# Siddhant Chaurasia

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## Education

**Binghamton University, State University of New York** May 2024
*Master of Science in Electrical and Computer Engineering* *CGPA: 3.90/4.00*

**Manipal University Jaipur** May 2022
*Bachelor of Science in Electronics and Communications Engineering* *CGPA: 7.29/10.00*

**Relevant Coursework:** Digital Signal Processing, Computational Tools, Neural Networks & Deep Learning, Mathematical Methods in EE, Data Structures and Algorithms Using C++, Computer Organization & Architecture, Embedded & Real Time Operating Systems

## Technical Skills

**Programming Languages:** C, C++, Python, MATLAB, R, Verilog, Assembly, JavaScript.
**Frameworks & Libraries:** PyTorch, TensorFlow, scikit-learn, FreeRTOS, Embedded Linux, Hadoop.
**Design & Development:** Circuit Design, PCB Design, DSP Algorithms, Hardware Interfaces.
**Tools & Instrumentation:** SPICE, Ansys HFSS, AutoCAD Electrical, MATLAB/Simulink, Xilinx Vivado, Oscilloscopes, Network Analyzers, JTAG, Altium Designer.
**Proficiencies:** Real-Time Systems, Embedded Systems, Machine Learning, EE Mathematics, Signal Processing.

## Professional Experience

**Research Assistant** July 2024 - Present
*Binghamton University* | Python, ML, Image Processing, Security Testing *Binghamton, NY*
- Engineered image byte manipulation techniques in Python that successfully bypassed C2PA's cryptographic checks.
- Identified a critical date-handling vulnerability and currently leveraging machine learning techniques for further exploitation.

**Machine Learning Research Intern** May 2022 - Nov 2022
*IOTA Informatics Pvt Ltd* | Python, PyTorch, Neural Network *Bhopal, India*
- Designed a CNN model using PyTorch to accurately recognize handwritten characters in doctors' notes.
- Increased recognition precision to 91% by applying OCR-specific preprocessing techniques and optimizing the model through cross-validation.

**Project Trainee (Internship)** Jan 2022 - May 2022
*Indian Space Research Organization* | Microwave Engineering, Ansys HFSS *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 for the antenna.

## Projects

**FPGA-Based Matrix Multiplier for AI Acceleration** | *Verilog, Vivado, Embedded Systems*
- Built and fine-tuned an 4x4 matrix multiplier on a Basys 3 FPGA for AI workloads, achieving real-time performance through UART-based input/output.
- Reduced computation latency and optimized FPGA resource usage, successfully synthesizing and simulating the design in Vivado.

**DFT Application in Jamming Signal Detection** | *MATLAB, Signal Processing, DFT, Bandpass Sampling*
- Developed a DFT-based technique in MATLAB to isolate target signals from jamming interference.
- Enhanced signal-to-noise ratio by up to 40 dB through precise spectral analysis and windowing methods, while bandpass sampling was employed to prevent aliasing during scenario simulations.

**AI vs. Human Text Classifier** | *Python, PyTorch, NLP, Transformer Models*
- Built a transformer-based NLP model in PyTorch, achieving 95% accuracy in distinguishing AI-generated from human-written text.
- Enhanced performance by leveraging BERT tokenization and fine-tuning hyper-parameters through grid search.

**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 10-15 dB.
- Validated performance through MATLAB simulations and real-time testing, demonstrating improved voice clarity.