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| **Zheren Ma** | Phone #: 512-8658134  Email: [zhrm@utexas.edu](mailto:zhrm@utexas.edu) | |
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| **EDUCATION** | | |
| The University of Texas at Austin (UT) PhD student in Mechanical Engineering *Sep. 2013-present*  Current GPA:***4.0/4.0***  Shanghai Jiao Tong University (SJTU) B.S. in Mechanical Engineering *Sep. 2009-July. 2013*  Overall GPA: ***91.07/100*** | | |
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| **GRADUATE LEVEL COURSEWORK** | | |
| Linear System Analysis, Advanced Vehicle Powertrain System, Modeling of Multi-energy System, Introduction to Modern Control, Time-series Modeling/Analysis/Control, Optimal Control Theory, Computational Fluid Mechanics, Multi-variable Control System, Digital Signal Processing, Digital Control, Stochastic Systems and Control | | |
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| **PUBLICATIONS** | | |
| * **Z. Ma** and D. Chen, “Modeling of coupled axial and torsional motion of a drilling system”, *ASME Dynamic Systems and Control Conference*, pp. V002T20A005, 2015. * **Z. Ma,** Z. Yan, M. L. Shaltout and D. Chen, “Optimal real-time control of wind turbine during partial load operation”, *IEEE Transactions on Control Systems Technology,* vol. 23, no. 6, pp. 2216-2226, 2015. | | |
| * **Z. Ma,** M. L. Shaltout and D. Chen, “An adaptive wind turbine controller considering both the system performance and fatigue loading”, *Journal of Dynamic Systems, Measurement, and Control,* vol. 137, no. 11, p. 111007, 2015. * **Z. Ma** and D. Chen, “Optimal power dispatch and control of a wind turbine and battery hybrid system”, *American Control Conference (ACC),* pp. 3052-3057, 2015. | | |
| * **Z. Ma**, M. L. Shaltout and D. Chen, “Adaptive gain modified optimal torque controller for wind turbine partial load operation”, *ASME Dynamic Systems and Control Conference*, pp. V002T18A002 -V002T18A002, 2014. | | |
| * **Z. Ma**, L. Gong, Y. Li and C. Liu,“CMAC-based real-time calculation of the effective welding current during AC resistance spot welding”, *Mechatronics and Automation (ICMA), IEEE International Conference*, pp. 1669-1674, 2013. * **Z. Ma**, M. L. Shaltout, and D. Chen, “Optimal power dispatch and control of an integrated wind turbine and battery system”, in press, *IEEE Transactions on Control Systems Technology*. * **Z. Ma**, B. Li and Z. Yan, “Wearable driver drowsiness detection using electrooculography signal”, *IEEE Radio Wireless Week*, 2016. | | |
| * C. Li, **Z. Ma**, L. Yao and D. Zhang, “Improvements on EMG-based handwriting recognition with DTW algorithm”, *Engineering in Medicine and Biology Society (EMBC), 35th Annual International Conference of the IEEE*, pp. 2144-2147, 2013. | | |
| * L. Gong, Y. Xi, **Z. Ma**, and C. Liu. "Modeling, identification and simulation of DC resistance spot welding process for aluminum alloy 5182", *Journal of Shanghai Jiaotong University*, vol. 18, no. 1, pp. 101-104, 2013. | | |
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| **SELECTED RESEARCH EXPERIENCES** | | |
| ***Multi-Phase Kick Modeling and Automation*** *Sep. 2015-present*  *Advisor: Dongmei Chen and Eric Van Oort Department of Petroleum Engineering, UT* | | |
| * Proposed a novel multi-phase modeling tool that can be deployed in combination with suitable hydraulic models for managed pressure drilling (MPD) well control. * Developed a software package for gas kick simulation that can handle many complexities which occur during a MPD well control incident such as handling multiple kicks from one or several formations, dynamic well control, automated choke control, sudden pump start up/shut off, non-Newtonian drilling fluids, arbitrary wellbore path (including directional and horizontal wells), area discontinuity, etc. | | |
