Swapnil Bhole
Masters ECE @ UMICH Ann Arbor

(+1) 734-747-1756
swapnilb@umich.edu

Linkedin: swapnilbhole22

INTRODUCTION

Research Engineer with 5+ years of experience in wireless system design. Strong expertise in RTL and SOC design, verification, and ASIC/FPGA development, along with a deep understanding of processor microarchitectures and high-performance computing. Passionate about optimizing hardware efficiency, developing scalable architectures, accelerating computational workloads and driving innovation.

EDUCATION

Masters, Electrical and Computer Engineering, University of Michigan Ann Arbor, USA 2024 — 2026
- **Research Assistant** under Prof Hun Seok Kim: Working on an ML-based non-coherent scheme to outperform LoRA GPA 3.7/4.0
- **EECS 470**: Computer Architecture, **EECS 570**: Parallel Computer Architecture, **EECS 598**: Quantum Computing

Bachelors, Electronics and Communication Engineering, NIT Nagpur, India 2014 — 2018
- Courses: Antenna Design, CMOS Design, Wireless Communications, Embedded Systems, Circuits GPA 8.93/10.0

PROJECTS

- **Designed a 2 way Superscalar, Out of order RISC-V Processor**, implemented with **R10K**-style, a dual-ported Icache, a single-ported Dcache, a PAg branch predictor achieving an average CPI of 3.96. Developed and verified modular components in SystemVerilog using Synopsys VCS, ensuring correctness through unit testing and standard system tests.

- **GPU Acceleration** of a Configuration Novelty Metric towards Enhanced Machine-Learned Interatomic Potentials using **CUDA**.

SKILLS

Programming	C, SystemVerilog, Python, MATLAB, Embedded C
Hardware Design	Synopsys VCS, Verdi, strong debugging skills, PCB design, Antenna design
Simulation softwares	Vivado, Vitis, Petalinux, HFSS, Eagle PCB, Keil C, Arduino, AVR Studio, Wireshark
RF Hardware Tools	Spectrum Analyzer, VSA, signal generator, Polaris EPC Simulator, Amarisoft eNodeB, TM500

EXPERIENCE

Centre for Development of Telematics (C-DOT) Bangalore 2018 — 2024
Scientist-C: Digital and Modem group

- Spearheaded a small team to design the 5G Low-PHY part of OpenRAN Radio Unit on **Zynq-7000 SoC**, packaged it into a small application running on **Petalinux**, using dual core ARM processor and Kintex FPGA on the ZC-706 board.
- Experienced in using MATLAB System Generator, Vivado IPs, FPGA, ARM processor, and Keysight 5G Simulator to simulate and design end-to-end 5G System level modules.
- Collaborated with industry players, service providers, and academics to evaluate **OpenRAN** solutions.
- Designed a Duo-binary turbo code decoder for DVB-RCS, a part of the DRDO project, generating revenue.

Scientist-B: Product Integration and Validation group, LTE Mobile Communication

- Developed RF and 3GPP test cases for LTE base station v2, securing a major telecom tender. Involved in performance testing of eNodeB for load, throughput, and stability analysis. Executed test cases for VoLTE, ETWS, NB-IoT, and location-based services.
- Managed procurement of LTE base station and core network simulators from European OEMs in a single year, Compliance testing wrt 3GPP Release 10, 11, 12. 2x2 MIMO and FDD+TDD support was also evaluated
- Generation of test suite for validation: S1 interface, X2 interface and Uu interface 3GPP specs for Release 9 (36.413, 36.423, 36.331).

PUBLICATIONS

1. *ATRNN: Using Seq2Seq Approach for Decoding Polar Codes* in *COMSNETS* (2020).
2. *DNNStream: Deep-learning based Content Adaptive Real-time Streaming* in *SPCOM* (2020).
3. *Deep Learning based Object Detection and Recognition Framework for the Visually-Impaired* in *ICCMC* (2020).
4. *A Compact Planar Antenna with Meander lines for TV White Space Applications* in *SCEECS* (2018).

ADDITIONAL

i) **COVID-19 volunteer** at the Community level; ii) Certification in **Options Trading** from Elearnmarkets; iii) Awarded **Best NCC Cadet and Black Belt Dan-2 in Karate**; iv) Organized cultural events and won various **basketball tournaments** in office.

Other Projects

SIM908 based Fuel Notification Device, VNIT Nagpur & TSecond, India
- Device helps in preventing malpractices regarding fuel volume
- Pulse counting for flow sensor and GPS Accuracy within 5m
- Patented by the Company
- Fits near filling hole of vehicle, measures the volume and sends text message to user immediately with fuel characteristics

CDOT Bhashantar Tool, CDOT Bangalore, India
- Designed Chrome extension for real time translation from English to Hindi of the text which is keyed in the CDOT webmail compose mail box, using Javascript and html.

Face and currency detection and recognition, VNIT Nagpur CSE Dept, India
- Tensorflow with Keras
- SSD Detector for Image classification and Inception v3 model for Image recognition
- Validation accuracy=98.3% and Testing accuracy=95%

IoT based SIS(Safety Instrumented Systems) for chemical labs, VNIT Nagpur ECE & Chemical Dept, India
- ESP8266-12E module used and Customized applet designed on IFTTT service
- User can monitor and switch off chemical process remotely through Google Assistant on his Android phone.
- Performance enhancement of IOT based SIS using Patch Antenna and Adaptive Algorithms

Microstrip Patch Antenna Design, VNIT Nagpur Adv Comm Lab, India
- Antenna for TVWS band(420-720 MHz)
- Compact and Miniaturized antenna with Meander-line structures

Mind Controlled Mini-Robotic Vehicle, Centre of Excellence, VNIT Nagpur, India
- Interfaced Neurosky EEG headset, HC-05
- Achieved device control using Eye-Blink, optimized code and power saving
- Helps paralysis patients
- Presented research paper at Technodocx'16

Robotics Projects, Makxenia, India
- Line follower robot, edge avoider, wall follower, light follower, obstacle avoider robots using ATMega16 microcontroller and AVR Studio, traffic signal controlled robot using Image Processing in MATLAB, Wireless robot using DTMF and Bluetooth modules.

Trainings & Certifications

Company tailored trainings on 5G, Cybersecurity and NCC Conference 2023 at IIT Guwahati, C-DOT Bangalore	**2022-2023**
Advanced Course in Machine Learning using Python, Centre for Continuing Education ,IIT Madras	**June 2021**
Deep Learning Summit on "Image AI Application", Aegis School of Data Science	**2019**
5G Knowledge Summit, IITM Madras, NanoCell, CeWIT India	**Dec 2018**
GIAN Course on "Advanced Medical Imaging: Wireless Endoscopy Analysis", VNIT Centre of Excellance	**Jan 2018**
Training program on "Role of Optimization in Engineering Applications", VNIT Centre of Excellance	**Dec 2017**
VECC (Variable Energy Cyclotron Centre, DAE, Govt. of India), Kolkata,	**Jun-Jul 2015**
PCB Design & Fabrication, CEDT NSIT Delhi	**Sep 2015**