

# Ankit Mehra

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## EDUCATION

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- **Indian Institute of Technology Mandi** Mandi, India  
*Master of Technology (Research) - Robotics and AI; GPA: 9.00* Aug 2022 - present  
*Courses: Robot Kinematics, Dynamics & Control, Deep Learning and Applications, Vision and Learning based control, Pattern Recognition, Matrix Theory, Programming Practicum, Advance Design Practicum*
- **G.B Pant Institute of Engineering and Technology** Pauri, India  
*Bachelor of Technology - Mechanical Engineering; GPA: 7.84* July 2017 - June 2021  
*Courses: Strength of Material, Kinematics of Machines, Dynamics of Machines, Thermodynamics, Machine Design, Robotics*

## SKILLS SUMMARY

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- **Robotics Skills:** ROS, OpenCV, Gazebo, Linux, IBVS, Simulink, OOPs, Edge Computing
- **Languages:** Python, C++, C
- **Deep Learning:** Tensorflow, Keras, Pytorch
- **Embedded System Programming:** Arduino Uno/Nano, STM32
- **CAD/CAE:** Solidworks, Ansys
- **Documentation:** Latex, Powerpoint, Excel
- **Other Tools:** Git, Github
- **Soft Skills:** Leadership, Event Management, Writing, Public Speaking, Time Management

## EXPERIENCE

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- **IIT Mandi** Onsite  
*Teaching Assistant (Full-time)* Feb 2023 - Present
  - **Vision and Learning based Control(AR518):** Image based and Position based visual surveying, Reinforcement learning based Control.
  - **Mechatronics(AR503):** Microcontroller & Microprocessors, Signal conditioning, Actuators, Drives and mechanisms, Modelling and system response
  - **Mechanics of Rigid Body(IC240):** System of forces, Equilibrium, Centroids and CG, Moment of Inertia, Friction, Virtual work and Potential Energy
- **Team Savitar Racing** Onsite  
*Design Head* 2019-2020
  - **Design and Fabrication of an All Terrain Vehicle for mBAJA 2020:** Employed CAD and CAE tools to model and analyze the structure of the ATV. Used weight reduction strategies through iterative design simulations, ensuring optimal material use while maintaining structural integrity
  - **Leadership:** Led a dynamic design team, fostering collaboration and coordinating efforts to meet project milestones.
  - **Impact:** Our team ATV competed in mBAJA 2020 in Pitampura, India and performed well.
- **Opto Electronics Factory** Onsite  
*Summer Intern* July 19- Aug 19
  - **Hands-on experience in manufacturing processes and quality control of components.:** Underwent extensive training encompassing a spectrum of manufacturing processes and industrial disciplines, gained practical insights and knowledge through direct engagement with seasoned plant professionals

## PROJECTS

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- **Autonomous firefighting Multi-agent System (Control System, Computer Vision, Multi-agent collaboration):** (Ongoing Thesis project) A firefighting system consisting of a tether based UAV and a ground vehicle, autonomously detects fire and extinguishes it in high rise buildings. The UAV and AGV works collaboratively to ensure smooth operation. Tech: ROS, Deep Learning, OpenCV, PID, Python, TensorFlow, Jetson Nano (Aug 22- Present)
- **Terrain adaptive search operation using UAV and Quadruped(Visual Servoing, Legged Robot):** This research project focuses on developing a coordinated search operation utilizing a UAV and a quadruped. The UAV is tasked with creating a global map of the environment, identifying different types of terrain. This terrain information is then communicated to the quadruped robot, which adapts its locomotion mode accordingly to navigate the environment efficiently. The project aims to integrate visual servoing techniques with legged robotic systems, enabling the quadruped to traverse diverse terrains autonomously and effectively during search and rescue missions. Tech: Deep Learning, OpenCV, ROS, Jetson Orin, Python. ( July 24-Ongoing)
- **Heterogeneous Multiagent collaborative UAV-AGV operation(Visual Servoing, Reinforcement Learning):** UAV-AGV system involves two robotics agents, UAV is agile and AGV has good payload capacity, hence the system is well balanced for many applications. Vision based tracking of UAV by AGV is performed. Comparative study of PID, sliding mode and reinforcement learning based controllers is done. Tech: Deep Learning, OpenCV, ROS, Jetson Orin, Reinforcement learning. ( June 24-Sept24)

