

Curriculum Vitae

Golam Gause Jaman

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Objective

Seeking roles as an Assistant Professor, Engineering Professional in Industry, and Research Scientist in National Laboratory settings, leveraging expertise in Machine Learning, Data-Driven Control Strategies, Mechatronics, Embedded Systems and Dynamic Systems.

Education

Ph.D. in Engineering and Applied Science (May 2024)

Idaho State University, ID, USA

Department of Mechanical Measurement and Control Engineering

M.S. in Measurement and Control System Engineering (Fall 2023)

Idaho State University, ID, USA

Department of Mechanical Measurement and Control Engineering

B.S. in Electrical Engineering (Spring 2015)

Idaho State University, ID, USA

Department of Electrical and Computer Engineering

B.S. in Electronics and Telecommunication Engineering (Magna Cum Laude - Summer 2013)

North South University, Dhaka, Bangladesh

Department of Electrical and Computer Engineering

Technical Skills

Programming Languages: C/C++, Python, MATLAB, LabVIEW, R, Assembly, PLC, Java, SQL

Machine Learning & AI: Keras, PyTorch, TensorFlow, Deep Learning, Reinforcement Learning

Hardware: AVR, PIC, Arduino, Raspberry Pi, Mbed, Particle (IoT), Allen-Bradley, NI cRIO (FPGA)

Control Systems: PID, LQR/LQG, Intelligent Control (Fuzzy, Genetic Algorithm, ANFIS, RL), SCADA

Signal Processing: Time Series Analysis, Image Processing, Computer Vision, Acoustic Signal Processing

Robotics & Mechatronics: Mobile Robotics, Sensor Fusion Integration, Motor Control, ROS, WSN

Data Analysis: Statistical Analysis, System Identification, Data-Driven Modeling

Professional Experience

■ Assistant Professor - Mechatronics (2024)

North Idaho College, ID, USA

Teaching, and research & development in the area of mechatronics and industrial automation & control. The role includes exploring and enhancing course content by incorporating industrial control components such as Allen-Bradly Compact Logix, MicroLogix, Micro 800 Series PLCs, Studio 5000, and Connected Component Workbench.

■ Graduate Research Assistant (2015-2024)

Idaho State University, ID, USA

Conducted research and instructed lab classes in programming, control theory, vibration analysis, embedded systems, and mechatronics.

■ Research Assistant (Spring 2021-Summer 2023)

Idaho National Laboratory (INL) - Idaho State University, ID, USA

Collaborated with INL on continuous electric field-assisted sintering process controller design.

■ Summer Scholar (Summer 2019, 2020, 2022)

Lawrence Livermore National Laboratory (LLNL), Livermore, CA, USA

Contributed to Feedstock Optimization and Solidification Trajectory Prediction in powder bed fusion projects.

Projects

1. Department of Electrical and Computer Engineering, ISU (2012-2015)

- SMS-based controller using GSM module, PIC microcontroller, and C/C++.
- Wireless Home Automation nodes with HMI option utilizing time division multiplexing. PCB design to support analog/digital sensors, power supply, and serial communication (UART).

2. Department of Mechanical Measurement and Control Engineering, ISU (2015-2023)

- Arduino-based adaptive control implementation for water level regulation in a tank.
- Twin propeller-based beam balancing system using PID, lead/lag, and fuzzy logic controllers.
- Adaptive Neuro Fuzzy Inference system (ANFIS) for quad-copter altitude control using Parrot mini-drone and MATLAB/Simulink.
- Wafer misalignment detection system using edge profile image analysis.
- Motion capture data analysis from VICON system connected to IR camera cluster.
- Mobile robot localization for indoor environments using laser and ultrasonic sensor arrays.
- Obstacle avoidance using depth camera connected to Raspberry Pi with real-time object identification.
- Prototype development for Continuous Electric Field Assisted Sintering (CEFAS). Integrated Modbus communication, servo motor control, closed loop control in NI cRIO FPGA hardware using LABView.

3. Department of Electrical and Computer Engineering, NSU (2007-2013)

- 8-bit computer architecture implementation.
- Line following robot build utilizing a custom board and AVR microcontroller.
- Investigation of mobile wireless sensor network with emphasis on region of interest via more effective swarm intelligence method. Developed simulation-based thesis work using MATLAB.

Participations

Participated in Spaceport America Cup 2023 (Intercollegiate Rocket Engineering Conference), Las Cruces, New Mexico as an ISU's Space Initiative Team member with expertise in the electronic bay. Our team has launched 30Kft commercial off-the-shelf (COTS) solid fuel single-stage rocket with a payload separation mechanism and recovery steps.

Research Experience

1. Feedstock Optimization (2019-2020) (LLNL)

Applied Machine Learning Fusion and 3D CNN techniques for predicting novel material's strength parameters such as stress, strain, and stress-strain profile. Feature utilized for the learning algorithm are Binary Statistical Image Feature (BSIF), Scanning Electron Microscopy (SEM), Computed Tomography (CT) images. Ensemble of linear regression/random forest and deep learning to automate strain and stress profile measurements for accelerated computing.

