

ARGHYA CHATTERJEE

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A robotics and machine learning researcher experienced in applying Deep Learning, Edge & Cloud Computing in Computer Vision for Object Detection, Segmentation & Localization, Advanced Perception based SLAM for Localization, Mapping, Metric & Semantic understanding of the environment, Control theory & Deep Reinforcement Learning for risk aware autonomous robotic exploration in perceptually degraded environments and Swarm Intelligence for multi-robot collaboration & rapid exploration in outer space to help take better decision for humans.

EDUCATION

- Bangladesh University of Engineering and Technology, Dhaka, Bangladesh**
Degree: BSc. in Mechanical Engineering Feb 2015 - Sept 2019
CGPA: 3.14/4.00
- Khulna Public College, Khulna, Bangladesh**
Degree: HSC in Science Jul 2012 - Aug 2014
GPA: 5.00/5.00
Class Position: 1st/60
- Khulna Bidyut Kendra Secondary School, Khulna, Bangladesh**
Degree: SSC in Science Jan 2010 - May 2012
GPA: 5.00/5.00
Class Position: 1st/60

RESEARCH & PROJECT EXPERIENCE

- Team Member, Team CoSTAR of NASA JPL**
DARPA organized SubT Challenge Jul 2020 – Present
Perception Team Leader: Dr. Benjamin Morrell (NASA JPL) California, USA
Topic: Advanced perception based multi-robot SLAM algorithms efficiency, accuracy & robustness testing along with object detection & localization capability analysis for robots like Spot, Husky & Roller-copter with NeBula autonomy setup (built by Team CoSTAR) mounted.
- Team Supervisor & Educator, STEMX 365**
JAXA (& NASA) org. Kibo-Astrobee ISS Robot Programming Challenge Jan 2020 – Present
International Project Coordinator: Mizanul H. Chowdhury (MIT) Tokyo, Japan
Topic: Autonomously operate Astrobee (A free flying robot) inside ISS avoiding obstacles with 3D perception, following way points and detecting QR & AR Tag.
- Research Assistant at Mars Rover Lab, BUET**
Project Researcher, Advisor & Instructor for URC, ERC & KRPC Oct 2019 – Sept 2020
Supervisor: Dr. Md. Ashiqur Rahman (BUET) Dhaka, Bangladesh
Topic: Autonomous Navigation Based on GPS, SLAM & Object Detection and Plan Path accordingly for Safe Exploration of Rovers on Rough Terrains, Caves and Mineral Ores of Earth and Mars.
- Software Team Leader & Member, Team Interplanetary**
ESA organized ERC & Mars Society organized URC Jun 2017 – Sep 2019
Supervisor: Dr. Md. Ashiqur Rahman (BUET) Dhaka, Bangladesh
Topic: GPS Based Autonomous Mars Rover Navigation & On-board Object Detection for URC and Way-point Based Autonomous Mars Rover Navigation & On-board AR Tag Detection for ERC.
- Researcher & Collaborator at Department of ME, BUET**
Undergraduate Thesis Mar 2018 – Apr 2019
Supervisors: Dr. Maglub Al Nur (BUET) and Dr. Muhammad Abir (MIT) Dhaka, Bangladesh
Topic: Computational Investigation on Pool Boiling IR Images for Segmentation of Dry Spots Automatically and Evaluating Performance of Traditional Image Processing and Deep Neural Networks in Quantifying Dry Area Segments.
- Team Leader, Team Octatron**
Undergraduate Project Mar 2017 - Feb 2018
Supervisors: Dr. M.A. Rashid Sarkar and Musanna Galib (BUET) Dhaka, Bangladesh
Topic: Fire and Flood Fighter Octocopter (UAV) for Extinguishing Fire in Fire Affected Buildings and Areas, and Distributing Flood Reliefs to people in Flood Affected Zones.

