SARASIJ BANERJEE

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EDUCATION

2021-Present	Ph.D., Control Systems Engineering Lab, Arizona State University	GPA: 4/4
2017-2021	B.Tech., Chemical Engineering, Indian Institute of Technology Kanpur	GPA: 7.72/10

RESEARCH PROJECTS

Data-Driven Control of Nonlinear Systems using Three-Degree-of-Freedom Model-on-Demand Model Predictive Control *(June'22-January'23)*
under Dr. D.E. Rivera, Professor, Control Systems Engineering Lab, ASU

- Improved the performance of conventional MPC by using a Model on Demand based predictive model hybrid global-local modeling algorithm
- Used Model on Demand (MoD) with 3-Degree-of-Freedom MPC (3-DoF MPC) to provide an integrated modeling and control framework that involves simple user decisions
- Demonstrated superior performance of 3-DOF MoD MPC in set-point tracking, disturbance rejection, and robustness against uncertainties and nonlinearities over conventional ARX-based MPC.

Predicting Goal Attainment in Control-Oriented Behavioral Interventions Using a Data-Driven System Identification Approach
under Dr. D.E. Rivera, Professor, Control Systems Engineering Lab, ASU

- Performed system identification of human behavior (Physical Activity) as a dynamic model of mathematical constructs
- Implemented a systematic approach through a unique experimental design, model architecture selection and estimation, and validation of behavioral data
- Evaluated a Discrete Simultaneous Perturbation Stochastic Approximation (DSPSA) search routine for generating a tool methodology for personalized behavioral intervention

Optimization and Tracking Control of Multi-Vessel Batch Distillation Column
under Dr. S. Jogwar, Assistant Professor, Department of Chemical Engineering, IIT Bombay

- Simulated a MATLAB-based detailed dynamic model of a Multi-Component Batch Distillation Column
- Generated open-loop optimal operation policy for maximization of multiple performance indicies
- Developed a model-based control scheme to track this optimal performance trajectory

Artificial Neural Network based Control for a Novel DC/DC Converter
under Dr. A. Mallik, Assistant Professor, Department of Electrical Engineering, Arizona State University

- Developed an ANN-based controller for a high gain step-down converter that adheres to a typical Point of Load application with two active switches and minimal passive components.
- Conducted a MATLAB-based simulation of the proposed control scheme for the 48V to 1V converter topology for concept verification
- Validated (a) a well-regulated output voltage with $\pm 1\%$ ripple and (b) undershoot/overshoot of the output voltage within a band of $\pm 3\%$ subjected to 100% load transient as per the P-o-L application requirements

Publications

- Sarasij Banerjee, Rachael Kha, Daniel Rivera, Eric Hekler, "Predicting Goal Attainment in Control-Oriented Behavioral Interventions Using a Data-Driven System Identification Approach", Extended Abstract, 2022 AIChE Annual Meeting, Phoenix, AZ, Nov'22,
- S. Banerjee, A. Chandwani and A. Mallik, "Artificial Neural Network based Direct Inverse Control for a Novel 48V-1V DC/DC Converter," in Proc. IEEE Power Electronics Drives and Energy System, Jaipur, Dec. 2020

RELEVANT COURSEWORK   *(A+ grade)

System Identification(Ongoing)	Design Optimization*	Linear Systems Theory*
Advanced Process Control*	Intelligent Systems and Control	Basics of Modern Control
Process Dynamics and Control		

SCHOLASTIC ACHIEVEMENTS

- Awarded University Graduate Fellowship by ASU based on scholastic achievement
- Received Outstanding Graduate Teaching Assistant Award for the Fall' 21 semester (Process Dynamics and Control)
- Awarded SEMTE General Scholarship by the School for Engineering of Matter, Transport & Energy, ASU
- Awarded INSPIRE scholarship by Ministry of Science & Technology, India for academic excellence
- Awarded the Merit Cum Means Scholarship by IIT Kanpur based on academic performance