WENBIN XU

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EDUCATION

Shanghai Jiao Tong University **Shanghai, China**

- Undergraduate, Dept. of Mechanical Engineering *Sep. 2015 – Jul. 2019 Expected*
- Major in Mechanical Engineering (**Honor Class**), Minor in Computer & Application
- **GPA** – Overall:**3.86/4.00** (91.33/100), Major: **3.86/4.00** (91.66/100), Ranking**: 1/59**
- **Standard Tests** – TOEFL: 104 (R28+L24+S23+W29), GRE: 324 (V154+Q170+AW4.0)

PUBLICATIONS

[1] **W. B. Xu**, X. D. Li, W. D. Xu, L. Gong*, *et al*., "Human-robot Interaction Oriented Human-in-the-loop Real-time Motion Imitation on a Humanoid Tri-Co Robot," *3rd International Conference on Advanced Robotics and Mechatronics (ICARM)*, NUS, Singapore, 2018. **To Appear**

[2] **W. B. Xu**, X. D. Li, L. Gong*, Y. X. Huang, *et al*., "Natural Teaching for Humanoid Robot via Human-in-the-loop Scene-motion Cross-modal Perception," *Industrial Robot.* **Under Review**

[3] **W. B. Xu**, C. J. Liu, C. Q. Zhou, Z. Y. Zhou, H. Mao*, "Scalable Production of Nitrogen-doped Carbons by Pyrolysis of Biomass-derived Carbons in NH_3 Gas," *22nd International Symposium on Analytical and Applied Pyrolysis*, Kyoto, Japan, 2018. **Conference Abstract**

[4] C. Q. Zhou, C. J. Liu, **W. B. Xu**, X. M. Chen, Z. Y. Zhou, H. Mao*, F. Qi, "N-doped Carbon-Silica Composite Confined Pd Nanoparticles for Abatement of Methane Emission from Automobiles," *Topics in Catalysis.* **Submitted**

[5] L. Gong*, X. D. Li, **W. B. Xu**, B. H. Chen, Z. L. Zhao, Y. X. Huang, C. L. Liu, "Naturally teaching a Humanoid Tri-Co Robot in a Real-time Scenario from First Person View, " *Science China - Information Sciences.* **Submitted**

HONORS & AWARDS

- China National Scholarship (**Top 1%**) 2016, 2017,2018
- Outstanding Student in School of Mechanical Engineering (**Top 10%**) 2016, 2017
- Three Good Student of Shanghai Jiao Tong University (**Top 10%**) Oct. 2016
- Honorable Mention of Mathematical Contest in Modeling (**Top 30%**) Apr. 2017
- Robomaster 2017, First Prize in Eastern Division (**3/29**) Jun. 2017
- Excellent Student Cadre of Shanghai Jiao Tong University (**Top 2%**) Oct. 2017
- Tang Lixin Scholarship (**2/422**) Dec. 2017

RESEARCH EXPERIENCE

Preparation of Catalysts for Lignocellulosic Biomass Conversion **Shanghai, China**

Advisor: Assistant Professor Ma Hao, SJTU Combustion and Energy Research Group *Jan. 2018 – Present*

- Synthesize Oxygen-containing Carbons (OCs) by hydrothermal treatment of glucose solution.
- Introduce metal ions to OCs by incipient wetness impregnation with a solution of a proper concentration.
- Pyrolyze OCs in NH_3 with lower temperatures than existing methods to prepare N-doped Carbons (NCs).
- Characterize NCs with XPS, BET and SEM and catalyze hydrolysis of cellulose to verify catalytic activity.

Humanoid Robot 3D Prototyping and Ultra-numerous DOF Control **Shanghai, China**

Advisor: Associate Professor Liang Gong, Institute of Mechatronics, SJTU *Oct. 2016 – Jun. 2018*

- Assemble a humanoid robot using open-sourced STL files with modifications through 3D printing.
- Perform IK for given gestures or targets and transfer trajectory arrays to slave controller through a protocol.
- Develop URDF files to visualize computed motions on a humanoid model in RVIZ through ROS.
- Develop a fast mapping algorithm to convert euler angles in BVH format into robot joint angles.
- Project live video from a camera onto VR glasses and capture eye-body-synergic human motion through 16 wearable IMUs to realize real-time imitation of upper limber's motion on a humanoid.

