Md Jahidul Islam

Assistant Professor
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Research Interests

- Robot perception: attention modeling; object detection and tracking; visual servoing
- Machine vision : image enhancement & super-resolution; low-power/single-board vision
- Underwater robotics: autonomous inspection & surveillance; long-term monitoring

Education

Ph.D. in Computer Science Fall 2015 - Spring 2021
University of Minnesota (UMN), Twin Cities
Dissertation: "Machine Vision for Improved Human-Robot Cooperation in Adverse Underwater Conditions"
Advisor: Prof. Junaed Sattar

M.Sc. in Computer Science & Engineering Spring 2012-15
Bangladesh University of Engineering and Technology (BUET)
Thesis: "Intelligent DSA by Exploiting a Synergy between Genetic Algorithm and Local Search"
Advisor: Prof. Md. Monirul Islam and Prof. A. B. M. Alim Al Islam

B.Sc. in Computer Science & Engineering Fall 2007-12
Bangladesh University of Engineering and Technology (BUET)
Thesis: "Self-adaptive and Genetically Programmed Differential Evolution"
Advisor: Prof. Md. Monirul Islam

Academic Enrollments

Assistant Professor (Tenure-Track) Spring 2022 - Present
Dept. of ECE, University of Florida
Leading the RoboPI (Robot Perception and Intelligence) group with the research focus of developing novel and improved robotics systems for challenging real-world applications.

Graduate Research Assistant Summer 2017, Fall 2018-20, Summer 2020 - Spring 2021
Interactive Robotics and Vision Lab (IRVLab)
Primary role involved working on sponsored research projects and assisting in the robotic field trials.

Graduate Teaching Assistant Fall 2016, Fall 2017, Spring 2018
Dept. of CSE, University of Minnesota (UMN), Twin Cities
Was involved in preparing/grading tests; also held office-hours and conducted occasional lectures.
Courses: Introduction to Intelligent Robotic Systems; Introduction to C/C++ Programming.

Assistant Professor / Lecturer Spring 2015 / Fall 2012-15
Dept. of CSE, United International University (UIU), Dhaka
Major courses instructed: Artificial Intelligence; Structured Programming Languages; Algorithms; Numerical Methods; Microprocessors and Microcontrollers; Data Communications; Electronic Devices and Circuits.

Adjunct Lecturer (Part-time) November 2013 - April 2014
Dept. of CSE, Bangladesh University of Engineering and Technology (BUET), Dhaka
Courses instructed: Machine Learning; Artificial Intelligence; Digital System Design; Software Engineering.

Industry Enrollments

Research Scientist II June 2021 - November 2021
Robert Bosch LLC, Sunnyvale, CA, USA
Worked with the CR/RHI3-NA team in two research projects focusing on several perception problems for mixed reality and cloud robotics applications.

Interim Engineering Intern Summer 2019
Qualcomm Technologies, Inc. Santa Clara, CA, USA
Worked with the Glance team on design/customization of vision-based models for ultra-low powered systems.

Research & Development (R&D) Intern Summer 2018
3M Corporate Research Systems Lab. Maplewood, MN, USA
Worked with the AI group on visual and corpus data analysis, and on building features of a virtual assistant app.

Honors and Awards

2021	Nominated for the 2021 best reviewer at the IEEE Journal of Oceanic Engineering (JOE).
2019-20	Doctoral Dissertation Fellowship (DDF), Dept. of CSE, University of Minnesota, USA.
2019	RAS travel grant for ICRA 2019 in Montreal, Canada.
2017	IEEE/RSJ travel grant for IROS 2017 in Vancouver, Canada.
2015-16	ADC graduate fellowship, Digital Technology Center (DTC), University of Minnesota, USA.
2012-13	Runner-up. International Robotics Challenge (IRC) grand finale, Techfest, IIT-Bombay, India.
2012	Champion. Bangladesh regional of IRC, IEEE student branch, BUET, Bangladesh.
2006	Odyssey honorary award. English club, Notre Dame College (NDC), Dhaka, Bangladesh.
2004	1st Gold medalist. Sher-e-Bangla government boys' high school, Dhaka, Bangladesh.

