Yujing "Bryant" Zhou
Curriculum Vitae

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Education

The University of Texas at Austin 2020 – 2022
Master's student in the Mechanical Engineering Department
GPA: 4.0/4.0

Bucknell University 2016 – 2020
B.S. in Mechanical Engineering
Minors in Mathematics and German
GPA: 3.81/4.0

Research Experience

Dynamic Game Solver for Nonlinear Systems **September 2021 – Present**

- Generalizing beyond LQ (H^{∞}) problems.
- Exploring the robust control and path-integral methods to solve zero-sum and general-sum dynamic games.

Encrypted LSTM Over the Homomorphic Space **May 2021 – August 2021**

- Represented the LSTM cell in a nonlinear model structure that combines a linear time-invariant dynamical system with a sector-bounded nonlinear operator.
- Implemented encrypted operations over the homomorphic space.

Extremum-Seeking-Based Ultra-Local Model Predictive Control **May 2021 – August 2021**

- Proposed the extremum-seeking-based ultra-local model predictive control (ES-ULMPC), which is a model-free version of MPC.
- Demonstrated the effectiveness of the proposed method for electric motor speed control.

Lane Detection using Extremum Seeking Method **February 2021 – May 2021**

- Applied extremum seeking control to design a color filter in HSV color space for lane detection applications under different lighting conditions.
- Demonstrated its effectiveness by a lane-following experiment with a scaled car in an indoor track setting.

Lane Detection using Model-Free Control **September 2020 – February 2021**

- Applied model-free control to design a color filter in the HSV color space for lane detection application under different lighting conditions.
- Performed simulation studies to test the proposed method with the assumption of straight-lane-following.

Eliciting Emergency Driver Responses with In-Vehicle Stimuli **May 2019 – March 2020**

- Constructed inverse vehicle dynamics model with Taylor series approximation to express the appropriate steering angle as a function of vehicle's velocity and position.
- Prepared simulator testing for human subjects and approved by IRB, but the experiment was not able to be finished due to the unforeseen COVID-19 disease.

Stroke-Hand-Recovery Device **January 2019 – May 2019**

- Prototyped different compliant building blocks for finger joints and manufactured them using both 3D printing and vacuum forming.

Resin-Extrusion 3-D Printer **May 2017 – December 2018**

- Designed and constructed a desktop-scale mini-extruder-based 3-D printer, which can use soft and pelletized materials such as thermoplastic elastomers to save material cost.
- Prototype can print soft objects with simple shapes, such as cubes or tetrahedrons, and hard objects with more complex shapes, such as cubes with indented letters on each surface.
- Project website: https://confluence.bucknell.edu/display/RMEFAM

Publications

Journal Publications

J1. **Y. Zhou**, Z. Wang, and J. Wang, "Illumination-Resilient Lane Detection by Threshold Self-adjustment Using Newton-based Extremum Seeking," *IEEE Transactions on Intelligent Transportation Systems* (Under Review)

Conference Publications

C1. **Y. Zhou**, Z. Wang, and J. Wang, "Real-Time Adaptive Threshold Adjustment for Lane Detection Application under Different Lighting Conditions Using Model-Free Control," *Proceedings of the 2021 Modeling, Estimation and Control Conference (MECC), Austin, Texas, Oct. 2021* (Accepted)

C2. **Y. Zhou**, Z. Wang, X. Zhou, H. Shen, and J. Wang, "Extremum-Seeking-Based Ultra-Local Model Predictive Control and Its Application to Electric Motor Speed Control," *2022 American Control Conference* (Under Review)

Fellowship and Awards

Professional Development Award 2021
The University of Texas at Austin Graduate School (UTGS) Fellowship 2020 – 2022

Academic Service

Reviewer for the 2021 Modeling, Estimation and Control Conference (MECC)
Reviewer for the 2022 American Control Conference (ACC)

Skills

Programming: MATLAB, C++, ROS, Python, LaTeX, LabView

Software: Gazebo, SOLIDWORKS, Master Cam, Abaqus, AutoCAD, Motion Gen

Language: Mandarin (native), English (fluent), German (basic)

Teaching Experience

ME 397 Medical Device Design and Manufacturing **August-December 2021**

Graduate course at UT Austin (teaching assistant)

ME 366J Mechanical Engineering Design Methodology **June-August 2021**

Undergraduate course at UT Austin (teaching assistant)

ME 302 Engineering Design Graphics **August-December 2020 & January-May 2021**

Undergraduate course at UT Austin (teaching assistant)

ME 216 Computational Analysis **January-May 2019**

Undergraduate course at Bucknell University (teaching assistant)

Relevant Coursework

The University of Texas at Austin – Graduate Courses

Autonomous Robots; Convex Optimization; Reinforcement Learning; Analytical Methods; Probability and Stochastic Processes; Intro to Modern Control; Vehicle Systems Dynamics and Control; Real Time Control System Labs; Stochastic Systems, Estimations, and Control; Propulsion Systems and Control

Bucknell University – Undergraduate Courses

Computational Analysis; Mechanics; Dynamics; Senior Design; Mechanism Design; Calculus III; Differential Equations; Linear Algebra; Probability