

JUMMAN HOSSAIN

Arbutus, Baltimore, Maryland

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RESEARCH INTERESTS

Autonomous Driving/Systems, Reinforcement Learning, Deep/Meta Reinforcement Learning, Robotics.

EDUCATION

University of Maryland Baltimore County (UMBC)	Aug 2021- July 2026 (expected)
Doctor of Philosophy (PhD); Information Systems	
University of Maryland Baltimore County	Aug 2021-Dec 2023
Master of Science (MSc); Information Systems	
Shahjalal University of Science & Technology, Bangladesh	Dec 2009-Dec 2013
Bachelor of Engineering; Computer Science & Engineering	

WORK EXPERIENCE

PhD Research Internship , Stormfish Scientific Corporation, USA	May 2024-Aug 2024
<ul style="list-style-type: none">Conducted experimental research and development in XR environments using AuroraXR® and other platforms.Collaborated with software development teams to integrate new algorithms and improve existing systems.Collaborated with XR technology teams to integrate navigation systems into military-grade simulations, enhancing operational strategies and decision-making processes.Analyzed simulation data to refine algorithms and improve the accuracy and efficiency of autonomous navigation systems.Designed and developed RL models for autonomous navigation, specifically for off-road environments, using simulated data from Unity integrated with ROS.Participated in the continuous evaluation and iteration of models based on simulated performance, ensuring they meet the rigorous demands of military and defense applications.Contributed to academic and technical publications, sharing findings and advancements with the broader research communities.	
Senior Software Engineer , BJIT Limited, Bangladesh	Oct 2018-Aug 2021
<ul style="list-style-type: none">Collaborated with a team of 40 members to implement and improve the Translation SDK for PockeTalk, an AI powered instant multi-sensory two-way IoT translation device from SourceNext. Added Image Translation using Google Cloud Vision Algorithms.Designed and implemented large-scale tourist spot finding application JAJA TV targeting 2020 Olympics in Japan.Processed video and audio with FFmpeg. Designed algorithms and optimized performance for media streaming with DASH, SmoothStreaming and double-decode support.	
Software Engineer , IPvision Canada Inc, Bangladesh	Sept 2015-Sept 2018
<ul style="list-style-type: none">Conducted research, designed, and implemented a fault-tolerant, highly available and quickly accessible distributed cloud storage system with OpenStack SWIFT.Developed different customized middleware systems for cloud storage and maintained a high-performance system for a social network platform, which could support millions of users online simultaneously.	
Software Engineer , Eyeball Networks Inc, Bangladesh	July 2014-Aug 2015
<ul style="list-style-type: none">Designed and developed uGrow Smart Baby Monitor for Android, which connects with the Philips Avent Smart Baby Monitoring camera and automatically switches between networks and optimizes audio and video quality for a continuous connection to user's baby.Implemented voice calling with VoIP Messenger SDK where parents can talk with their baby.	

RESEARCH EXPERIENCE

Research Assistant , UMBC	Fall 2021 – Present
<ul style="list-style-type: none">Conducting research at the Mobile, Pervasive and Sensor Computing (MPSC) LabAdvisor: Dr. Nirmalya Roy	

TEACHING EXPERIENCE

Teaching Assistant , UMBC	Fall 2021 – Spring 2024
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- IS 420 Database Application Development
- IS 620 Advanced Database Projects
- Designing and conducting lab sessions for a class of 60 undergraduate/graduate students.

PUBLICATIONS

Learning Optimal Policies with Quasi-Potential Functions for Asymmetric Traversal

- (AAMAS 2025, Under Review) - **Jumman Hossain**, Nirmalya Roy.

QuasiNav: Asymmetric Cost-Aware Navigation Planning with Constrained Quasimetric Reinforcement Learning

- (ICRA 2025, Under Review) - **Jumman Hossain**, Abu Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, and Theron Trout .

SERN: Simulation-Enhanced Realistic Navigation for Multi-Agent Robotic Systems in Contested Environments

- (ICRA 2025, Under Review) - **Jumman Hossain**, Abu Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, and Theron Trout .

TopoNav: Topological Navigation for Efficient Exploration in Sparse Reward Environments

- IROS 2024 - **Jumman Hossain**, Abu Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, and Theron Trout .

EnCoMP: Enhanced Covert Maneuver Planning with Adaptive Target-Aware Visibility Estimation using Offline Reinforcement Learning

- ACSOS'24 - **Jumman Hossain**, Abu Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, and Theron Trout .

CoverNav: Cover Following Navigation Planning in Unstructured Outdoor Environment with Deep Reinforcement Learning

- IEEE ACSOS'23 - **Jumman Hossain**, Abu Zaher Faridee, Anjon Basak, Derrik Asher and Nirmalya Roy.

SynchroSim: An Integrated Co-simulation Middleware for Heterogeneous Multi-robot System

- IEEE DCOSS 2022- Emon Dey, **Jumman Hossain**, Nirmalya Roy.

Simulated Forest Environment and Robot Control Framework for Integration with Cover Detection Algorithms

- IEEE/ACM BDCAT'22 -Avi Spector, Wanying Zhu, **Jumman Hossain** and Nirmalya Roy.