Selected Publications

Journal Articles

[J1] J. Mo, **M. J. Islam**, and J. Sattar. *Fast Direct Stereo Visual SLAM.*. IEEE Robotics and Automation Letters (RA-L), 7 (2), pp. 778-785, 2021, DOI: 10.1109/LRA.2021.3133860, 2021. [Impact Factor: 3.74]
`https://ieeexplore.ieee.org/document/9645348`
`https://github.com/IRVLab/direct_stereo_slam`

[J2] **M. J. Islam**, J. Mo, and J. Sattar. *Robot-to-Robot Relative Pose Estimation using Humans as Markers*. Autonomous Robots, 45 (4), pp. 579–593, 2021, DOI: 10.1007/s10514-021-09985-6. [Impact Factor: 3.602]
`https://link.springer.com/article/10.1007/s10514-021-09985-6`

[J3] **M. J. Islam**, Y. Xia, and J. Sattar. *Fast Underwater Image Enhancement for Improved Visual Perception*. IEEE Robotics and Automation Letters (RA-L), 5 (2), pp. 3227-3234, 2020. [Impact Factor: 3.61]
`https://ieeexplore.ieee.org/document/9001231`
`https://github.com/xahidbuffon/FUnIE-GAN`

[J4] **M. J. Islam**, J. Hong, and J. Sattar. *Person Following by Autonomous Robots: A Categorical Overview*. The International Journal of Robotics Research (IJRR*), 38 (14), 2019. [Impact Factor: 6.134]
`https://journals.sagepub.com/doi/10.1177/0278364919881683`

[J5] **M. J. Islam**, M. Fulton, and J. Sattar. *Towards a Generic Diver Following Algorithm: Balancing Robustness and Efficiency in Deep Visual Detection*. IEEE RA-L, 4 (1), pp. 113-120, 2018. [Also presented at the ICRA 2019]
`https://ieeexplore.ieee.org/document/8543168`

[J6] **M. J. Islam**, M. Ho, and J. Sattar. *Understanding Human Motion and Gestures for Underwater Human-Robot Collaboration*. Journal of Field Robotics (JFR), 2018, DOI: 10.1002/ROB.21837. [Impact Factor: 4.345]
`https://onlinelibrary.wiley.com/doi/full/10.1002/rob.21837`

Conference Papers

[C1] **M. J. Islam**, R. Wang, and J. Sattar. *SVAM: Saliency-guided Visual Attention Modeling by Autonomous Underwater Robots*. Accepted for publication at the Robotics: Science and Systems (RSS), July 2022.
https://arxiv.org/pdf/2011.06252.pdf
https://github.com/xahidbuffon/SVAM-Net

[C2] **M. J. Islam**, P. Luo, and J. Sattar. *Simultaneous Enhancement and Super-Resolution of Underwater Imagery for Improved Visual Perception*. Robotics: Science and Systems (RSS), July 2020, Virtual.
http://www.roboticsproceedings.org/rss16/p018.pdf
https://github.com/xahidbuffon/Deep_SESR

[C3] **M. J. Islam**, C. Edge , Y. Xiao, P. Luo, M. Mehtaz , C. Morse, S. S. Enan, and J. Sattar. *Semantic Segmentation of Underwater Imagery: Dataset and Benchmark*. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 2020, Virtual.
https://arxiv.org/pdf/2004.01241.pdf
https://github.com/xahidbuffon/SUIM

[C4] **M. J. Islam**, S. S. Enan, P. Luo, and J. Sattar. *Underwater Image Super-Resolution using Deep Residual Multipliers*. IEEE International Conference on Robotics and Automation (ICRA), May 2020, Virtual.
https://ieeexplore.ieee.org/document/9197213
https://github.com/xahidbuffon/SRDRM

[C5] **M. J. Islam**, M. Ho, and J. Sattar. *Dynamic Reconfiguration of Mission Parameters in Underwater Human-Robot Collaboration*. IEEE International Conference on Robotics and Automation (ICRA), pp. 1-8, May 2018, Brisbane, Australia.
https://ieeexplore.ieee.org/document/8461197

[C6] C. Fabbri, **M. J. Islam**, and J. Sattar. *Enhancing Underwater Imagery Using Generative Adversarial Networks*. IEEE International Conference on Robotics and Automation (ICRA), pp. 7159-7165, 2018, Brisbane, Australia.
https://ieeexplore.ieee.org/document/8460552

[C7] **M. J. Islam** and J. Sattar. *Mixed-domain Biological Motion Tracking for Underwater Human-Robot Interaction*. IEEE International Conference on Robotics and Automation (ICRA), pp. 4457-4464, May 2017, Singapore.
https://ieeexplore.ieee.org/document/7989516

[C8] J. Mo, **M. J. Islam** and J. Sattar. *IMU-Assisted Learning of Single-View Rolling Shutter Correction*. Conference on Robot Learning (CoRL), 2021.
https://openreview.net/forum?id=Pp0Co2vU28N