2. Hand Motion Classification using sEMG Signal (2020-2023) (ISU-MCERC)

Developed a non-invasive method for upper limb motion classification. ResNet-50 trained from the scratch utilizing hand engineered spatio-temporal feature.

3. Trajectory Prediction in Additive Manufacturing (2022) (LLNL)

Utilized PredRNN network for accelerated computation in ALE3D-CAFE simulations. The ALE3D-CAFE simulations are primarily used for the trajectory generation of solidification process takes place during the powder bed fusion (metal 3D printing).

4. LENS-DED Modeling (2020-2021) (INL)

Implemented a NARX architecture for modeling the Laser Engineered Net Shaping - Directed Energy Deposition (LENS-DED) system. Reinforcement Learning explored for the meltpool size control in the Additive Manufacturing.

5. Autonomous Wheelchair (2020-2022) (LLNL)

Developed an obstacle avoidance method utilizing real-time object identification using computer vision and machine learning. The image classification is applied to the RGB images while depth camera provided proximity information to produced fused feature for obstacle avoidance. The work is implemented in Raspberry Pi with external TPU. A wheelchair path planning simulation platform is developed in MATLAB for future research objectives. In addition, indoor mobile robot localization techniques are explored for education.

6. Spike Stall Precursor Detection (2023-2024) (ISU-MCERC)

Employed GNN and GRU hybrid network for compressor spike stall precursor detection.

7. Rapid Joule Heating (2021-2023) (INL)

Designed instrumentation and controllers using LabVIEW. Applied Reinforcement Learning for controller solutions.

8. Model-based Reinforcement Learning Systems (2024) (ISU-MCERC)

Investigations of MBRL for linear, non-linear, and unstable systems with system identification/deep learning model, and fuzzy reward inclusion.

Publications

1. G. G. Jaman, A. Monson, K. R. Chowdhury, M. Schoen and T. Walters, "**System Identification and Machine Learning Model Construction for Reinforcement Learning Control Strategies Applied to LENS System**," 2022 Intermountain Engineering, Technology and Computing (IETC), Orem, UT, USA, 2022, pp. 1-6, doi: 10.1109/IETC54973.2022.9796761.
2. Brian Gallagher, Matthew Rever, Donald Loveland, T. Nathan Mundhenk, Brock Beauchamp, Emily Robertson, Golam G. Jaman, Anna M. Hiszpan- ski, and T. Yong-Jin Han. "**Predicting compressive strength of consolidated molecular solids using computer vision and deep learning**". *Materials Design*, 190:108541, 2020.
3. G. G. Jaman, N. Farheen and M. P. Schoen, "**Cost Effective Mobile Robots Navigation and Mapping System for Education**", 2020 Intermountain Engineering, Technology and Computing (IETC), Orem, UT, USA, 2020, pp. 1-6, doi: 10.1109/IETC47856.2020.9249154.
4. N. Farheen, G. G. Jaman and M. P. Schoen, "**Object Detection and Navigation Strategy for Obstacle Avoidance Applied to Autonomous Wheel Chair Driving**," 2022 Intermountain Engineering, Technology and Computing (IETC), Orem, UT, USA, 2022, pp. 1-5, doi: 10.1109/IETC54973.2022.9796979.
5. G. G. Jaman and S. C. Chiu, "**A Mobile Wireless Sensor Network Emphasizing Region of Interest via a More Effective Swarm Intelligence Method**," 2014 National Wireless Research Collaboration Symposium, Idaho Falls, ID, USA, 2014, pp. 74-78, doi: 10.1109/NWRCS.2014.18.
6. Jaman, G. G. and Schoen, M. (2024) "**Convolutional Neural Networks for Time Series Data Processing Applicable to sEMG Controlled Hand Prosthesis**", *Technische Mechanik - European Journal of Engineering Mechanics*, 44(1), pp. 47–60. doi: 10.24352/UB.OVGU-2024-053.
7. G. G. Jaman, M. P. Schoen and J. Li, "**Spike Stall Precursor Detection in Axial Compressor System using GNN-RNN Hybrid Architecture**," 2024 4th Interdisciplinary Conference on Electrics and Computer (INTCEC), Chicago, IL, USA, 2024, pp. 1-7, doi: 10.1109/INTCEC61833.2024.10603034.
8. N. Farheen, G. G. Jaman and M. P. Schoen, "**Model-Based Reinforcement Learning with System Identification and Fuzzy Reward**," 2024 Intermountain Engineering, Technology and Computing (IETC), Logan, UT, USA, 2024, pp. 80-85, doi: 10.1109/IETC61393.2024.10564417.
9. G. G. Jaman and M. P. Schoen, "**Reinforcement Learning Controller Design Applied to Rapid Joule Heating Application**". *In preparation for conference paper submission*.
10. G. G. Jaman, N. Farheen, and M. P. Schoen "**Model-based Reinforcement Learning Utilizing NARX and Closed Loop Identification**". *In preparation for conference paper submission*.