Kundan Saha

Roll No.: 2211mt23
M.Tech
Mechatronics
Indian Institute of Technology, Patna

+91-8927171848
kundansaha96@gmail.com
kundan_2211mt23@iitp.ac.in
kundan-saha-60a537133

Education

Degree/Certificate	Institute/Board	Percentage	Year
M.Tech. (Mechatronics)	Indian Institute of Technology, Patna	88.20%	2024
B.Tech. (Electrical)	IMPS College of Engineering and Technology, Malda	74.10%	2017
Intermediate	Kendriya Vidyalaya, Malda	68.00%	2013
Secondary	Malda J M S Hindi High School	73.38%	2011

Experience

- **IIT Patna** ***From 12th August 2024-Continue***
  Project Staff under Dr. Rishi Raj, Associate Professor, Mechanical Department, IIT Patna Patna
  - Passive Two-Phase Heat Spreader for Hot-spot Mitigation in Micro-gravity of Space Sponsored by **Human Space Flight Centre(HSFC), ISRO**
  - My contributions include procuring electronics components and boards, designing electronic circuits and PCBs, and implementing control methods.

Projects

- **Design and Development of the Smart Device. (Embedded Systems, Signal Processing, IOT, & AI) July 2023-June 2024**
  under the guidance of Dr. Atul Thakur, and Dr. Rishi Raj.
  - Designed and fabricated an **embedded system** for heart sound acquisition using ESP32 WROOM microcontroller and microphone sensor.
  - Applied **digital signal processing** techniques to reduce noise and store heart sound data.
  - Created **deep learning architectures** for heart sound classification.
  - Integrated **computer vision** to assist user to acquire heart sound from correct location of chest.
  - **Tools used**: Solidworks, Ptoteus, Arduino IDE, Microphones, Stethoscope, ESP32 WROOM Microcontroller.
  - **Algorithms and Libraries used**: CNN, LSTM; OpenCV, NumPy, MatplotLib, Tensorflow, scikit-learn, librosa.

- **Design, control, and implementation of a Ball Balancing Platform. (Control System) Mar. 2023 to May 2023**
  under the guidance of Dr. Atul Thakur.
  - Designed and fabricated a ball balancing platform using SolidWorks.
  - Integrated the system with Arduino UNO microcontroller, a camera, and a servo motor.
  - Implemented a PID controller using MATLAB to maintain the ball at the center.
  - **Video of Demonstration:** CLICK_HERE

- **Design and development of an Omnidirectional Robot. (Mobile Robotics) September 2022 to December 2022**
  under the guidance of Dr. Atul Thakur.
  - Design a PLC-controlled system with components for 15 cycles of sequential expansion and compression of a double-acting cylinder. Each cycle included a 5-second delay, utilizing an electro-pneumatic supply.
  - **Video of Demonstration:** CLICK_HERE

- **Design an automation system using a Programmable Logic Controller. (PLC) March 2023**
  under the guidance of Dr. Atul Thakur.
  - Design a PLC-controlled system with components for 15 cycles of sequential expansion and compression of a double-acting cylinder. Each cycle included a 5-second delay, utilizing an electro-pneumatic supply.
  - **Video of Demonstration:** CLICK_HERE

- **Design an automation system using an Industrial Robot to pick & place objects. (Industrial Robotics) December 2023**
  under the guidance of Dr. Atul Thakur.
  - Simulate and demonstrate automated pick-and-place tasks with a **KUKA robot** using RoboDK software, and physically execute the tasks using the Teach Pendant interface after the tool, base, and camera calibrations.
  - **Video of Demonstration:** CLICK_HERE

- **Design and Fabrication of a PCB for Noise Reduction and Signal Amplification. (PCB Design) March 2023**
  under the guidance of Dr. Atul Thakur.
  - Designed and simulated a Printed Circuit Board (PCB) using Proteus to reduce noise and amplify signals getting from a microphone sensor.
  - The design involved applying signal conditioning techniques to ensure optimal performance.

– The PCB was then fabricated using the Nvis 72 PCB Prototype Machine, and then test & measure using measurement equipments like signal generator, audio analyzer and CRO.

- **Data acquisition from accelerometer using LABVIEW and NI DAQ module. (LABVIEW)** **March 2023**
  under the guidance of Dr. Atul Thakur.
  – Acceleration data is collected from the accelerometer using a dedicated setup comprising an NI DAQ device, which interfaces with **MATLAB** on the PC for signal processing.

- **Object detection and tracking. (Computer Vision)** **January 2024**
  It detects the hand and segments and counts the number of fingers held up.
  – **Libraries used**: Open CV, TensorFlow, NumPy, Media Pipe, Hand Tracking Module.

Key Courses Taken

- Control System, Mechatronics, Mobile Robotics, Machine Learning, Signal Processing, Control of Electric Drives

Technical Skills

- **Programming:** MATLAB, Python, LabView, Embedded C, Ladder Diagram(PLC)
- **Tools:** Google Colab, Pycharm, Jupyter.
- **Libraries:** NumPy, Pandas, Scikit-learn, Matplotlib, Seaborn, TensorFlow, OpenCV, Mediapipe, Librosa
- **Algorithms :** Logistic Regression, Random Forest, Decision Tree, KNN, CNN, LSTM.
- **Simulation Softwares:** TinkerCAD, Proteus, RoboDK, Simulink .
- **Embedded Communication Protocols:** CAN, I2C, SPI, I2S .
- **Design Softwares:** Solidworks,Autodesk Eagle
- **Fabrication machines:** CO2 laser cutting machine, 3D printing machine, PCB machine

Positions of Responsibility

- **Teaching Assistant,** For the Mechatronics Lab Course, IIT Patna *July, 2023 - May, 2024*
- **Master Boy's Welfare Secretary,** Gymkhana(Student Body), IIT Patna *April, 2023 - April, 2024*
- **Organising Member,** 5th International Heat and Mass Transfer Conference 2023, IIT Patna *(14-17) Dec 2023*

Achievements

- **GATE 2022 Qualified,** in Electrical Engineering paper with Gate Percentile of 92.16 *2022*