

Tanvir Alam Shifat

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PROJECTS

MPC controller design for Wave Energy Converters (WECs) June 2022 – Present

- Designed a linear feedback controller and optimized gains for maximum power output.
- Designed an MPC controller based on the linear feedback gains using impedance matching technique.
- Improved MPC DC gain close to a linear controller by using linear matrix inequality (LMI) optimization

Linear PTO for tractor trailer suspension system Jan 2023 – Present

- Demonstrated and formulated relative movement between the Chassis and Cab of a Class 8 Commercial Tractor.
- Designed a linear energy extraction methodology to minimize the parasitic loss on the inherit system.
- Implemented impedance matching technique for maximum power extraction in analogous tractor-trailer system.

Supercapacitors for Pulsed Power Application June 2021 – June 2022

- Outlined a supercapacitor module controlled by a dual active bridge (DAB) converter for high power output.
- Designed an active front end for the energy storage system from 3-Ph AC power to DC output.
- Implemented $d-q$ current control framework for generator control.

AI-based Prognostics and Health Management of BLDC Motors Sep 2018 – May 2021

- Set up test-rig setup and NI LabVIEW DAQ environment for monitoring multiple sensor signals.
- Established several frameworks for fault detection and RUL estimation subjected to different electrical and mechanical faults in BLDC motor using signal processing and machine learning techniques.
- Developed a novel feature selection method using motor current's 3^{rd} harmonic component for improved fault classification.

TECHNICAL SKILLS

Languages: Python, MATLAB, R, LabVIEW, LabVIEW-NXG, C

Modeling Tools: PLECS, Simulink, AutoCAD, CATIA, Origin, Simscape.

AI Libraries: Scikit-learn, TensorFlow, Keras, Pytorch, OpenCV, Scipy

Hands-on: DAQ setup (NI, Speedgoat, Oscilloscope), Sensor calibration, Testing and verification.

Others: LaTeX, Microsoft Office, Adobe PS, Adobe AI, Adobe Lightroom, RedHat Linux, Unix OS.

EDUCATION

Oregon State University Corvallis, OR, USA

Ph.D. in Electrical and Computer Engineering

June 2021 - Present

Kumoh National Institute of Technology

Gumi, South Korea

MS in Mechanical Engineering

Sep 2018 - Aug 2020

East West University

Dhaka, Bangladesh

BS in Electrical and Electronic Engineering

Jan 2012 - Apr 2016

EXPERIENCE

Graduate Research Assistant June 2021 – Present

Oregon State University

Corvallis, OR

- Took part in projects by the US Department of Energy, Sandia National Laboratory, ConMet (Daimler Trucks).
- Designed a 1 kW prototype for pulsed power generation using power converters and Supercapacitor.
- Built a model predictive controller tuned by a linear controller for optimum performance with constraints.
- Served as Teaching Assistant for ENGR202 (Electrical Circuits II).

Graduate Research Assistant Sep 2018 - May 2021

Kumoh National Institute of Technology

Gumi, Rep. of Korea

- Developed predictive maintenance framework of electric machines for several mechanical and electrical faults.
- Improved BLDC motor fault diagnosis techniques by combining machine learning and signal processing algorithms
- Set up data acquisition and monitoring through HIL interface by integrating MATLAB and LabVIEW.
- Used statistics and signal processing to predict the remaining useful life of BLDC motors for electrical faults.
- Mentored undergraduate capstone research teams with test rig setup, DAQ environment setup, and data analysis.