



# Balveer Singh

IndiaAI Fellow | *PhD Scholar @ IIT Ropar* | *UGC – NET Qualified*

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## SUMMARY

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PhD student at IIT Ropar working in robotics and computer vision, with a focus on perception and real-world systems. Currently exploring vision-language-action (VLA) approaches and building a deeper understanding through research and experimentation. Keen on continuous learning, experimentation, and applying technology to solve meaningful problems.

## WORK EXPERIENCE

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### Freelance 3D Animation Developer

Oct 2024 – Feb 2025

Created educational 3D animation videos in Blender on electronics topics such as breadboards, push buttons, and resistors. Managed modeling, lighting, and compositing workflows for school-level educational animations.

### Software Development Intern – IIT Bombay

Aug 2021 – Jul 2022

Worked under Prof. Ganesh Ramakrishnan on full-stack web development for PMUI, Udaan Translation Tool, and OCR Interface. Contributed to frontend and backend using Django, integrated GitHub API, and deployed production-ready tools. Supported project management, troubleshooting, and intern mentoring under OpenOCRCorrect and UDAAN initiatives.

### Student Coordinator – IoT Lab, Department of CSE

Jan 2021 – Apr 2021

During my final year of engineering, I got an opportunity to manage & set up the IoT Lab in the Department of Computer Science & Engineering. I used to teach the basics of the Internet of Things to my Juniors. After opening the lab 25 students enrolled in IoT Course. And at the end of March, we made 7 projects which made a huge contribution during the NAAC inspections.

### Co-founder - MechFinix Lab

Feb 2020 – Apr 2021

We created an innovation lab to inspire students to develop technical and non-technical skills through projects in robotics and the IoT. The lab, managed by students and operating 24/7 on campus, also allows students to teach their juniors and gain practical experience.

## EDUCATION

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2025 – Present	<b>Ph.D. in Computer Science and Engineering</b> , IIT Ropar, Punjab, India.
2022 - 2024	<b>M.E. in Artificial Intelligence and Machine Learning</b> , Chandigarh University, Punjab, India (CGPA: 8.4/10).
2017 – 2021	<b>B.Tech in Computer Science and Engineering</b> , Baba Banda Singh Bahadur Engineering College, Punjab, India (CGPA: 7.5/10).

## PROJECTS

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**YDM-SLAM: YOLOv8-powered Dynamic Mapping (2024)** – Integrated YOLOv8 with ORB-SLAM3 to detect dynamic objects and improve localization robustness.

**Leap OCR & Udaan Translation Tool (2022)** – Contributed to IIT Bombay's OpenOCRCorrect / UDAAN initiative by enhancing OCR pipelines for Indian languages.

**Aqua-Serving Robot (2020)** – Built a semi-autonomous robot that serves drinks and avoids obstacles using ultrasonic sensors.

**Facial Recognition Door System (2019)** – Smart door powered by Raspberry Pi, utilizes a camera for facial recognition to grant access to authorized individuals.

**Crop Monitoring System (2021)** – Soil moisture maintenance system with NodeMCU and soil moisture sensor, featuring water tank with pump for automatic irrigation.

## PUBLICATIONS

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Singh, B., et al. (2024). YDM-SLAM: YOLOv8-powered Dynamic Mapping of Environment using ORB-SLAM3. *ICDSNS-2024*.

Singh, B., et al. (2023). Advancements and Challenges in Visual-Only Simultaneous Localization and Mapping (V-SLAM): A Systematic Review *ICSCSS-2024*.

Singh, R., et al. (2020). Development of a Cost Effective Beverage and Food-Serving Robot for Hygienically Outcomes and Human Comfort. *IJCMAS-2020*

## SKILLS

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<b>Programming</b>	Python, C++, JavaScript/TypeScript, SQL, Bash
<b>Research Areas</b>	Computer Vision, DL, Robot Learning, Vision-Language-Action (VLA) Models
<b>Frameworks</b>	PyTorch, OpenCV, ROS/ROS2, Django, FastAPI, Next.js
<b>Tools</b>	Linux, Git, Docker, Gazebo, Blender, PostgreSQL, Nginx
<b>Soft Skills</b>	Research Writing, Technical Communication, Team Leadership, Mentoring

## CERTIFICATES AND ACHIEVEMENTS

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- Qualified **UGC-NET (Computer Science)** with 88.5 percentile.
- Completed **ISRO IIRS** course on Space Science And Technology Awareness Training.
- **GeeksforGeeks Certificates** Vulnerability Disclosure Recognition