

Mahtab Noor Shaan

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Huntsville, AL

RESEARCH INTEREST

Reinforcement Learning, Deep Learning, Robotics, Control Theory

EDUCATION

- **University of Alabama in Huntsville (UAH)** Alabama, USA
M.Sc. in Electrical Engineering Aug. 2025
 - **Thesis:** *Safe Reinforcement Learning for Trajectory Tracking of Wheeled Mobile Robots with Minimal Intermittent Observations*
 - **Advisor:** *Dr. Avimanyu Sahoo*
- **Bangladesh University of Engineering and Technology (BUET)** Dhaka, Bangladesh
B.Sc. in Electrical and Electronics Engineering Sept. 2017

RESEARCH EXPERIENCE

- **Autonomous Cognition & Control Laboratory (ACCL), UAH** Huntsville, USA
Graduate Research Assistant Robotics and Control Sept. 2023 – Aug. 2025
 - Developed safe reinforcement learning-based control synthesis framework for nonlinear cyber-physical systems (WMRs) using Control Barrier Functions (CBFs) and event-triggered feedback, achieving 61% reduction in communication load while maintaining safety guarantees.
 - Investigated formal safety enforcement and real-time feasibility of RL-based controllers through simulation and analysis in MATLAB and ROS2/Gazebo.
 - Implemented and validated real-time control experiments on NVIDIA Jetson and Arduino platforms.

INDUSTRY EXPERIENCE

- **Hiperdyne Corporation** Tokyo, Japan
AI Engineer Oct. 2017 – Dec. 2022
 - Built and deployed ML models on AWS (EC2, S3, Lambda) for predictive analytics and automation.
 - Performed statistical data analysis of mobile data consumption behaviour that led to discovering new business insights and boosting revenue by 5%.
 - Developed Python-based computer vision applications (license plate recognition, object detection).
 - Created distributed data pipelines using Dask for scalable preprocessing and analytics.
 - Designed dashboards and automated forecasting pipelines, improving prediction accuracy by 5.6%.
 - Collaborated with multi-disciplinary teams for production deployment and system integration.

PUBLICATIONS

1. R. Correa, **M. N. Shaan**, H. Trivedi, B. Patel, L. A. G. Celi, J. W. Gichoya, I. Banerjee, **A Systematic Review of Fair AI Model Development for Image Classification and Prediction.** *Journal of Medical and Biological Engineering*, 2022.
2. N. Ibtehaz, M. S. U. Haque, **M. N. Shaan**, A. K. M. H. Haque, A. S. Dipta, A. Rahman, S. Mahboob, A. Bhattacharjee, **IMPACT: Image Processing-based Maze Solver, Persistent Autonomous object Carrying boT.** *Proc. IEEE ICECE*, 2018.
3. M. T. Islam, **M. N. Shaan**, E. J. Easha, A. T. Minhaz, C. Shahnaz, S. A. Fattah, **Enhancement of Noisy Speech via Decision-Directed Wiener in the Perceptual Wavelet Packet Domain.** *IEEE TENCON*, 2017.

SELECTED PROJECTS

- **Safe RL-based Motion Planning for Wheeled Mobile Robots:**
Designed a safe RL framework integrating Control Barrier Functions for trajectory tracking and lane-keeping of wheeled mobile robots under minimal sensing. Included event-triggered control to minimize communication cost while maintaining provable safety.
- **Animal AI Olympics:**
Participated in the Animal AI Olympics Competition where Unity Machine Learning Agents Toolkit (ML-Agents), Reinforcement Learning, and Imitation Learning Method were used to solve the task.
- **Intracranial Hemorrhage Detection:**
Participated in the Kaggle competition to detect intracranial hemorrhage from CT images of brain (Top 19%). Model was developed using fastai library and EfficientNet backbone.
- **Predicting Molecular Properties:**
Participated in the Kaggle competition to predict magnetic interaction between two atoms in a molecule given the coupling type and molecule structure data (Top 11%).
- **Diagnosis of Pleural Effusion from Lung Sounds:**
Designed and implemented a simple pleural effusion detection method analyzing power spectral density of lung sounds data. Built the hardware ourselves to collect data by visiting hospitals.
- **Industrial Robot Prototype:**
Built a prototype line follower and maze solver robot as control systems lab project. Arm had similar arm structures used in pick and place machines. We used a novel object detection method that reduced the time and resource complexity significantly for real-time operation.

TECHNICAL SKILLS

- **Languages:** Python, MATLAB, C, C++
- **Frameworks and Libraries:** ROS, ROS2, Gazebo, PyTorch, TensorFlow, Scikit-learn, OpenCV, Keras, FastAI, NLTK, Flask, Dask, Gradio, Open3D, Shapely, CloudCompare
- **Operating Systems:** Windows, Linux
- **Cloud Architecture:** AWS(EC2, S3, Lambda, Eventbridge, SageMaker), Docker
- **Hardware:** NVIDIA Jetson, Arduino
- **Other:** Git, LaTeX