- Researcher & Technical Leader, Team Out of the Box**
 Microsoft BD Internship Project Jan 2017 - May 2017
 Supervisors: Sonia B. Kabir and Ashikur Rahman (Microsoft) Dhaka, Bangladesh
 Topic: Earlier Screening of Particular Disability in Children Through Mobile Application Using Microsoft Products like Azure Cloud Platform and Bing Maps Server.
- Team Leader, Team Igniters**
 Undergraduate Project Jul 2016 - Feb 2017
 Supervisors: Dr. M.A. Rashid Sarkar and Dr. A. B. M. Alim Al Islam (BUET) Dhaka, Bangladesh
 Topic: Hand Wearable Solar Powered Obstacle Detection and Safe Navigation Device for Blind People in Low Cost.

TEACHING EXPERIENCE

- BUET Mars Rover Robotics Team** Oct 2020 - Present
Teaching Assistant at Mars Rover Lab, BUET Dhaka, Bangladesh
- JAXA org. Kibo Astrobee ISS Robot Prog. Challenge** Jan 2020 - Present
Educator & Instructor of Teams from Bangladesh, STEMX 365 Dhaka, Bangladesh
- National Space Carnival & Camp** Sep 2019 - Jun 2020
Instructor & Academic Coordinator for Workshops & Camps Dhaka, Bangladesh
- Bangladesh Astronomical Society** Mar 2017 - Apr 2019
Instructor for Workshops & Seminars Dhaka, Bangladesh

PROFESSIONAL EXPERIENCE

- Bangladesh Astronomy Research Collaboration (BARC)** Jan 2020 - Present
 Advisor & Fellow Member Dhaka, Bangladesh
 Activities: Give advice on research activities & how the organization should operate.
- Youthpreneur Network (A Social Welfare Organization)** Jun 2019 - Jun 2020
 Head of STEM Education & Development Dhaka, Bangladesh
 Activities: Instructed, Organized and Lead Projects, Workshops, Olympiads and Camps in Educational Institutions to Promote STEM Education in Bangladesh.
- American Astronomical Society** Apr 2018 - Mar 2020
 Country Collaborator & Member Dhaka, Bangladesh
 Activities: Celebrated International Astronomical Events in Bangladesh and Reported to Proper AAS Authority for Publishing on their Magazines.

PUBLICATIONS

- Matteo Palieri, Benjamin Morrell, Abhishek Thakur, Kamak Ebadi, Jeremy Nash, **Arghya Chatterjee**, Christoforos Kanellakis, Luca Carlone, Cataldo Guaragnella, Ali-akbar Agha-mohammadi, "[LOCUS: A Multi-Sensor Lidar-Centric Solution for High-Precision Odometry and 3D Mapping in Real-Time](#)," IEEE Robotics & Automation Letters Journal, 2020, vol: 6/2, pp. 421-428.
- Arghya Chatterjee**, M. Galib and M. A. R. Sarkar, "[Application of Arduino in designing modern electromechanical laboratory](#)," 2017 IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI), Chennai, 2017, pp. 222-225.
- Arghya Chatterjee**, S. Dutta, P. Sarkar and A. B. M. A. A. Islam, "[Obstacle Detector for Blind People with Low Cost](#) (Poster Presentation)," Proceedings of 2017 International Conference on Networking, Systems and Security (NSysS), Dhaka, 2017.

INTERSHIPS & TRAININGS

- Microsoft Bangladesh Limited** Jan 2017 - May 2017
Internship Project: Disabling Disability through Microsoft Products Dhaka, Bangladesh
- Khulna Power Company Limited** Oct 2018 - Oct 2018
Training: Power Plant Visit & Industrial Attachment (3 weeks) Khulna, Bangladesh

