Tanvir Alam Shifat

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Projects

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

- Developed a nonlinear optimization technique for MPC controller in WEC application.
- Improved energy capture in two different WEC devices using impedance matching and feedback control technique.
- Improved MPC DC gain close to a linear controller by using linear matrix inequality (LMI) technique.

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 truck.
- 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 diagnosis.

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.
- Set up data acquisition and monitoring through HIL interface by integrating MATLAB and LabVIEW.
- Improved BLDC motor fault diagnosis techniques by combining machine learning and signal processing algorithm.
- Prototyping methodologies 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.