

# Swapnil Meshram

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## EDUCATION

### Master of Science, Robotics and Autonomous Systems (Electrical Engineering)

Expected December 2024

Arizona State University, Tempe, AZ

GPA: 3.64/4.00

**Relevant Coursework:** Introduction to Deep Neural Networks, Embedded Machine Learning, Power Electronics & Power Management, Connected and Automated Vehicles, Realtime DSP

### Bachelor of Engineering, Electronics Engineering

May 2020

K. K. Wagh Institute of Engineering Education and Research, Nashik, India

CGPA: 6.48/10

**Relevant Coursework:** Electronic Devices & Circuits, Advanced Power Electronics, Automotive Electronics, Embedded Processors, Electromagnetics & Wave Propagation

## TECHNICAL SKILLS

**Hardware and Software Development Tools:** Altium Designer, Autodesk Eagle, KiCAD, LTspice, Simulink, Ansys Maxwell, Google Colab, Anaconda, Jupyter Notebook, Visual Studio Code, Git

**Programming Languages:** Python, C, Embedded C, MATLAB

**Libraries & Frameworks:** NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, PyTorch, TensorFlow, ROS

## EXPERIENCE

### Miniaturized and Advanced Power Electronics Laboratory: Research Aide

February 2023 – September 2023

Arizona State University

Tempe, Arizona

- Developed Printed Circuit Boards for planar transformers with medium-voltage isolation ratings of **26kV, 35kV, and 48kV**.
- Engineered multi-layer PCB designs (**2, 4, 6, 10, 12, 14 layers**), optimizing for project specifications.
- Collaborated with Ph.D. students to evaluate and optimize designs, ensuring alignment with project goals.
- Diagnosed and resolved technical challenges in PCB design, contributing to successful project completions.

### Aerospace Engineers Private Limited: Electrical & Electronics Engineer

June 2021 – December 2022

Autonomous & Undersea Systems Division

Tamil Nadu, India

- Led R&D for unmanned marine robotic vehicles (AUVs, ROVs, ASVs), designing electrical architectures for **300-meter depth AUVs** and achieving **15% cost reduction** through optimized designs and efficient project management practices.
- Designed embedded electronics systems from concept to prototype, covering hardware selection, schematic design, PCB layout, and system integration.
- Designed the Power Distribution and Sensor Suite for unmanned marine vehicles (AUVs, ROVs, ASVs), **increasing endurance by 10%** and **compacting wiring length by 30%**.
- Created the Thruster Control Board for a Micro class submarine, **increasing endurance by 5%** and eliminating active cooling requirements.

## ACADEMIC PROJECTS

### Deep Learning Approaches to Audio Classification

January 2024 – April 2024

Arizona State University

Tempe, Arizona

- Explored multiple neural network architectures (CNNs, LSTMs, ResNet18, SVMs, Transformers) for classifying musical instruments, with CNNs achieving the **highest accuracy of 63.75%** on spectrogram data.
- Focused on preprocessing steps like generating spectrograms and extracting MFCC features to ensure the models effectively captured the spatial and temporal characteristics of audio signals.

### Comparative Analysis of SLAM Algorithms

January 2024 – April 2024

Arizona State University

Tempe, Arizona

- Compared Cartographer and GMapping SLAM algorithms using RPLIDAR, evaluating mapping accuracy with metrics like MSE and MAE.
- Demonstrated that GMapping performed better in simpler environments, while Cartographer excelled in more complex layouts with obstacles.

### EdgeVision: User-Defined Object Counting Using Raspberry Pi

August 2023 – December 2023

Arizona State University

Tempe, Arizona

- Designed and implemented a real-time object detection and tracking system using the Faster R-CNN ResNet-50 model on Raspberry Pi 4, achieving **95.6% accuracy in bright conditions** and **82.5% in low-light conditions**.
- Developed modules like the LineSegmentCounter for user-defined object counting and CentroidTracker for reliable tracking, ensuring the system was optimized for resource-constrained embedded platforms.