SKILL SETS

- **Prg. Language:** Python, C++, C#, C, R, Arduino, Java, Java S, HTML, PHP, CSS, & LATEX.
- **Framework & OS:** ROS, OpenCV, PCL, Nvidia Isaac SDK, Keras, TensorFlow, PyTorch, Caffe, CUDA, OpenGL, Kubernetes, .NET, Django, Linux, Mac, Windows & Android.
- **Software & Tool:** Git, Github, Gitlab, Docker, MIPAR, Solidworks, Ansys, PLC, Blender, Unity & UE 4, Verge3D, Carla Simulator, Microsoft Airsim, Deeplab, OpenPose3D, Meshroom, Meshlab, CloudCompare, Open3D, OpenDroneMap, OpenSpace, Photoshop, Kdenlive & MS Office Family.
- **IDE, Compiler & Text Editor:** CodeBlocks, Microsoft Visual Studio, MATLAB, Atom, Jupiter Notebook, PyCharm, Android Studio, Nodejs, IntelliJ IDEA, VS Code & Notepad++.
- **Cloud Platform:** AWS Compute, AWS RoboMaker & Storage, GCP, Google Colab.
- **Hardware:** GPS (RTK), IMU, VLP-16 (3D) & RPLidar (2D) LIDAR, Intel Realsense D200 & 400 series RGBD & L515 Lidar Camera, ZED 3D Camera, Microsoft Kinect Camera, Nvidia Jetson & Intel NUC Boards, Arduino & Raspberry PI Boards, Pixhawk, Ardupilot, VESC, BLDC motor, Nvidia AMD GTX Boards & Oculus Rift S VR Headset.
- **Robotic Platforms:** Husky (custom developed autonomy setup mounted) from Clearpath Robotics, Spot (custom developed autonomy setup mounted) from Boston Dynamics, ANYmal from ANYbotics, Astrobee from NASA, Mongol-E v4 (custom developed robot with arm) from Team Interplanetary, Octacopter (custom developed UAV) from Team Octatron.
- **Technology:** Computer Vision, Image Proc., ML, DL, DRL, Object Detection & Localization, Image Segmentation, Action Recognition, Pose Tracking, SLAM, Path Planning, Control, Photogrammetry, 3D Printing, AR, VR & MR, Game Dev, Web Dev, Video Editing, GPU, Edge & Cloud Computing.
- **Language Proficiency:** Bangla, English & Hindi.
- **Others:** Astronomy, Creative Arts, Singing, Harmonium & Guitar Playing, Organizing, Show Hosting, Volunteering, Swimming, Cycling, Playing Cricket, Football & Badminton.

AWARDS, HONORS & SCHOLARSHIPS

- **Gold Medalist from Duke of Edinburgh International Foundation** Dec 2019
Awarded for Outstanding Extra-curricular & Service to the Society London, UK
- **2 nd in Asia & 16 th Internationally in European Mars Rover Challenge** Sep 2019
European Space Foundation (ESF) & European Space Agency (ESA) Kielce, Poland
- **Finalist in IEEE SS12 International Project Competition & Maker Fair** Jul 2017
SS12: Age of Innovation and Maker Fair 2017 Hyderabad, India
- **1 st in National Project Show Competition (Senior Category)** May 2017
EEE Day, BUET Dhaka, BD
- **3 rd in Inter University Project Show Competition** Apr 2017
Mechanical Festival, BUET Dhaka, BD
- **1 st in National Poster Presentation Competition** Mar 2017
Robolution, MIST Dhaka, BD
- **2 nd in Inter University Project Show Competition** Nov 2016
CSE Day, BUET Dhaka, BD
- **1 st in All Classes (2002 - 2014)**
 - Primary at Elizabeth M Primary School (2002-2006)
 - Secondary at Khulna BKS School (2009-2012)
 - Junior at Khulna BKS School (2006-2009)
 - H. S. at Khulna Public College (2013-2014)
- **Govt. Merit Scholarship from Education Board of Bangladesh (2006 - 2019)**
 - Primary Scholarship (2006-2009)
 - Secondary Scholarship (2013-2014)
 - Junior Scholarship (2010-2012)
 - H. Secondary Scholarship (2015-2019)
- **Olympiad Achievements:**
 - 1 st in Reg. R. of Science Olympiad'14
 - 3 rd in Reg. & 10 th in Nat. R. of Astro-Olympiad'13
 - 1 st in Reg. R. of Zoology Olympiad'14
 - 3 rd in Reg. R. of Math Olympiad'14

CERTIFICATIONS (COURSERA)

- **Machine Learning** by Stanford University, Feb 2018.
- **Deep Learning Specialization** (5 course) by DeepLearning.ai, Sept 2018.
- **Modern Robotics: Mechanics, Planning & Control** Specialization by Northwestern Uni, May 2021.

