Samir Bhattarai

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Education

University of Southern Mississippi Hattiesburg, MS
Bachelor of Science in Computer Engineering, Minor in Mathematics *Aug. 2023 – May 2027*

Experience

Undergraduate Research Assistant Aug 2024 – Present
University of Southern Mississippi *Hattiesburg, MS*

- Simulated FPGA-based authentication schemes for drones using Chebyshev maps generating 800 keys in 1.2169ms with 25.0 KB communication overhead
- Implemented the authentication scheme on the FPGA board (Xilinx VHSL/Vivado) using VHDL, utilizing 20.9% LUTs and 8.7% of Flip-Flops with a Latency of 10ms
- Developed vision-enabled autonomous robot using Raspberry Pi camera with YOLOv9 real-time object detection (30 FPS) integrated with ROS-based navigation stack
- Utilized ROS melodic for SLAM-based path planning and obstacle avoidance, achieving 88% route efficiency through probabilistic roadmaps (PRM) and 93% collision reduction via dynamic window approach

Software Developer Feb. 2025 – April 2025
Infolaya *Hattiesburg, MS*

- Developed a full-stack web app enabling non-technical users to upload CSV, XLSX, JSON, or TXT files for automated visualizations and predictions
- Built a FastAPI backend with OpenAI integration to generate Python visualization code and frontend UI using Next.js and Tailwind CSS
- Deployed backend on AWS EC2 and frontend on Vercel to ensure high availability and scalable performance

Extracurricular Experience

USM ACM-IEEE Robotics Club | *Python, C++, Fusion 360, Microcontrollers, Electronics* Sep 2023 – Present

- Engineered the robot for locomotion, cargo pickup, and sorting mechanisms using Autodesk Fusion 360, ROS, and Gazebo for the SoutheastCon 2025 hardware competition
- Contributed to building robot hardware and around 30% of the code in the robot's locomotion

ESP32 TTS Audio Streaming and Download Server | *C++, IoT, OpenAI, ESP32* Sep 2023 – Present

- Designed an IoT system for real-time Bluetooth audio streaming and MP3 file downloads via a local web server, using OpenAI's TTS API hosted on ESP32 Wrover Dev module
- Utilized SPIFFS for storage, WiFi for connectivity, and API communication for converting the AI's message into audio file for streaming and downloads

CCRC Scientific Circle | *C++, Microcontrollers, Mechanics, Radio Module, Electronics* April 2022 - March 2023

- Tested stationary and sun-tracking solar panel setups (with/without wipers), demonstrating a 20-25% efficiency increase in sun-tracking systems with wipers
- Engineered a Battle Bot using Arduino ATmega 328 and a 433 MHz RF module for responsive navigation and optimized performance

Technical Skills

Languages: C++, Python, MATLAB, VHDL, System Verilog, JavaScript, HTML/CSS
Frameworks: ROS2, Tensorflow, Django, FastAPI, React, Node.js, Next.js
Developer Tools: Vivado, VitisHSL, Fusion 360, MATLAB, Gazebo, Git, Docker, Google Cloud Platform, VS Code
Libraries: Matplotlib, OpenCV, Keras, pandas, NumPy, Matplotlib

Honors & Awards

- Presidents List Scholar: Fall 2023, Spring 2024, Fall 2024 – University of Southern Mississippi
- Academic Excellence Award, Full Tuition Scholarship – University of Southern Mississippi
- Winner - LOCUS 2020, 17th National Technological Festival SDG 7 Category – Sun-Tracking Solar Panel project
- 1st runner-up – Kathmandu University, Annual Robotics Festival – Battle Bot