NEHAL THAKER

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SUMMARY

Motivated Robotics and Autonomous Systems Engineer with a strong academic background and hands-on experience. Eager to join a collaborative team to contribute my skills in designing, building, and maintaining mechanical automation systems, fostering both individual and team growth.

ACADEMIC PROJECTS

Operational Safety Testing Platform for Automated Vehicles (Simulation Team)
- Developed a platform for simulation results through **Digital Twin** and ensures more edge cases are encountered in the closed course and public road testing by adding Augmented Reality.
- Worked on configuring the **Unreal Engine** with **Carla** on **Ubuntu 20.04** and also developed a precise **Autoware** map, which are simulation environments for designing and testing automated vehicle systems.

Self-Balancing Motorcycle
- Designed and constructed a **Self-Balancing motorcycle** integrating an inertia wheel as a gyroscope, hands-on experience in building electromechanical systems with a focus on balance and stability.
- Maintains stability by implementing a PID control system loop using collected IMU data through the **Simulink** model in **MATLAB** which is uploaded to Arduino.

Programming the Dobot - Robotics in Microelectronics Manufacturing course (By **Prof. Sangram Redkar**).
- Developed precise programming for the Dobot in a Microelectronics Manufacturing course, to automate intricate tasks such as precise pick-and-place operations and intricate pattern writing.

Automated Intruder Detection System
- Engineered an **Intruder Detection System** utilizing the Atmega-8 microcontroller as a central processing unit, showcasing custom automation and hardware integration for security applications.
- Collected data using a reed switch and vibration sensor and sent it to the cloud using the ESP32 Wi-Fi module.
- Used the open source pre-trained SVM model to accurately classify the signal in the form of an alert on the application making it a low-cost flexible compact intruder detection system.

Spring-Smasher
- Conceptualized and designed a biomimicry-inspired **Spring-Smasher mechanism**, drawing inspiration from the Mantis shrimp, demonstrating innovative thinking in creating high-speed, impact-resistant tools.
- Consisted of an arrangement of springs that enables the tool to achieve ultra-high speeds, providing the necessary force to break through tough materials. It is made up of Bouligand nanostructure which makes it reinforced, and impact resistant.

Ocean Wave Simulation
- Generated a Realistic and Complex Ocean Wave Simulation animation using Blender, simulation and visualization relevant to dynamic systems in automation design.

Object Sensing car
- Constructed an Arduino Leonardo-based bot equipped with an Infrared Sensor tuned through a potentiometer, practical experience in **Mechatronics** and **object sensing applications** (Fall 2022).
- Coded the Arduino through the Simulink model, which detects any object in front of the bot and stops the motors from rotating, preventing the bot from moving forward.

Micro-controller-based heart pulse measurement
- Developed a microcontroller-based **Heart Pulse Measurement** unit using the AT89552, designing and implementing healthcare-related automation systems. This system monitors the patient's condition using an infrared device sensor.

EDUCATION

Master's Robotics and Autonomous Systems System Engineering Major	May 2024
Arizona State University, Tempe, AZ	GPA 3.89

Relevant Coursework: Robotic Systems, Linear Algebra, Mechatronics Systems, and Multi-Robot Systems, Python for Engineering, Biomimicry in Design

TECHNICAL SKILLS

Tools /Technologies: Ubuntu, SOLIDWORKS & Blender for mechanical design, PCB Designing, LiDAR, Carla, Auto-ware, Microsoft Office, GitHub, VSCode

Programming: Python, MATLAB, Simulink and CSS

Development Boards: Arduino, Raspberry Pi, microcontrollers

Certifications: Certified researcher with published contributions in the 4th International Conference on Advances in Science & Technology (ICAST2021).