Md Jahidul Islam

Ph. D. Candidate (ABD) in Computer Science
Interactive Robotics and Vision Lab (IRVLab)
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Interests and Domain Knowledge

I am an avid practitioner of artificial intelligence with a passion for robot perception, machine vision, and deep learning. I am particularly interested in the following domains:

- Robot perception: attention modeling; object detection and tracking; autonomous following
- Deep visual learning: image enhancement; super-resolution; segmentation and scene parsing
- Applied machine vision: design of computationally light on-chip or single-board vision models

Education

Ph.D. in Computer Science Fall 2015 - Today
University of Minnesota (UMN), Twin Cities
Ongoing Ph.D. research work focuses on the design and development of robust perception modules for visually-guided underwater robots. More at: `https://xahidbuffon.github.io/projects.html`.
Dissertation: "Machine Vision for Improved Human-Robot Cooperation in Adverse Underwater Conditions"
Advised by: Prof. Junaed Sattar
Major courses: Field Robotics; 3D Computer Vision; Advanced Machine Learning; Matrix Theory; Non-linear Optimization; Artificial Intelligence II; Sensing/Estimation in Robotics; Probability and Stochastic Processes.

M.Sc. in Computer Science & Engineering Fall 2012 - Spring 2015
Bangladesh University of Engineering and Technology (BUET)
Thesis: "Intelligent DSA by Exploiting a Synergy between Genetic Algorithm and Local Search"
Advised by: Prof. Md. Monirul Islam and Prof. A. B. M. Alim Al Islam
Major courses: Neural Networks; Meta-heuristic Algorithms; Wireless Networks; Computational Geometry.

B.Sc. in Computer Science & Engineering Fall 2007 - Spring 2012
Bangladesh University of Engineering and Technology (BUET)
Thesis: "Self-adaptive and Genetically Programmed Differential Evolution"
Advised by: Prof. Md. Monirul Islam
Major courses: Structured Programming Languages; Linear Algebra; Machine Learning; Artificial Intelligence; Microprocessors; Concrete and Discrete Mathematics; Operating Systems; Database Management Systems.

Academic Enrollments

Graduate Research Assistant Fall 2020/18, Summer 2020/17
Interactive Robotics and Vision Lab (IRVLab)
Primary role involves working on sponsored research projects and assisting in the robotic field trials.

Graduate Teaching Assistant Spring 2018, Fall 2017/16
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 and Lecturer May 2012 - August 2015
Dept. of CSE, United International University (UIU), Dhaka
Major courses: Artificial Intelligence; Structured Programming Languages; Algorithms; Numerical Methods; Microprocessors and Microcontrollers; Data Communications; Electronic Devices and Circuits.

Part-time Lecturer 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 Experiences

2019 Summer Internship, R&D
Qualcomm Technologies, Inc.
Santa Clara, CA, USA.
Worked with the Glance team on design/customization of various vision-based models for faster processing and better portability on ultra-low powered systems.

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

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

Selected Publications

[J4] **M. J. Islam**, R. Wang, K. Langis, and J. Sattar. *SVAM: Saliency-guided Visual Attention Modeling by Autonomous Underwater Robots*. In review at the IEEE Transctn. on Pattern Analysis and Machine Intelligence (T-PAMI), 2020.
`https://arxiv.org/pdf/2011.06252.pdf`
`https://github.com/xahidbuffon/SVAM-Net`

[C4] **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`

[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`

[C3] **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`

[C2] **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`

[J2] **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`

[J1] **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`

[C1] **M. J. Islam**, M. Ho, and J. Sattar. *Dynamic Reconfiguration of Mission Parameters in Underwater Human-Robot Collaboration*. IEEE ICRA, pp. 1-8, May 2018, Brisbane, Australia.
`https://ieeexplore.ieee.org/document/8461197`

Honors and Awards

2019-20	Doctoral Dissertation Fellowship (DDF), Dept. of CSE, University of Minnesota.
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.
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.

Collaboration and Mentoring Experience

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 graduate student at UIUC.
- Youya Xia: UG student, UMN (2018-19); she is now a PhD student at Cornell.
- 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, Christopher Morse, and Ruobing Wang: current UG students at the UMN.

Participation in Marine Robotics Field Trials

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

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

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

References are available on request. For more information, please visit: `http://www.jahidul.org/`.