

Hardaat Singh Baath

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EDUCATION

B.E. in Computer Science

Birla Institute of Technology and Science, Pilani ✉

Nov 2021 – present

Sancoale, Goa, India

RESEARCH EXPERIENCE

CSIR - CEERI, Pilani ✉

Research Intern

Jun 2023 – Aug 2023

Pilani, Rajasthan, India

- Advisor: Dr. Dhiraj Sangwan ✉
- Developed a novel pipeline utilizing Deep Learning techniques for the generation, segmentation, and restoration of Rajasthani Wall Murals.

PUBLICATIONS

Damage Segmentation and Restoration of Ancient Wall Paintings for Preserving Cultural Heritage ✉

Nov 2023

International Conference on Computer Vision and Image Processing, 2023

Hardaat Singh Baath, Soham Shinde, Jinam Keniya, Priyanshu Ranjan Mishra, Anil Saini, Dhiraj Sangwan

PROJECTS

Project Kratos, A Mars Rover ✉

May 2023 – present

Club Project

- Worked on a **P-controlled visual servo** algorithm to follow Arrow and ArUco tags detected using **YOLOv3, YOLOv5, OpenCV and Python**.
- Implemented **RTK-GNSS**-based GPS coordinates system and **PID-based** algorithm to navigate to the specified points. Achieved accuracy of 10 cm.
- Implemented **Elevation Terrain Mapping** algorithm using Point Cloud information received from Zed2i stereo camera.
- Implementing **global and local path planning** algorithms for autonomous navigation in unknown environment Jetson Xavier AGX.

Deep Learning Techniques for Damage Restoration

Jun 2023 – Aug 2023

Supervised Project

- Advisor: Dr Dhiraj Sangwan ✉
- Developed a DL-based pipeline for damage generation, segmentation and restoration of Rajasthani Wall Murals.
- Used models like **StyleGAN2-ada-PyTorch** for damage generation, **UNet++** and **DeepLabV3+** for damage segmentation and **AOT-GAN** and **Partial Convolutional Network** for image inpainting.

Using Haar Wavelets for Mapping

Sep 2023 – present

Supervised Project (ongoing)

- Advisor: Dr Amit Setia ✉
- Designing and implementing a HAAR wavelets-based computationally efficient mapping algorithm for drones using point cloud.
- Implementing an obstacle avoidance algorithm using the above mapping algorithm.

LSTM for Stock Market Prediction

Feb 2024 – present

Supervised Project (ongoing)

- Advisor: Dr. J K Sahoo ✉
- Exploring and implementing an LSTM-based algorithm for Stock Market Prediction using various features like Signal line, MacD line etc.
- Exploring ensembling techniques for volumetric analysis and profit maximization.

SKILLS

Programming Languages

C, C++, Python, Java, MATLAB

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Libraries

Numpy, Matplotlib, Pandas, Seaborn,

OpenCV, Scikit-learn

Framework

ROS, PyTorch, Tensorflow, Keras

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Tools

Gazebo, CoppeliaSim, Git and

GitHub

Soft Skills

Public Speaking, Canva, Creative

Writing

Languages

English, Hindi, Punjabi

RELEVANT COURSES

Computer Programming | Data Structures and Algorithms | Database Management Systems | Operating Systems | Computer Networks | Computer Architecture | Probability and Statistics | Linear Algebra | Differential Equations | Multivariate Calculus | Machine Learning | Brain Inspired Deep Learning

Online Courses

- AMRx: Autonomous Mobile Robotics, ETH Zurich [↗](#)
- CS231n Stanford Computer Vision [↗](#)
- IBM AI Engineering Specialization (*ongoing*)

AWARDS

Excellence Award (Overall) [↗](#)

Jan 2023

Internation Rover Competition, Bangalore

- Won **Best Overall Rover** award.
- Stood 2nd in the Autonomous Challenge and 4th overall.

MENTORSHIP

Subsystem Lead [↗](#)

May 2023 – present

Autonomous Subsystem, Project Kratos

Sancoale, Goa, India

- Leading a team of 10+ members in the Autonomous System.
- Doing Research and Development of the current system and involved in collaboration with other subsystems.

Project Mentor [↗](#)

Jun 2023 – Sep 2023

Quark Summer Technical Projects, BITS Goa

Sancoale, Goa, India

- Mentored a summer course on ROS, Robot Automation and Computer Vision for university freshers.
- Conducted instructional sessions hands-on tutorials and evaluated weekly assignments

PMP Mentor [↗](#)

Oct 2022 – Jul 2023

Peer Mentorship Program, BITS Goa

Sancoale, Goa, India

- Mentored university freshmen throughout the first year via counselling and assistance for academic and non-academic fields