Sudhir Pratap Yadav

Engineer Focused on Intelligent Robots

CONTACT

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SOFTWARE

Programming: Python, C++, MATLAB, JAVA

Frameworks: Pytorch, ROS, Isaac Sim, Pybullet, OpenCV

HADRWARE

Robot Arms: UR5, Kinova, TAL Brabo, Open Manipulator

Mobile Robots: Husky, P3DX, Turtle Bot

Other Robots: 26-DOF Humanoid, Quadraped, Quadcopter

Embedded: Jetson Nano, Arduino, RaspberryPi, Intel real sense camera, Kinect camera, Motion Capture System, IMU, GPS, Lidar, Dynamixel Motors

ACHIEVEMENTS

Academic Distinction

Awarded for the best Academic Performance in the academic year 2016-17 among all students of III year B.Tech (Electrical Engineering) Program.

Coursera Mentor

Selected as a mentor for the course Robot: Estimation and Learning

EDUCATION

Ph.D. - Robotics and Mobility System — **July 2023 - Ongoing**

IIT Jodhpur, Rajasthan (India)

CGPA: 10.0/10.0

B.Tech. in Electrical Engineering — **2014 - 2018**

IIT Jodhpur, Rajasthan (India)

CGPA: 8.64/10.0

WORK EXPERIENCE

Black Coffee Robotics — **Sep 2024 - March 2025**

Robotics Intern

Working on fine-tuning large AI models for robotic tasks. Designed and implemented custom MoveIt! Pro behaviours and AR projection system for clients. Developed farm robot simulation in Isaac Sim.

IIT Jodhpur — **Jan 2023 - July 2023**

Junior Research Fellow

Developed unity simulation to collect visual and LIDAR data for desert environment. Developed custom 3D-LIDAR sensor in unity.

TIH iHub Drishti — **Sep 2021 - Jan 2023**

Research Engineer | Jodhpur, India

Developed technology for vision-based navigation in GPS-denied environments, demonstrated on Quadcopter. Developed algorithms and frameworks for learning multiple vision-based manipulation tasks on robotic arms using Reinforcement Learning.

TCS Innovation Lab — **May 2017 - July 2017**

Robotics Software Engineering Intern | TCS Noida

Developed ROS interface for TAL BRABO Industrial robot. Created a pipeline for making the arm follow a green-colored ball to demonstrate proper working of the interface.

Robotics Research Center — **May 2016 - June 2016**

Robotics R&D Intern | IIIT Hyderabad

Developed kinematic model of 26-DOF Humanoid and implemented static balance using force sensors and ZMP. Implemented passive perturbation rejection using compliance of motors.

PUBLICATIONS

Learning vision-based robotic manipulation tasks sequentially in offline reinforcement learning settings — **2024**
Robotica: 1-16

Yadav SP, Nagar R, Shah SV.

PROJECTS

3D Human Skeleton Tracking using RGBD — **August 2024**
Side Project

Developed a real-time human skeleton tracking system using a 2D deep learning-based detector and depth data to triangulate 3D coordinates using an Intel RealSense D455 camera. Developed visualization software for real-time rendering.

Multi-agent ecosystem Simulation in Unity — **April 2024**
Side Project

Implemented a virtual simulation of a natural ecosystem highlighting the interactions between various animals and their environment. Created a realistic and dynamic simulation that demonstrates the behaviours of different organisms in response to environmental changes and interactions with each other. Also, demonstrate planning and other capabilities to navigate the environment.

Visual Servoing on Turtlebot — **Dec 2023**
Side Project

Developed visual servoing algorithm for turtlebot (mobile robot). A camera is attached to the robot, and a visual target is defined. The robot will try to track and follow the target.

3D Scene Reconstruction of a Desert Environment — **Nov 2023**
Side Project

Compared various NERF approaches to reconstruct 3D desert environment. Simulated as well as real dataset was used to compare various techniques.

VR Tours — **Dec 2022**
Side Project

Created a virtual reality tour of the Robotics Lab (`https://sudhirpratapyadav.github.io/roboticslab/`) and a restaurant (`https://panditjikadhaba.github.io/`).

Pick-Place Robot — **Aug 2022**
Side Project

Developed a vision-based robot system to pick and place objects. Intel RGBD camera was used to detect the object location and then motion is planned accordingly for the robot to perform the pick-place operation.

Neural Radiance Field - NERF — **July 2022**
Side Project

Created NERFs for various locations using images. NERFs are 3D models created using Neural Networks. Images are collected and then a neural network is trained to create 3D models.

National Park Quiz - WebUI — **July 2021**
Side Project

Developed a WebUI for learning about the national parks of India.

Vision based control of UR5 robotic arm using Deep RL — **May 2017 – May 2018**
Robotics Lab IIT Jodhpur

Developed and Trained RL agent for moving UR5 robotic arm. Aim was to train arm for Visual servoing a specific object of certain colour. ROS was used to control UR5 robot while RL agent was trained using TORCH(LUA) on simulator GAZEEBO.

Quadruped Navigation using RL — **Dec 2016 – May 2017**
Robotics Lab IIT Jodhpur

Main focus of this project was to make quadruped learn to walk on terrain without any previous knowledge. The Kinematic model of quadruped and RL agent were developed in C++.

Playing 2048 game using RL — **July 2016 – Dec 2016**
Robotics Lab IIT Jodhpur

Developed copy of 2048 game in C++. Used Reinforcement Learning to learn and play the game

Simulation of Autonomous Mini-Helicopter — **July 2016 – Dec 2016**
Robotics Lab IIT Jodhpur

Design and development of Autonomous Helicopter to carry 2.6 kg Nuclear Radiation Sensor in Emergency Scenario in desert area. This problem was given by Defence Lab Jodhpur. We developed a very accurate simulation of helicopter in matlab. PID control was applied on this simulation for simple control.

Navigation of Quad-copter — **June 2016 – July 2016**
Robotics Lab IIT Jodhpur

Implemented PID control for trajectory tracking using VICON motion capture system and ROS.

Control of P3DX and Mapping — **June 2016 – Dec 2016**
Robotics Lab IIT Jodhpur

Controlled P3DX using ROS with PID controller. Used Kinect for depth sensing and implemented Occupancy Grid mapping in MATLAB.

Gait Planning Of Quadruped — **Jan 2016 – May 2016**
Robotics Lab IIT Jodhpur

Developed a kinematic simulation of quadruped in MATLAB with crawl gait. Crawl gait was also implemented on real quadruped robot.

Unblock-Me Solver — **2015**
Robotics Lab IIT Jodhpur

Image Processing based game solver. Developed a GUI in JAVA, to automatically solve a game named UNBLOCK ME. User has to show the mobile to laptop camera, software will detect game state and solve it.

All of my projects are **open-source** and can be found on my github (`https://github.com/sudhirpratapyadav`)

COMMUNITY BUILDING

- **ROS Workshops:** I have conducted several workshops on ROS (Robot Operating System)
- **Teaching:** I am a teaching assistant in the Experimental Robotics Course, where we teach students how to apply various robotics concepts on real hardware.
- **Mentoring**: I have been mentoring several students in various robotics-related projects.
- **Head (2015), Mentor (2016) Robotics Club**: Mentored students and took few lecture series so to strengthen robotics culture in IITJ