Shivank Goyal

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EDUCATION

- **Indian Institute of Technology (IIT) Patna** — Patna, India
  *(BTech in Chemical Engineering. **CPI: 7.8**)* — *July 2023 - May 2027*
- **Modern Vidya Niketan - 88** — Faridabad, India
  *(All India Senior School Certificate Examination (CBSE). **Percentage: 94.0**%)* — *Apr 2021 - Mar 2023*

ACCOMPLISHMENTS

- Ranked **3rd** in **Engineers Conclave** at Inter IIT Tech Meet 12.0 held at IIT Madras, among other IITs.
- Ranked **7th** overall and **3rd** in positive points in an **Aerial Robotics** problem statement presented by **ideaForge** at Inter IIT Tech Meet 13.0 held at IIT Bombay, competing against other top IIT's.
- Secured an All India Rank of **12815** out of **1.2** million candidates in Joint Entrance Examination 2023.

PROJECTS

- **ideaForge (Aerial Robotics)** — **Source Code**
  Inter IIT Tech Meet 13.0 (IIT Bombay) — *Oct '24 - Dec '24*
  - Deployed custom PX4 firmware on **Pixhawk**, reducing latency by ~18% and improving control stability.
  - Led integration and **50+ hrs** of ROS/Gazebo simulation to validate drone reliability under fault conditions.
  - Piloted autonomous missions via **QGroundControl**, achieving **>95%** success in obstacle-rich environments.
  - Developed a motor failure recovery algorithm with **0.036s** detection using **Geometric** and **Sliding Mode Control**, improving fault tolerance by **35%**.

- **ISRO Robotics Challenge 2025 (Aerial Space Robotics)** — **Source Code**
  ISRO (Bangalore) — *Dec '24 - Apr '25*
  - Co-led a team of **10** to design a drone with **ANAV** for GPS-denied Martian-like environments.
  - Qualified top **5%** from **177 teams** nationwide; advancing to the next competition stage.
  - Executed **100+ hrs** of ROS/Gazebo simulation; modified **Pixhawk** and connected **Companion Computer** to boost real-time compute by **40%**.
  - Implemented **RTAB-Map SLAM** achieving <**0.1 m** accuracy; developed terrain-based landing zone detection logic.

- **DD Robocon 2025 (Ground Robotics)**
  ABU Robocon 2025 (IIT Delhi) — *Oct '24 - Jul '25*
  - Designed control logic for a basketball robot, focusing on compliance and trajectory systems.
  - Engineered a depth camera-based perception module for distance estimation with ±**5 cm** accuracy.
  - Tested Gazebo + hardware integration using **ROS-based control**; achieved **>90%** shot consistency.
  - Reached national finals at IIT Delhi, among only **2 IIT teams** from **200+** entries.

- **Autonomous Mapping and Navigation (Ground Robotics)** **Source Code**
  Personal Project *Aug '25 - Sep '25*
  - Built an autonomous ground robot leveraging **RTAB-Map SLAM** and **Nav2** for real-time 3D mapping and waypoint navigation.
  - Executed custom motion logic on **Jetson Nano,** enabling structured exploration with a depth camera (270° coverage) and LiDAR (360° coverage) for map generation.
  - Performed **autonomous waypoint navigation** with **<10 cm localization error**.
  - Optimized path planning and coverage strategy, improving navigation efficiency by **30%.**

PROFESSIONAL EXPERIENCE

- **Robotics Engineer (TECHEAGLE)**
  May '25 - Aug '25
  - Researched autonomous navigation in GPS-denied flight for drones/VTOLs.
  - Implemented **Visual Inertial Odometry** using **OpenVINS**.
  - Simulated **100+ scenarios** with **LiDAR, stereo, and depth** sensors to benchmark localization.
  - Achieved **<0.1 m** mapping accuracy using **RTAB-Map** + **ORB-SLAM**.
  - Reduced flight trajectory deviation by **35%** via obstacle avoidance logic.
  - Connected perception + planning using **OFFBOARD mode**; improved maneuvering.
  - Built **ROS-Gazebo bridge** with **Micro XRCE-DDS**; boosted data rate by **20%**.

- **UAV Developer (Indian Robotics Solution)**
  Dec '24 - Apr '25
  - Led software development to meet aviation safety standards, improving system reliability.
  - Implemented **UART/I2C/CAN** protocols, reducing communication failures by **30%**.
  - Embedded tamper-proofing in **PX4** for GPS/RC modules; enhanced security.
  - Used **u-center** to boost GPS accuracy and lock time by **20%**.
  - Upgraded **QGroundControl** (Qt) for better UX and diagnostics.

- **Product Developer (Cloudologix)**
  Jun '24 - Sep '24
  - Integrated **Azure cloud services** including Virtual Machines, Kubernetes Clusters, SQL Databases, and App Services into a new project using **REST APIs**.
  - Streamlined resource provisioning and automated backend workflows via **Azure API Management**, with thorough interface testing in **Postman**.

TECHNICAL SKILLS

- **Programming Languages:** C++, Python, Bash
- **Software & Simulation:** ROS, Gazebo, QGroundControl, MAVLink, Qt Creator. MATLAB
- **Autonomy & Control:** PX4 Autopilot, RTAB-Map, Visual-Inertial Odometry, SLAM
- **DevOps & Tools:** Microsoft Azure, Docker, Git, Postman
- **Communication & Tools:** UART, I2C, CAN Bus, Micro XRCE-DDS, u-center

SOCIETIES/EXTRA-CURRICULAR ACTIVITIES

- **Main Team Member** of Team Phoenix (ABU Robocon) of IIT Patna.
- **Sub - Coordinator** of Rocketry and Aviation Club of IIT Patna.
- **Overall Coordinator** of InterIIT Tech Meet 14.0.