Selected Talks and Presentations

03/22: Invited talk at the Harbor Branch Oceanographic Institute (HBOI), Florida Atlantic University (FAU).
08/20: Conference presentation of paper [C2] at the IEEE/RSJ IROS 2020 (virtual).
07/20: Conference presentation of paper [C1] at the RSS 2020 (virtual).
06/20: Presentation on “Challenges of Salient Object Detection"at IRVLab, UMN (interactive).
05/20: Conference presentation of paper [C3] at the IEEE ICRA 2020 (virtual).
12/19: Presentation on “Learning Generative Model from Single Image"at IRVLab, UMN (interactive).
11/19: Presentation on “Simultaneous Enhancement and Super-Resolution"at VCAI, UMN (seminar).
05/19: Conference presentation of paper [J3] at the IEEE ICRA 2019, Montreal, Canada (interactive).
02/19: Presentation on “Challenges of Underwater Visual Perception"at UIU, Dhaka (invited talk).
06/18: Conference presentation of paper [C4] at the IEEE ICRA 2018, Brisbane, Australia (interactive).
03/18: Poster presentation on “Robo-Chat-Gest Language", MnDrive Symposium, UMN (interactive).
02/18: Presentation on “One-Shot Person Re-Identification"at IRVLab, UMN (interactive).
10/17: Presentation on “Gradient-based Optimization Functions"at SDCC, UMN (interactive).
06/17: Conference presentation of paper [C6] at the IEEE ICRA 2017, Singapore (talk).
03/17: Poster presentation on “The MDPM Tracker", MnDrive Symposium, UMN (interactive).

Participation in Marine Robotics Field Trials

2018 and 2019: Bellairs Research Institute in Barbados (see `https://www.mcgill.ca/bellairs/`)

Collaboration and Mentoring Experiences

Peer Collaboration

- The Multi-robot convoying project (2017): lead by Dr. Florian Shkurti at the Mobile Robotics Lab of McGill University; Florian Shkurti is now an Assistant Professor at UToronto.
  `http://www.cim.mcgill.ca/~mrl/robot_tracking/`
- The UGAN project (2018): lead by Cameron Fabbri at the IRVLab; he is now working at 3M.
  `https://github.com/cameronfabbri/Underwater-Color-Correction`
- The UnRolling project (2020): lead by Jiawei Mo at the IRVLab.
  `https://github.com/IRVLab/unrolling`

Mentoring Experience

- Peigen Luo: UG student, UMN (2019-20); he is now a software engineer at Google.
- Youya Xia: UG student, UMN (2018-19); she is now a PhD student at Cornell.
- Ruobing Wang: UG student, UMN (2020-22); he is now a graduate student at CMU.
- Yuyang Xiao: UG student, UMN (2019-20); he is now a graduate student at UIUC.
- Marc Ho: Masters student, UMN (2017-18); he is now working at Optum.
- Muntaqim Mehtaz and Christopher Morse: current UG students at the UMN.

Community Services

Conference and Journal Reviewer

- IEEE ICRA 2016-21, IEEE/RSJ IROS 2016-20
- IEEE ICME 2021, ICCV 2019, CRV 2018-20
- IEEE Signal Processing Letters (SP-L)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Industrial Electronics (T-IE)
- Elsevier Signal Processing: Image Communication (SPIC)
- IEEE Journal of Oceanic Engineering (JOE)

Member / Student Member

- IEEE and IEEE RAS
- TinyML summit 2019-20
- Graduate student panel, UMN
- Self-Driving Car Club (SDCC), UMN
- Robot vision reading group, IRVLab
- Field robotics reading group, IRVLab
- Vision reading group, Dr. Park's Lab

Software and Hardware Skills

Programming Languages

- Python, C++/C
- Java, MATLAB
- Unix Shell

Deep NN Libraries

- TensorFlow 1.14+
- Keras 2.2.0+
- PyTorch 1.5.1+

Embedded AI devices

- Nvidia Jetson Xavier, TX2
- Nvidia Jetson Nano
- Google Coral Edge TPU

Operating Systems

- Linux (Ubuntu)
- Windows

Vision Tool-kits

- OpenCV 3.0
- ROS Kinetic/Melodic

Robotic platforms

- AQUA 8, OpenROV
- TurtleBot 2

Volunteering and Extracurricular Activities

Volunteer / Activist

- Clean Energy and Climate (CEC)
- One-Taka-Meal Project
- Oceanic Preservation Society (OPS)

Practitioner / Enthusiast

- Keen explorer: century-old math problems and puzzles
- Semi-professional cricketer: major leagues in MN/CA/TX
- Self-taught photographer: like to travel & capture memories