

BHAVESH BAKSHI

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EXPERIENCE

Mechatronics Engineer

Oct 2022 - Present

SS Innovations (Surgical Robotics), Gurgaon

- Architected **29-DOF bipedal humanoid** integrating whole-body control, SLAM, voice AI, and RL locomotion
- Built sim-to-real pipeline with **4,096 parallel Isaac Lab environments**; achieved **<5% real-world gap**
- Developed XR teleoperation (Quest 3) with **<50ms latency** for dexterous manipulation via IK
- Implemented voice pipeline: Whisper + Ollama LLM + RAG + TTS; **200ms** response, **50ms** e-stop
- Engineered **500Hz** control loop: 14-DOF arms, 12-DOF legs, 3-DOF waist via Unitree SDK2
- Led surgical robotics integration: motion control, encoders, safety systems

Lead Technical Consultant

Apr - Sep 2022

Learning Links Foundation (EdTech NGO)

- Trained **1,000+ students** in robotics, IoT, embedded systems across Kendriya Vidyalayas
- Mentored **30+ projects** from ideation to working prototypes

Engineering Intern

Jun - Aug 2019

Heavy Engineering Corporation Ltd, Ranchi

- Assisted heavy machinery manufacturing; cross-functional engineering reviews

TECHNICAL SKILLS

Robotics: ROS2, Unitree SDK2, MuJoCo, Isaac Lab, SLAM, IK/FK

Languages: Python, C++, MATLAB, Bash

ML/RL: PyTorch, Stable-Baselines3, PPO, ONNX, TensorBoard

Vision: OpenCV, RealSense, ArUco, MediaPipe

CAD/FEA: SolidWorks, Fusion 360, Ansys, Creo

Embedded: Arduino, RPi, ESP32, EtherCAT, CAN

Infrastructure: Docker, Git, Linux, CycloneDDS, REST

Fabrication: 3D Print, TIG Weld, PCB, Machining

SELECTED PROJECTS

Naamika: Voice-Controlled Humanoid

29-DOF bipedal with WBC, SLAM, LLM voice control, 22-action safety gate. Production-deployed.
ROS2, CycloneDDS, Whisper, Ollama, FAISS

ASAP Bipedal Motion Learning

Sim-to-real via PPO in 4,096 parallel envs. Walking, kicking, gesture policies on hardware.
Isaac Lab, PyTorch, ONNX, Domain Randomization

Universal RL Training Center

PyQt6 GUI: URDF loading, reward design, curriculum training, domain rand. 12 modules.
PyQt6, MuJoCo, Stable-Baselines3, ONNX

XR Teleoperation System

Quest 3 to robot IK. Sub-50ms, 6-DOF mapping, dexterous hands.
OpenXR, CycloneDDS, RealSense

Fixed-Wing & Multi-Rotor UAVs

BAJA SAE ATV Chassis (3x)

5 aircraft iterations + FPV quad. Aerodynamic design,
PID tuning, flight tested.
Betaflight, Arduino, PID Control

4130 chromoly frame. 38kg, 2.1+ FOS, 25% cost
reduction via DFM.
SolidWorks, Ansys, TIG Welding

EDUCATION

B.E. Mechanical Engineering

2017 - 2021

Birla Institute of Technology, Mesra
CGPA: 7.3/10

Higher Secondary (PCM + CS)

2015 - 2017

Army Public School Damana, Jammu
School Topper: C++, Physics, Chemistry (95/100) |
90%

AWARDS

GOLD World Skills India 2017 - Mobile Robotics

GOLD BIT Patna Robotics 2018

2ND IIT Patna Robotics 2017

Boeing RC Aircraft - IIT KGP 2018

GOLD IIT Patna Robotics 2018 - Aqua Soccer

GOLD IIT Delhi Robotryst 2014 - Junior

SAE BAJA India 2019 & 2020

Technoxian-18 Drone Championship

LANGUAGES

English - Professional

Hindi - Native

French - Basic