Navigating the Unknown: Reinforcement Learning in Unpredictable Outdoor Environments

- (Under Review) - **Jumman Hossain**, and Nirmalya Roy.

Meta-RL with Off-Policy Learning and Transferrable Demonstrations (MROLTD)

- (In Progress) - **Jumman Hossain**, and Nirmalya Roy.

Quasimetric Reinforcement Learning: A Survey

- (In Progress) - **Jumman Hossain**, and Nirmalya Roy.

GapNav: Diverse Gap-Crossing Navigation Planning with Offline Reinforcement Learning

- (In Progress) - **Jumman Hossain**, and Nirmalya Roy.

HONORS & AWARDS

- UMBC GSA and IS department Travel Grant to participate ACSOS 2024 and IROS 2024 Conference
- IEEE Travel and Diversity Grant to participate ACSOS 2024 Conference
- IEEE Travel and Diversity Grant to participate ACSOS 2023 Conference.
- UMBC GSA and IS department Travel Grant to participate ACSOS 2023 Conference.
- UMBC GSA and IEEE Travel Grant to Participate BDCAT 2022 Conference.
- Udacity Introduction to Machine Learning with TensorFlow Scholarship. Dec 2021
- Udacity Machine Learning Scholarship. June 2021
- Champion at Code Warriors' Challenge Bangladesh. 2014

GUINNESS WORLD RECORD

Largest Code Debugging/Bug Fixing Competition (Participant)

Dec 2021

- Participated in Amazon Web Services', Inc. (USA) Guinness World Record-setting largest code debugging/bug fixing competition, resolving 62 bugs in Java and Python.

RESEARCH/COURSE PROJECTS

Virtual Physical Co-Simulations and Real-Time Collaborative Decision Making May 2023- Present

- Working collaboratively with US Army Research Lab and Stormfish Scientific Corporation (**ARL Funded ArtIAMAS MIPS Project**) to conduct control and feedback loop validation between virtual and physical agents/environments to ascertain the minimal robotic assets needed for terrain sensing and coverage, prior to deploying multi-asset army robotic systems in contested environments.

Follow the Soldiers, UMBC

Aug 2021 – Dec 2021

- Developed an AWS DeepRacer project to identify and follow soldiers using object-detection ML models; optimized using ROS 2 Foxy, TensorFlow, and Intel OpenVino.

Healthcare Analytics, UMBC

Aug 2021 – Dec 2021

- Led a team project in the Data Mining course, aiming to predict hospital patients' Length of Stay (LOS) using various Machine Learning models.

Extracting Weather Data, UMBC

Aug 2021 – Dec 2021

- Collaborated on a project to extract and compare weather data from multiple websites using rule-based information extraction and ML methods.

Classification of Common Agricultural Plants by Species, UMBC

Jan 2022 – June 2022

- Participated in developing a CNN model to accurately classify agricultural plant species in the Computer Vision course project.

Autonomous Driving with Deep Reinforcement Learning in CARLA Simulation, UMBC Aug 2022- Dec 2023

- Applied DRL techniques in the Gym-CARLA simulated environment for autonomous vehicle training and testing in an Advanced AI course project.

MENTORSHIP

- Advised three undergraduate students as part of the Research Experiences for Undergraduates (REU) programs that funded by the National Science Foundation (NSF).
- Wanying Zhu, Senior, University of Georgia – Summer 2022
- Avi Spector, Sophomore, University of Maryland College Park – Summer 2022
- Vicki Young, Senior, University of San Francisco – Summer 2023
- Snehalraj Chugh, Yash Kamble; MPS (Data Science), UMBC - February 2024 - Present

SERVICES

- Reviewer, **IEEE ICRA 2025**
- Reviewer, **IEEE BigData**; 2021
- Reviewer, **IEEE PerCom**; 2022, 2023
- Reviewer, **IEEE/ACM CHASE**; 2023
- Reviewer, **PMC Journal, Elsevier**; 2023
- Reviewer, **IEEE IE**; 2024
- Reviewer, **IEEE / CVF CVPR WAD Workshop**; 2024
- Local Organizer, **2023 NSF-TIH Principal Investigators' Meeting**, Baltimore, MD.

SKILLS

- *Languages*: Java, Python, Shell Scripting, C/C++ (Programming Contest level).
- *Libraries and Framework*: TensorFlow, Keras, PyTorch, Stable-Baselines3, RLlib, JAX, CUDA, Matplotlib, Gazebo, Weka, CARLA, Gym, Mujoco, Unity 3D , Pandas, NumPy, Scikit-learn , Android SDK, FFmpeg, Retrofit, RxJava.
- *Version Control Systems*: Git (Gitlab/GitHub), BitBucket.
- *Testing Tools*: Junit, Nose.
- *Automation Tools*: Jenkins, Ansible.
- *Development Tools*: Android Studio, PyCharm, IntelliJ IDEA.
- *Platforms*: Windows, Linux, Mac, Robot Operating System (ROS).
- *Databases*: SQL, SQLite, MySQL, NoSQL, PL/SQL Android ROOM.