- **Control of Mobile Robots** by Georgia Institute of Technology, May 2020.
- **Image & Video Processing** by Duke University, Nov 2018.
- **Intro to Satellite Communications** by Institut Mines – Télécom, May 2019.
- **Wireless Communications for Everybody** by Yonsei University, Dec 2018.
- **AstroTech** by University of Edinburgh, Dec 2019.

LEADERSHIPS

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| • Head of STEM Education & Development | <i>Youthpreneur Network</i> |
| • Software Team Lead | <i>Team Interplanetary, BUET</i> |
| • Technical Lead of Internship Project | <i>Microsoft BD</i> |
| • President (Senior Rover Mate) | <i>BUET Rover Scout Group</i> |
| • President | <i>Satyen Bose Science Club, BUET</i> |
| • Team Lead for Development & Planning | <i>ESAB, BUET Unit</i> |

VOLUNTEERING

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| • Sceptre (Poverty Alleviation Organization) | Jan 2015 - Present |
| Activities: Org. free medical camps & distribute dress & sewing machines to poor people monthly. | |
| • BUET Rover Scout Group | Feb 2015 - Apr 2019 |
| Activities: Volunteered on tree plantation camp & org. flood relief distribution camp monthly. | |
| • Khulna Bidyut Kendra Secondary School Scout Group | Jan 2006 - Mar 2012 |
| Activities: Volunteered on medical camps, tree plantation events & sports day at KBKSS. | |

WORKSHOPS & SEMINARS

- **International Youth Leadership Summit-2016** org. by BYLC.
- 4 th BIRDS International Workshop on **Demystifying Satellites** org. by BRAC University.
- Seminar on **Zero Robotics** by M.H. Chowdhury of MIT org. by Dept. of Mech. Eng., BUET.
- Seminar on **Space Stories and ISS Experiences** by Astronaut Dr. Tess Caswell of NASA org. by Dept. of Civil Eng., BUET.
- Seminar on **4-fold Resolution Increase in Endoscopic Imaging** by J.M. Kahn of Stanford University org. by Dept. of Biomedical Eng., BUET.
- Workshop on **ML, PCB, Graphic Designing, & Technical Paper Writing** org. by IEEE BDS.
- Workshop on **CFD, Ansys Fluent, Solidworks & 3D Printing** org. by Involute Tech BD.

MEMBERSHIPS

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| • Institute of Electrical and Electronics Eng. (IEEE) | • American Astronomical Society (AAS) |
| • American Institute of Aero and Astronautics (AIAA) | • IEEE Robotics and Automation Society |
| • Bangladesh Astronomy Research Collaboration | • Bangladeshi Researchers Network |

REFERENCES

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| <ul style="list-style-type: none"> • Dr. Benjamin Morrell
Perception Team Leader, Team CoSTAR
Ex. Post Doc Researcher, JPL, Caltech .
Robotics Technologist, NASA JPL .
Email: benjamin.morrell@jpl.nasa.gov • Dr. Md. Ashiqur Rahman
Project Supervisor
Professor, Dept. of Mech. Eng., BUET.
Email: ashiqurrahman@me.buet.ac.bd | <ul style="list-style-type: none"> • Dr. Muhammad Abir
Thesis Co-Supervisor
Ex. Post Doc. Researcher, Dept. of NSE, MIT.
Imaging Specialist, Phoenix Nuclear Labs.
Email: miabir@mit.edu • Mizanul H. Chowdhury
Project Supervisor
Admin of ZR, Space Systems Lab, MIT.
Email: mizanul@mit.edu |
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