Nasim Mahmud Mishu

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RESEARCH INTEREST

My research interests focus on the intersection of **robotics and artificial intelligence**, with a particular interest on **swarm intelligence, AI-driven robotic systems, and computer vision**. I am also interested in CAD-based robotic design, motion planning for autonomous navigation, and the integration of perception and control mechanisms to enhance intelligent decision-making in robotic agents.

EDUCATION

- **North South University**   Dhaka, Bangladesh
  Bachelor of Science in Computer Science and Engineering   May 2017 – December 2021
  CGPA: 3.39/4.00 (87–89%)
  Thesis Title: Autonomous Obstacle Avoiding Exploring Robot (AOAVER)

EXPERIENCE

- **Research Assistant**   Dhaka, Bangladesh
  NSU Intelligent Robotics (NIRO) Laboratory   October 2024 – Present
  Dept. of Electrical and Computer Engineering, North South University
  Supervisor: Dr. Shahnewaz Siddique
  Research Area: Swarm robotics with a focus on centralized and decentralized control systems
  Primary Assignments:

  - Investigated swarm robotics architectures under centralized and decentralized control strategies.
  - Integrated machine learning techniques to enhance swarm behavior, coordination, and adaptability.
  - Designed experiments for evaluating swarm performance in dynamic environments.

- **Teaching Assistant**   Dhaka, Bangladesh
  Dept. of Electrical and Computer Engineering, North South University   January 2025 – Present
  Courses: Fall'25, Spring'25 (EE494/ CSE495A: Introduction to Robotics)
                 Summer'25 (EE494/ CSE495A, CSE543: Introduction to Robotics)
  Primary Assignments:

  - Supported course delivery on robotics fundamentals (kinematics, motion planning, perception, control).
  - Assisted students through tutorials, homework evaluation, and project guidance.
  - Helped with exam invigilation and grading to maintain academic integrity.

- **Part-time Research Assistant**   Dhaka, Bangladesh
  Dept. of Electrical and Computer Engineering, North South University   December 2023 – June 2024
  Supervisor: Dr. Shahnewaz Siddique
  Research Area: Resource-efficient visual Deep Reinforcement Learning (DRL) for autonomous agents and robots.
  Primary Assignments:

  - Developed custom datasets for feature extraction in vision-based tasks.
  - Applied ML models for segmentation-based vision in autonomous agents.
  - Benchmarked approaches to improve resource efficiency in DRL models.

- **Founding Member**   Dhaka, Bangladesh
  NSU Ignite North South University   September 2018 – February 2022
  Primary Assignments:

  - Designed and constructed remote-controlled and autonomous robots for competitions.
  - Conducted hands-on workshops to train and inspire new robotics enthusiasts.

PROJECTS

- **NIRO Educational Bot**   October 2024 – Present
  - Developed an educational robot at NSU Intelligent Robotics (NIRO) Lab to support hands-on learning and research.
  - Integrated core components (gyroscope, IR sensors, motors, WiFi) with Raspberry Pi and Arduino.
  - Designed a customizable 3D-printed chassis and PCB, enabling hardware extensions.
  - **Tech used:** Raspberry Pi, Arduino, 3D Printing, PCB Design

- **Project Hex**   February 2025 – Present
  - Designed a hexapod robot with six legs (3 DOF each) for robust mobility on uneven terrain.
  - Integrated 18 high-torque bus servo motors, powered by LiPo battery for extended operation.
  - Implemented Arduino-based real-time control with modular support for Raspberry Pi and sensors.
  - **Tech used:** Arduino, High-torque Servo Motors, LiPo Battery, Modular Robotics Design

- **Autonomous Obstacle Avoiding Exploring Robot (AOAVER)**   Summer 2021 — Spring 2022
  - Designed and developed an autonomous robot for search and rescue in disaster-prone areas.
  - Implemented obstacle avoidance and exploration algorithms for hazardous environments.
  - Integrated sensors and controllers for real-time perception and decision-making.
  - **Tech used:** Python, YDLidar X4, Raspberry Pi 3 B+, Arduino UNO, Linux OS, ROS

- **Assist Seniors and Disabled with Hand Gesture Recognition**   Spring 2020
  - Built a low-cost hand gesture recognition system to assist elderly and disabled individuals.
  - Enabled emergency calling through gesture-based interaction using a mobile app.
  - Applied computer vision for reliable gesture detection and recognition.
  - **Tech used:** Python, OpenCV, Raspberry Pi 3 B+, Pi-camera, Firebase, Android Studio

PUBLICATIONS

Special Proceedings

- Haque, Ridwanul, Md. Saif Ahammod Khan, **Nasim Mahmud Mishu**, Rahat Jahangir Rony, and Nova Ahmed. "Understanding the Healthcare Sector in Bangladesh: Experiences and Services during the COVID-19 Pandemic." ***6th Asian CHI Symposium 2022***, Apr. 2022, New Orleans, LA. North South University, Bangladesh. [ISBN]

Journals & Research Papers

- Neloy, Asif Ahmed, Rafia Alif Bindu, Sazid Alam, Ridwanul Haque, Md. Saif Ahammod Khan, **Nasim Mahmud Mishu**, and Shahnewaz Siddique. "Alpha-N-V2: Shortest Path Finder Automated Delivery Robot with Obstacle Detection and Avoiding System." ***Vietnam Journal of Computer Science***, vol. 7, no. 4, 2020, pp. 373–389. World Scientific. [DOI]

- Neloy, Asif Ahmed, Rafia Alif Bindu, Sazid Alam, Ridwanul Haque, Md. Saif Ahammod Khan, **Nasim Mahmud Mishu**, and Shahnewaz Siddique. "Alpha-N: Shortest Path Finder Automated Delivery Robot." *Asian Conference on Intelligent Information and Database Systems* **(ACIIDS 2020)**, edited by Ngoc Thanh Nguyen et al., vol. 12034, Springer, 2020, pp. 217–228. Lecture Notes in Computer Science. [DOI].

REFERENCES

- **Dr. Shahnewaz Siddique**

  PhD, Georgia Institute of Technology, Atlanta, Georgia, USA

  Associate Professor

  Dept. of Electrical and Computer Engineering, North South University

  Google Scholar | Email: shahnewaz.siddique@northsouth.edu