pipelined MIPS Processor, UESTC**   **Apr. – Jun. 2018**
  - ➢ Built a 32-bit CPU based on gate-level circuits; embedded deep pipeline into its ALU module; ran FFT on this simulated processor.
  - ➢ Won **1st place** in the Efficiency Competition amongst all teams.

HONORS&AWARDS

Shiqiang Scholarship (top 1%); 1st, 2nd Merit Student Scholarship in UESTC (top 5%).