

# Siddhant Chaurasia

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## EDUCATION

### Binghamton University, State University of New York

Master of Science in Electrical and Computer Engineering

May 2024

CGPA: 3.90/4.00

### Manipal University Jaipur

Bachelor of Science in Electronics and Communications Engineering

May 2022

CGPA: 7.29/10.00

**Relevant Coursework:** Digital Signal Processing, Computational Tools, Mathematical Methods in EE, Neural Network & Deep Learning, Estimation Theory, Data Structures and Algorithms Using C++, Embedded & Real-Time Operating Systems, Computer Organization & Architecture, Implantable Bio-electronics, Implementation of Human-Org-On-Chip

## TECHNICAL SKILLS

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

**Frameworks & Tools:** FreeRTOS, Embedded Linux, GIT/GitHub, JIRA, MATLAB/Simulink, PyTorch, TensorFlow

**Design & Development:** DSP Algorithms, Embedded Systems, Hardware Interfaces

**Engineering Tools & Instrumentation:** Oscilloscopes, Network Analyzer, JTAG, Linux/UNIX Command Line

**Proficiencies:** Digital Signal Processing, Mathematical Modeling, Numerical Methods, Image Processing, Audio Processing

## PROFESSIONAL EXPERIENCE

### Research Assistant

July 2024 - June 2025

Binghamton University | Python, Image Processing, Security Testing

Binghamton, NY

- Developed **Python**-based image byte manipulation techniques to bypass cryptographic checks in C2PA standards.
- Identified and analyzed a date-handling vulnerability, applying systematic testing to support ongoing exploitation efforts.

### Machine Learning Intern

May 2022 - Nov 2022

IOTA Informatics Pvt Ltd | Python, PyTorch, Neural Network

Bhopal, India

- Built a convolutional neural network model using **PyTorch** for handwritten character recognition in medical notes.
- Increased recognition precision to 91% by applying **OCR-specific preprocessing techniques** and optimizing the model.

### Project Trainee (Internship)

Jan 2022 - May 2022

Indian Space Research Organization | Microwave Engineering, Ansys HFS

Ahmedabad, India

- Modeled and simulated a **square coaxial 4-way power divider** for a 2 GHz phased array antenna using **Ansys HFSS**.
- Achieved equal signal split and precise quadrature phase differences across output ports, enabling efficient circular polarization.

## PROJECTS

### Generative Denoising for Medical Image Reconstruction | Python, PyTorch, Diffusion Models, Image Processing

- Developed and trained a conditional **score-based diffusion model** (VP-SDE with U-Net/Attention) in **PyTorch** to reconstruct clean medical CT patches from noisy inputs ( $\sigma_n = 0.3$ ) using the OrganAMNIST dataset.
- Achieved a **+2.44 dB PSNR improvement** by utilizing a combined loss function (MSE + frequency-domain L1), effectively removing noise while preserving anatomical details in the reconstructed images.

### Doppler-AoA based Passive Emitter Localization | Statistical Signal Processing, Numerical Methods, MATLAB

- Formulated signal model and derived Cramer-Rao Lower Bound for aircraft-based emitter localization using combined Doppler Shift and Angle-of-Arrival measurements.
- Implemented MATLAB simulations with Least Squares estimator, demonstrating improved localization accuracy through multi-parameter sensor fusion.

### Real-Time DSP for Noise Suppression | C++, MATLAB, DSP, Embedded

- Designed and implemented a noise suppression algorithm using **adaptive filtering (LMS)** on an **ESP32** microcontroller, reducing background noise in voice recordings by 8-10 dB.
- Validated performance through **MATLAB** simulations and real-time testing, demonstrating improved voice clarity.

### FPGA-Based Matrix Multiplier for AI Acceleration | Verilog, Vivado, Computer Architecture

- Built and fine-tuned a **4x4 matrix multiplier** on a Basys 3 FPGA, achieving real-time performance through **UART-based I/O**.
- Reduced computation latency and optimized FPGA resource usage by pipelining the second-level loop of the matrix multiplication algorithm, successfully synthesizing and simulating the design in **Vivado**.

## LICENSES & CERTIFICATIONS

### Embedded Systems Essentials with Arm: Getting Started (edX)

Nov 2024

**Skills:** Embedded Systems, C++, Embedded C, ARM Cortex-M, Mbed

### GitHub Foundations (GitHub)

Feb 2025

**Skills:** GIT, Version Control