Flight Control System Based on Sensors and CPU in Smartphone

Advisor: Assistant Professor Junqi Wu, School of Aeronautics and Astronautics, SJTU *Oct. 2015 – Oct. 2016*

- Develop self-balancing algorithm of single-rotor based on PID control and extend it to quadrotor platform.
- Simulate quadrotor motion in Gazebo and AirSim using modified source code PX4 or an offboard API.
- Use Raspberry Pi to communicate with Pixhawk through Mavros to control quadrotor attitude and position.
- Have a quadrotor follow the manipulator automatically according to GPS obtained from a smartphone.

SELECTED PROJECT

Trajectory Planning and Control of a Rotorcraft | Project Leader **Shanghai, China**
Advisor: Associate Professor Ye Ding, Robotics Institute, SJTU *Mar. 2018 – Jun.2018*
- Generate optimal spatial trajectories based on non-uniform B-Spline method with minimum flight time objective.
- Derive intermediate attitudes according to quaternions at given points using spherical interpolation methods.
- Formulate dynamic models of quadrotor and fully actuated hexarotor and design controllers for specified tasks.
- Simulate whole system in Matlab and AirSim to achieve desired motion, i.e. flipping and crossing narrow frames.

Design and Simulation of a six-axis Industrial Arm | Project Leader **Shanghai, China**
Advisor: Professor Zhenhua Xiong, Robotics Institute, SJTU *May. 2018 – Jun.2018*
- Simulate typical motion on an industrial arm based on ABB-IRB1600 in SOLIDWORKS and Adams.
- Assemble 3D model with servo motors and reducers selected with simulation results and design transmissions.

Arm Rehabilitation Exoskeleton | Project Leader **Shanghai, China**
Advisor: Associate Professor Peter Shull, Robotics Institute, SJTU *Sep. 2017 – Jan.2018*
- Design a 5-DOF exoskeleton with 3 DOF at shoulder based on the SOLIDWORKS simulation.
- Perform corresponding motion according to trajectory arrays computed through inverse kinematics.

Bionic Crab-like Robot | Project Leader **Shanghai, China**
Advisor: Professor Peizhong Yang, Institute of Intelligent Manufacturing, SJTU *Mar.2017 – Jun. 2016*
- Design a bionic crab-like robot with numerous four bar linkages being legs driven by only one motor.
- Adopt 3D printing and laser cutting techniques to manufacture a prototype.

EXTRACURRICULAR ACTIVITIES

A+ Club (consists of top 1% of 1200 students in School of ME) **President** Mar. 2017 – May.2018
- Organize weekly academic assistance aimed at fellow students with GPA lower than 2.0/4.3.
- Invite seniors and instructors to give lectures about different topics to share individual experiences.
- Summarize the contents of core courses, which have been downloaded over 3,000 times.

Student Association of Science & Technology in ME **Minister** Jun. 2016 – Nov. 2017
- Organize Freshman Competition of Innovative Mechanical Design and science & technology lectures.
- Cooperate with various high-tech enterprises to raise funds for competitions and activities.

Mathematical Contest in Modeling **Leader** Feb. 2017
- Choose optimized parameters of toll plaza based on cellular automata to reduce traffic congestions.

Graduation Party of School of Mechanical Engineering **Volunteer** 2016, 2017
- Assign work for group members, prepare for necessities and receive graduates as well as honored guests.

Shanghai International Marathon **Volunteer** Oct. 2016
- Provide water and soft drinks for marathoners at forty kilometers, cheer them up and distribute materials.

TECHNICAL SKILLS

Programming Languages – C/C++, Python, Java

Applications – Abaqus, Adams, AirSim, AutoCAD, CasaXPS, Labview, Matlab, ROS, Solidworks, Origin, UG

Characterization – BET, GPLC/HPLC, SEM, TEM, TGA, TOFMS, XPS