

# KUSH KUMAR KUSHWAHA

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## EDUCATION

### Johns Hopkins University

Masters of Science and Engineering in Robotics *GPA: 3.67*

Baltimore, USA

Expected May 2027

### Vellore Institute of Technology

BTech Computer Science with AI and Robotics *GPA: 9.56*

Chennai, India

Sept 2021 - July 2025

## RESEARCH EXPERIENCE

### Intuitive Computing Laboratory, JHU

*Graduate Research Assistant*

Baltimore

Oct. 2025 - Present

#### Coffee Robot System for Small Talk

- Developing motion and control workflows for coffee preparation tasks.
- Implementing task sequencing logic for autonomous multi-step manipulation.
- Designing ROS nodes for integration to multimodal small talk systems.

#### HRI study using Fourier GR3 Humanoid

- Assisting with the setup and configuration of a humanoid robot for ongoing Human-Robot Interaction (HRI) research.
- Working with teleoperation tools to run and monitor controlled interaction sessions.
- Exploring the proprietary software stack to understand how perception, planning, and control components are organized.
- Modifying and testing existing modules to support behaviors required for upcoming HRI experiments.
- Debugging communication and integration issues across different parts of the system.
- Supporting preparation of the robot for future human-subject studies.

## INTERNSHIP EXPERIENCE

### Reliance Industries Limited

*AI and ML Engineering Intern*

Navi Mumbai

Aug. 2023 - Nov. 2023

- Worked on developing and fine-tuning large language models using Python.
- Applied quantization techniques to improve LLM inference speed by 50% on CPU.
- Deployed LLaMA and Falcon 40B models on Azure cloud infrastructure.
- Collaborated with senior engineers to integrate AI models into data workflows.
- Gained hands-on experience with prompt engineering and model evaluation.

## PATENTS

### COTS detection and Elimination AUV- ROS1, Python, Embedded C

Crown-of-Thorns Starfish Detection and Elimination Glider. **Patent Published.**

### An Autonomous and Remotely Operated Armament Neutralization System- Python, Embedded C

An IED diffuser system with long range remote connectivity capabilities. **Patent Published.**

## COMPLETED PROJECTS

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### Shadow Controlled Robotic Humanoid Arm- *Python, Embedded C*

- Built and assembled a 3D printed robotic arm for motion replication experiment.
- Implemented computer vision based hand tracking to enable shadow control of the arm.
- Used machine learning and deep learning models to detect and track hand movements in real time.
- Integrated the vision pipeline with the robotic arm to translate hand gestures into corresponding arm motions.

### Head Tracking Bot- *Python, Embedded C*

- Built a head-shaped robotic prototype with a mounted camera capable of tracking and following head or hand movements.
- Integrated computer vision models with basic robotic control to enable real-time motion tracking.
- Tested and refined the system to ensure stable tracking during live demonstrations.
- Used the robot in outreach sessions with elementary school students in rural villages to encourage interest in science and technology.

### Audio-Video based Emotion recognition - *Python*

- Developed emotion recognition models using both audio and visual inputs to study their combined effectiveness for HRI systems.
- Worked with the RAVDASS and FER datasets to train and evaluate multimodal and visual-only approaches.
- Compared performance across modalities to understand the relationship between speech cues and facial expressions.

### Robotic Humanoid Hand Payload for UAV- *Python, ROS2, MicroPython*

- Developed a robotic humanoid hand equipped with an embedded camera for visual object detection.
- Implemented computer vision methods to track moving objects in real time and autonomously grasp them as they approach the hand.
- Integrated the robotic hand as a payload attachment on a UAV platform.

## SKILLS

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**Programming Languages:** Python, C, C++, Java, Dart, Embedded C, JavaScript

**Machine Learning:** Scikit-learn, Pandas, NumPy

**Deep Learning:** TensorFlow, PyTorch

**Computer Vision:** OpenCV

**Robotics:** ROS1, ROS2, MicroPython, MQTT

**Other:** Git, Linux, Docker

## CERTIFICATIONS

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**Meta React Native Specialization**

Meta Sept 2023

**Deep Learning Specialization**

DeepLearning.ai Aug 2023

**Enterprise Automation Certification**

Workato Jun 2023

**Computer Vision**

Kaggle Jan 2022

**Data Visualization**

Kaggle Jan 2022

**Feature Engineering**

Kaggle Jan 2022

**Advanced SQL**

Kaggle Feb 2022