| ***Modeling and Simulation of Vibrations in a Drilling System*** *Feb. 2015-May. 2015*  *Advisor: Dongmei Chen Department of Mechanical Engineering, UT* | | |
| * Modeled drill string by using a distributed drill pipe model and a comprehensive rock-bit interaction model. * Simulated and analyzed vibrations in drilling system including bit-bounce, stick-slip and bit whirl. | | |
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| ***Optimal Power Dispatch and Control of a Wind Turbine and Battery Hybrid System*** *June. 2014-Nov. 2014*  *Advisor: Dongmei Chen Department of Mechanical Engineering, UT* | | |
| * Developed an efficient and reliable power scheduling approach that applied model predictive control (MPC) to probabilistic wind speed forecast. * Proposed a real-time active power controller that enhances power reference tracking and optimizes the performances of hybrid system under instantaneously varying wind speed. | | |
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| ***Wind Turbine Control During Partial Load Operation*** *Sep. 2013-May. 2014*  *Advisor: Dongmei Chen Department of Mechanical Engineering, UT* | | |
| * Designed a dynamic-programming-based controller and improved wind energy capture compared to the baseline control under fluctuating wind profiles. * Proposed an adaptive gain modified optimal torque controller which improved turbine performances in terms of wind energy harvesting and fatigue loading mitigation, and better robustness against model uncertainties. * Developed a user interface, WTSim that connects the NREL software FAST, Turbsim, WT\_Perf, Mlife to Matlab-Simulink and used WTSim for controller validation and fatigue analysis. | | |
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| ***Electromyography (EMG)-based Handwriting Recognition*** *Aug. 2012-Nov. 2012*  *Advisor: Dingguo Zhang Institute of Robotics, SJTU* | | |
| * Improved the Dynamic Time Warping (DTW) algorithm for EMG recognition of writing lower-case letters. * Increased the average recognition accuracy by 9.2% compared to the conventional approach by using a Mahalanobis-Distance-based repetitive template-making method. | | |
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| **INTERNSHIP** | | |
| ***DeltaV Process Control Intern*** *May. 2015-Aug. 2015*  *Manager: Dirk Thiele Emerson Process Management* | | |
| * Developed VBA-based spreadsheet for automating data analysis and report generation. * Implemented algorithms for predicting variance of process variables and identifying interacting control loops based on power spectrum analysis. * Applied Microsoft Power BI to create cloud-based dynamic reports. | | |
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| ***ST International Scholarship Intern*** *Jul. 2012-Aug. 2012*  *Manager: Richard Chin ST Kinetics, Singapore Technologies Engineering* | | |
| * Applied Pure Pursuit algorithm to AGV guidance for tracking a given path with GPS measurement errors. * Prevented the vehicle from cutting corners by using a nonlinear function that better represents human drivers’ judgment and look-ahead distance. * Implemented the guidance law on an OpenGL-based platform and achieved accurate guidance performance. | | |
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| **AWARDS & ACTIVITIES** | | |
| Research assistant in UT  Teaching assistant of the course Engineering Computational Methods in UT  Excellent Graduate of Shanghai Jiao Tong University (5%)  Second prize of National Undergraduate Mathematical Modeling Contest (5%)  Scholarship of Singapore Technologies Engineering (2%)  First Prize of Academic Excellence Scholarship of Shanghai Jiao Tong University (3%) | | *Jan. 2015- May. 2016*  *Sep. 2013- Dec. 2014*  *May. 2013*  *Oct. 2012*  *2010, 2011, 2012*  *2011, 2012* |
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| **COMPUTER SKILLS** | | |
| Matlab/Simulink, C++, Python, Java, html, Unigraphics, AutoCAD, VBA, Microsoft Power BI, DeltaV | | |