YI WANG

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EDUCATION

Columbia University, New York, NY
MS in Mechanical Engineering | GPA: 4.00/4.00 Expected Dec 2023
- Concentration on Robotics and Control

Sichuan University, Chengdu, CN
B. E. in Mechanical Engineering | GPA: 3.73/4.00 Jun 2022
- Concentration on Energy and Combustion

PUBLICATIONS

- **Yi Wang**, Jiarong Kang, Zhiheng Chen, and Xiaobin Xiong, " Terrestrial Locomotion of PogoX: From Hardware Design to Energy Shaping and Step-to-step Dynamics Based Control." https://arxiv.org/abs/2309.13737
- **Yi Wang**, Kin-Pang Cheong, Junyang Wang, Shaotong Liu, Yong Hu, Minking Chyu, Jianchun Mi, "Operational Condition and Furnace Geometry for Premixed C3H8/Air MILD Combustion of High Thermal-Intensity and Low Emissions." Energy (Under review). Ref: EGY-S-23-14285

RESEARCH EXPERIENCE

University of Wisconsin-Madison, Madison, USA Jun 2023 - Present
Research Assistant: Design and Control of PogoX
- Developed a novel robotic system, PogoX, that seamlessly integrates a quadrotor with a spring-loaded leg, enabling aerial vehicles to perform terrestrial locomotion under heavy payloads.
- Engineered a decoupled control strategy that employs vertical height control through a quadratic program-based energy shaping and horizontal velocity control inspired by step-to-step dynamics, achieving robust hopping under varying conditions.
- Overcame traditional limitations of quadrotors by incorporating a spring-loaded leg, expanding the operational envelope and paving the way for versatile applications in complex environments.

Columbia University, New York, USA Feb 2023 - Jun 2023
Research Assistant: EMG Pattern Classification
- Evaluated different EMG pattern classification algorithms such as Linear Discriminant Analysis (LDA), Support Vector Machine (SVM), and Deep Neural Network(DNN) to classify the EMG signals into different head-neck movements and achieved 86.5% accuracy using ConvRNN Classification method.
- Detected a motor impaired user's intention to execute specific head movements based on neck muscles EMG and implemented selected machine learning algorithm into neck brace's control system and tested it on ALS patients in real-time.

Sichuan University, Chengdu, CN May 2021 - Dec 2022
Research Assistant: Optimization of Furnace Geometry
- Unveiled groundbreaking strategies to reduce CO, NOx, and UHC emissions by 90% in both low and high thermal intensity scenarios, fundamentally redefining clean energy benchmarks for MILD combustion in cylindrical furnaces.
- Validated a novel reactor network calculation method for C3H8/air MILD combustion, setting a precedent for accurate and effective modeling in the extension of MILD combustion systems to high-power applications like boilers and gas turbines.
- Deciphered the complex relationships between furnace geometry and operational conditions, laying the groundwork for highly efficient and environmentally-friendly power generation solutions.

ACADEMIC PROJECTS

Design and Control a Legged Robot
- Designed and controled a small bipedal robot, succeeding a walking speed of 15 cm/s in both simulation (Pybullet) and real-world environments.

Design and Control a Embedded Manipulator.
- Designed and controled a desktop robotic arm, utilizing FPGA to enable arm movement and grasping through solving forward and inverse kinematics.

Object Recognition and Path Planning of Manipulator
- Implemented object recognition and grasping in a simulation environment (Pybullet) using visual methods trained on deep neural network. Utilized RRT and A* path planning algorithms to achieve robotic arm movement.

SKILLS

Simulation: Pybullet, Mujoco and Gazebo
Program Language: Python, Matlab, C, C++, ROS and ROS2
Sensor: IMU, Lidar Distance Sensor, Stereo Camera, Flight Controller, Force Resistance Sensor