Tanvir Alam Shifat

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PROJECTS

MPC controller design for wave energy converters (WECs) June 2022 – Present
- Developed and verified a constrained PI-psuedo control for WEC using MPC with a tracking error $< 1\%$.
- Enhanced energy capture in two WEC devices by using impedance matching and feedback control techniques.

Linear PTO for tractor trailer suspension system Jan 2023 – Present
- Formulated a mathematical model of the relative movement between the chassis and cab of a Class 8 commercial truck, demonstrating a maximum power extraction potential of 8 kW.
- Implemented impedance matching technique in an analogous tractor-trailer system, achieving maximum power extraction of 20 kW.

Supercapacitors for pulsed power application June 2021 – June 2022
- Outlined a supercapacitor module architecture controlled by a dual active bridge (DAB) converter for high power output, achieving a peak power of 1 kW.
- Implemented d-q current control framework for generator control, achieving a dynamic response of 50 ms.

AI-based prognostics and health management of BLDC motors Sep 2018 – May 2021
- Built a test-rig and NI LabVIEW DAQ environment for monitoring and acquiring multi-sensor signals, including motor speed, current, and temperature.
- Established fault diagnosis and RUL estimation frameworks using machine learning techniques (ANN, LSTM), achieving an accuracy of 95%.
- Devised a novel feature selection method using motor current's 3rd harmonic for fault diagnosis, improving accuracy by 10% over conventional methods..

TECHNICAL SKILLS

Languages: Python (scripting, machine learning, data analysis), MATLAB (simulation, control systems, signal processing), R (statistics), LabVIEW (data acquisition, calibration), LabVIEW-NXG (embedded systems).
Modeling Tools: PLECS, Simulink, AutoCAD, CATIA, Origin, Simscape.
AI Libraries: Scikit-learn, TensorFlow, Keras, Pytorch, OpenCV, Scipy, Numpy, Pandas.
Hands-on: DAQ setup (NI, Speedgoat, Oscilloscope), Sensor calibration, Testing, and verification.
Others: 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).
- Served as Teaching Assistant for ENGR202 (Electrical Circuits II), ECE531 (Power Electronics).

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.
- Mentored undergraduate capstone research teams with test rig setup, DAQ environment setup, and data analysis.