Shailesh

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EDUCATION

- **Indian Institute of Technology, (IIT ISM) Dhanbad** — Dhanbad, India
  Bachelors of Technology in Electrical Engineering — *Class of 2025*
- **Al Momin International School** — Gaya, India
  High School(12th); Percentage: 92.4% — *Class of 2021*

RESEARCH EXPERIENCE

- **Undergraduate Research Internship** — Remote
  Under Prof. G.C. Nandi & Andrew Melnik — *Aug 2024 - Present*
  - **Project:**:(VLM & LLM) to solve robotic manipulation problems.
    - Working on precise manipulation in indoor environment relying on robot vision.

- **ERC Lab, National Taiwan Normal University** [video] — Taipei, Taiwan
  Research Intern: Under Prof. Saeed Saeedvand & Prof. Jacky Baltes — *May 2024 - Jul 2024*
  - **Project**: Collaborative control of upper & lower body of wheeled humanoid robot using multi-agent RL.
  - **Description**:
    - Trained robust policy to maneuver and jump in Isaac Gym environment.
    - Trained collaborative policies for upper and lower body, using MAPPO, IPPO & Dual-A2C.
    - Policy could handle manipulation task by upper body while the lower body handle balancing & maneuver.

- **Stochastic Robotics Lab, Indian Institute of Science (IISc, Bangalore)** — Bangalore, India
  Research Intern: Under Prof. Shishir Kolathaya NY — *December 2023*
  - **Project**: Locomotion controller that can execute diverse gaits with variable footswing, posture, and speed.
  - **Description**:
    - Trained a single policy that can execute four different gaits.
    - Robot trained on teacher-student curriculum learning.
    - Developed a ROS package for the same robot.
    - Transferred the RL policy into ROS(Gazebo) environment.

- **TEXMiN (Technology Innovation Hub)** [video] — Dhanbad, India
  Research Assistant: Under Prof. Arun Dayal Udai — *Feb 2023 - Apr 2024*
  - **Project**: Development of in-house Quadrupedal Robot for Mining Application.
  - **Work on Quadrupedal Robot**:
    - Developed ROS based framework for a in-house developed Quadrupedal Robot.
    - Derived kinematics & dynamics for the robot.
    - V1: Locomotion controller using ZMP stabilization.
    - V2: Reinforcement Learning based control policy.
    - Hardware testing of locomotion controller.

SELECTED PROJECTS

- **Inter IIT Tech Meet 11.0** [video]
  Drona Aviation Problem Statement — *Dec 2022 - Feb 2023*
  - **Project**: Hovering a pluto drone on a particular height using ArUco Tag. Using ArUco tag, get a pose estimation of the drone. Move the drone in rectangular motion (1 x 2 meter). Make the second drone follow the first drone.
  - Worked on accurate pose estimation of drones with ArUco Tag using a single monocular camera.

- **Omni-Wheel Self Balancing Bike** [link]
  Eyantra Project — *Nov 2023 - Jan 2024*
  - Solved the mathematical model implemented LQR control.
  - Simulated the robot in Coppeliasim
  - Developed the hardware and implemented the LQR control on the robot .

- **Two-Wheeled Self Balancing Robot** [video]
  Mentored by Prof. Arun Dayal Udai — *Mar 2023 - Dec 2023*
  - Developed a custom cascaded PID based controller that incorporate acceleration value as well.
  - Simulated our robot in Gazebo(cascaded PID controller) and in Simulink(with LQR controller)
  - Designed and build a two wheeled robot in hardware from scratch.

SKILLS

- **Programming**: C++, Python, MATLAB, Linux, Git
- **Simulation/Visualization**: Isaac Gym, Gazebo, RViz, CoppeliaSim, Simulink
- **Frameworks/Libraries**: ROS/ROS2, RViz, PyTorch, OepnCV, SymPy, Matplotlib
- **Hardware**: Yashkawa Arm, Diablo Robot, Nvidia Orin, Depth Camera, 3D LIDAR, Dynamixel Actuators, RaspberryPi, Ordroid XU4

RELEVANT COURSEWORK

- **Robotics**: Reinforcement Learning, Self Driving Cars, Controls Bootcamp, Industrical Robotics & Automation
- **Mechatronics**: Embedded Systems, Engineering Mechanics, Analog and Digital Electronics
- **Software**: Machine Learning, Deep Learning, Data Structure & Algorithm

HONORS AND AWARDS

- 1st Position: ($12,000) Robofest Gujarat 3.0 2023 (India's Biggest Robotics Competetion)

- 1st Position: Vichesta(ROS simulation competition), Takshak 2022 (East India's Largest Robotics Fest)

- 3rd Position: Robowars(BattleBots) at Concetto 2022 (Annual Tech Fest of IIT Dhanbad)