- **Inter-campus autonomous drone delivery (Drone building, Waypoint Navigation):** Built a drone to deliver 3 kg essentials between 2 campuses of IIT Mandi autonomously and live video streamed footage from the drone to our laptop, challenging mountainous terrain of Mandi made the experiment difficult. Tech: drone building, Python, ROS. ( April 24)
- **Design and development of an Autonomous Ground Vehicle (Sensor Fusion, Embedded system programming):** Designed an AGV and built it from scratch for autonomus operations. Designed control algorithm for the AGV and mounted multiple sensors onboard. Tech: STM32, manufacturing processes, Solidworks, Python, ROS (March 24)
- **Navigation and precise autonomous landing of a UAV (Computer Vision):** Waypoint based navigation and then vision based precise landing of the UAV on the desired location. Validation and testing of algorithm were done on a pixhawk based UAV. Tech: Python, ROS, Jetson Nano, OpenCV, Pixhawk. (Nov 23)
- **Design and development of Quadruped Robot (Robot Kinematics, Embedded system programming):** Designing of a kinematics based 4 legged robot with servo motors. Designed control algorithm, solved forward and inverse kinematics of each leg, designed GAIT pattern. Achieved walk and trot motion. Tech: Solidworks, 3D printing, Arduino (July 23)

## PUBLICATIONS

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- **International Conference on Computer and Automation Engineering (ICCAE 2024):** Ankit Mehra, Amit Shukla, Darshankumar Prajapati, Pushkar Kumar, Ashish Rana and Tushar Patil “ Vision-based Control of UAV for Autonomous Firefighting” , International Conference on Computer and Automation Engineering (ICCAE 2024), Melbourne, Australia.
- **International Conference on Robotics and Automation Sciences (ICRAS 2024):** Naisarg Pandya, Amit Shukla, Pushkar Kumar, and Ankit Mehra “ Autonomous Sensor-based Control of Aerial Manipulator for Horizontal Pipe Structure Tracking with Continuous Contact” , International Conference on Robotics and Automation Sciences (ICRAS 2024), Tokyo, Japan.
- **American Control Conference (ACC 2025):** Ankit Mehra, Amit Shukla, Darshankumar Prajapati, Pushkar Kumar, and Ashish Rana “ Pixels to Pursuit: A Comparative Study of PID, SMC, DQN, and DDPG based control for Vision-Based UAV-AGV Collaboration” , American Control Conference (ACC 2025), Denver, USA (Status- Communicated).

## CONFERENCES, WORKSHOPS AND CONCLAVES

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- Advanced Legged Robots: Dynamics and Control workshop, Lucknow, May 2024
- International Conference on Computer and Automation Engineering, Melbourne, Mar 2024
- ROSCon India, Bengaluru, Dec 2023
- Automation and Robotics Expo, New Delhi, July 2023
- G20-S20, IIT Mandi, June 2023
- Drone Conclave, Palampur, June 2023
- IndoML-2022, Gandhinager, Dec 2022
- Do Drones, Bengaluru, Nov 2022

## VOLUNTEER EXPERIENCE

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- **Mentor at Drone & Robotics Bootcamp Group, IIT Mandi** Mandi, India  
*Conducted offline technical sessions and hands on sessions impacting 100s of students. June 2023 - Present*
- **Taught and guided Highschool students during Covid period** Dehradun, India  
*Taught classes, conducted tests and prepared assignments for students during Covid period. May 2021 - Nov 2021*