

ARGHYA CHATTERJEE

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🌐 <https://arghyachatterjee.github.io>

A machine learning researcher experienced in applying Deep Learning, Edge & Cloud Computing for Computer Vision (CV) related applications, Advanced Perception (CV & LIDAR) based SLAM for semantic awareness of the environment, Multi-agent collaboration for autonomous robotic exploration in perceptually degraded environments and Swarm Intelligence for rapid & effective exploration of outer space to help make 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 special 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.
- **Graduate Research Assistant at Mars Rover Lab, BUET**
Software Team Advisor (& Ex. Lead) of Interplanetary for URC & ERC Sep 2019 – Present
Supervisor: Dr. Md. Ashiqur Rahman (BUET) Dhaka, Bangladesh
Topic: Autonomous Navigation Based on GPS, SLAM, AR Tag and Object Detection for Safe Exploration of Rovers on Rough Terrains, Caves and Mineral Ores of Earth and Mars.
- **Researcher & Collaborator, 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.
- **Researcher & Team Leader, BUET**
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 - Mar 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.

- **Researcher & Team Leader, BUET**

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

- **STEMX 365 for JAXA Kibo Astrobee ISS RPC** Jan 2020 - Present
Educator & Instructor of Teams from Bangladesh Dhaka, Bangladesh
- **BUET Mars Rover Robotics Team** Sep 2019 - Present
Instructor at Model & Project Lab (Mars Rover Lab), BUET 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.

INTERNSHIPS & TRAININGS

- **Microsoft Bangladesh Limited** Jan 2017 - Mar 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, Docker, MIPAR, Solidworks, Ansys, PLC, Blender, Unity & UE 4, Verge3D, Carla Simulator, Microsoft Airsim, OpenPose3D, Meshroom, Meshlab, CloudCompare, 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 D435i RGBD & L515 Lidar Camera, ZED 3D Camera, Nvidia Jetson & Intel NUC Boards, Arduino & Raspberry PI Boards, PX4, Ardupilot, VESC, BLDC motor, Nvidia AMD GTX Boards & Oculus Rift S VR Headset.
- **Technology:** Computer Vision, Image Proc., ML, DL, DRL, Object Detection & Recognition, Image Segmentation, Pose Tracking, SLAM, Photogrammetry, 3D Printing, AR, VR & MR, Game Dev, Web Dev, Video Editing, GPU, Edge & Cloud Computing.
- **Language:** 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
- **2nd in Asia & 16th Internationally in European Mars Rover Challenge** Sep 2019
European Space Foundation (ESF) & European Space Agency (ESA) Kielce, PL
- **Finalist in IEEE SS12 International Project Competition & Maker Fair** Jul 2017
SS12: Age of Innovation and Maker Fair 2017 Hyderabad, IN
- **1st in National Project Show Competition (Senior Category)** May 2017
EEE Day, BUET Dhaka, BD
- **3rd in Inter University Project Show Competition** Apr 2017
Mechanical Festival, BUET Dhaka, BD
- **1st in National Poster Presentation Competition** Mar 2017
Robolution, MIST Dhaka, BD
- **2nd in Inter University Project Show Competition** Nov 2016
CSE Day, BUET Dhaka, BD
- **1st in All Classes in Primary, Junior, Secondary & H. Secondary** 2002-2014
Elizabeth Primary Sc., Khulna BKS Sc., Khulna Pub. Cl. Khulna, BD
- **Govt. Board Scholarship in Primary, Junior, Secondary & H. Secondary** 2006-2014
Education Board of Bangladesh Govt., Jessore Khulna, BD
- **Olympiad Achievements:**
 - 1st in Reg. R. of Science Olympiad'14
 - 3rd in Reg. & 10th in Nat. R. of Astro-Olympiad'13
 - 1st in Reg. R. of Zoology Olympiad'14
 - 3rd in Reg. R. of Math Olympiad'14

CERTIFICATIONS

- **Machine Learning** by Stanford University on Coursera, Feb 2018.
- **Deep Learning Specialization** (5 course) by DeepLearning.ai on Coursera, Sept 2018.
- **Control of Mobile Robots** by Georgia Institute of Technology on Coursera, May 2020.
- **Image & Video Processing** by Duke University on Coursera, Nov 2018.
- **Intro to Satellite Communications** by Institut Mines – Télécom on Coursera, May 2019.

- **Wireless Communications for Everybody** by Yonsei University on Coursera, Dec 2018.
- **AstroTech** by University of Edinburgh on Coursera, Dec 2019.
- A Course on **Nuclear Power Eng.** by Institute of Nuclear Power Engineering, BUET, Apr 2018.

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

- **Sceptre (Poverty Alleviation Organization)**
Activities: Org. free medical camps & distribute dress & sewing machines to poor people.
- **BUET Rover Scout Group**
Activities: Volunteered on alumni day at BUET & org. flood relief distribution camp.
- **Khulna Bidyut Kendra Secondary School Scout Group**
Activities: Volunteered on medical camps, tree plantation events & sports day at KBKSS.

SEMINARS & WORKSHOPS

- **International Youth Leadership Summit-2016** org. by BYLC.
- 4th 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 Nuclear Society (ANS) | ● IEEE Robotics and Automation Society |
| ● Bangladesh Astronomy Research Collaboration | ● BYLC Graduate Network (BGN) |

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 | <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 |
| <ul style="list-style-type: none"> ● Dr. Md. Ashiqur Rahman
Project Supervisor
Professor, Dept. of Mech. Eng., BUET.
Email: ashiquurrahman@me.buet.ac.bd | <ul style="list-style-type: none"> ● Mizanul H. Chowdhury
Project Supervisor
Arch. & Admin of ZR, Space Systems Lab, MIT.
Email: mizanul@mit.edu |