

Kshitij P. Gaikwad

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Experience

Chief Technology Officer, Third Eye Technologies, Venture Fellow-New York University Mar 2022 to Sep 2023

- Led the development of a multi-camera device for precise eye tracking to monitor neurodegenerative disease(MS)
- Developed a decentralized system utilizing single-board computers (SBCs) to control clusters via TCP/IP communication, resulting in a 400% information acquisition boost compared to single-camera setup. (Linux, Python)
- Employed Computer Vision for real-time image processing and feature detection. (OpenCV, TensorFlow Lite)
- Integrated Precision Time Protocol Daemon (PTPD) for synchronized feature assessment across multiple cameras.
- Engineered custom PCB for targeted IR LED illumination (Altium, Milling).
- Utilized CAD and additive manufacturing for rapid prototyping.

Graduate Assistant, New York University

Sep 2021 to Dec 2021

- Conducted and assessed the Automatic Control Lab, tutoring class of 40 students in fundamental control theory concepts such as system identification, modeling, and implementing control techniques like PID and LQR

Research Assistant, Mechatronics, Controls, and Robotics Lab, NYU

Feb 2021 to Sep 2021

- Developed ambient assistive technology to assist older adults with tele-rehabilitation.
- Determined human joint angles and range of motion with a monocular camera using Google Mediapipe.
- Compared and validated the accuracy against the ground-truth data measured using the Kinect RGB-Depth camera.

Education

New York University, Tandon School of Engineering, Brooklyn, NY

May 2022

Master of Science in Mechatronics and Robotics

(GPA: 3.794)

Relevant Coursework: Simulation Tools for Robotics, Interactive Medical Robotics, Robots for Disability, Swarm Robotics, Data Engineering.

RTMNU, Nagpur, India

Bachelor of Engineering in Mechanical Engineering

Robotics Software Engineering Nanodegree Program, Udacity

Relevant Coursework: C++, ROS, Sensor fusion, SLAM, V-SLAM, Path-Planning, Navigation.

Research Publication

H. K. Wazir, K. Gaikwad, and V. Kapila, "Range of motion assessment using a digital voice assistant," IEEE Int. Conf. Eng. Med. Biol. Soc., 2022, pp. 2577-2580

Projects

High-Speed Video Acquisition for Traumatic Brain Injury Detection

- Developed high-speed acquisition system utilizing Raspberry Pi sampling at 200Hz, evaluating saccadic movements.
- Utilized custom algorithms and OpenCV for image processing to extract vital features.
- Investigated the relationship between Traumatic Brain Injury (TBI) and acquired movement data.

Haptic Interfacing with Time Domain Passivity Control

- Designed and simulated a 2-channel teleoperation system while considering communication delays and applying control strategies to ensure stable and accurate operation.
- Applied controllers like Energy-domain TDPC & Modulated TDPC. Analyzed their effects on forces and velocities.

Estimation of Physiological Tremors

- Conducted frequency analysis on accelerometer data to extract hand tremors by isolating relevant information.

Swarm Robotic Controller

- Developed and implemented a decentralized algorithm for agile formation adjustments in 6 robot clusters.
- Executed control architecture, adapting behaviors based on the neighbor count for effective robotic coordination.

Autonomous Covid Test Delivery Robot

- Developed software for an autonomous robot to follow the predefined path and navigate through intersections with an IR sensor array while using a computer vision algorithm to trigger action for relevant cues.
- Evaluated communication protocols (I2C, SPI, USART) and established a seamless connection between the microcontroller (Arduino) to SBC (Raspberry Pi 4).

Technical Skills

Python, C++, MATLAB, ROS, ROS2, Simulink, Linux, Git, OpenCV, TensorFlow, LibCamera, Solidworks, Fusion360, Raspberry Pi, Arduino, STM3, Additive Manufacturing, PCB Milling, Microsoft Kinect, Altium