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++, Matlab, XML, Shell, Verilog, SQL
Skills: Pytorch, Tensorflow; Git, Docker, Jupyter Notebook; ROS, Gazebo, Pybullet, UWSim, VizDoom, SolidWorks; Adobe Softwares
GRE: Verbal 156/ Quantity 170/ AW 4.0 | **TOEFL:** Reading 27/ Listening 26/ Speaking 25/ Writing 25/ Total 103

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 (D3QN) 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.
  - 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 echo sounder (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 3D environment (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 the **1st place** in the Efficiency Competition amongst all teams.

HONORS&AWARDS

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