Harshil Bhatt

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EDUCATION

Manipal Institute of Technology **Manipal, KA**
BTech in Electronics and Communication Engineering *Expected Graduation: May 2023*

EXPERIENCE

ReTiSense **Bengaluru, KA**
Embedded Systems Engineer *Aug 2021 - Oct 2021*

- Worked with BLE 5.0
- Added support for various peripherals to firmware
- Power management of nRF52 microcontrollers
- Optimised memory management and data compression onboard nRF52

Mars Rover Manipal **Manipal, KA**
Senior Research Engineer *May 2020 – Present*

- Published a paper on wireless sensor networks at a flagship conference organized by IEEE.
- Developed system drivers for sensors and actuators for ROS1/2 and freeRTOS
- Guided a team of juniors towards research and academic publications

Sensegrass **Bengaluru, KA**
Firmware Engineer Intern *Jan 2021 - Mar 2021*

- Diagnosed feasibility of new products
- Prepared BOM for upcoming products
- Analyzed working of existing products and devised improvements

PUBLICATIONS

Wireless Sensor Networks for Search and Rescue Management in Floods *IEEE-CONECCT*

- Proposed novel routing algorithm with over twice better throughput in sensor networks
- Designed cost-effective sensor node capable of human detection
- Developed scalable solution able to support 512 nodes over $7.5km^2$

Increasing Physical Layer Security through Hyperchaos in VLC Systems *Peer-Review*

- Proposed a system utilising a 4D Henon Map to generate hyperchaos in the transmitter.
- Designed a sliding mode controller for chaos synchronisation between the transmitter and receiver.
- Increased physical layer security in VLC systems to prevent eavesdropping.
- Achieved satisfactory BER and throughput using a single channel regular LED

HONORS & AWARDS

IEEE ComSoc Bangalore "Protsahan" **Dec 2021**
IEEE
The Bangalore ComSoc chapter, Protsahan drive, was launched to recognize contributions in the Communication Sector by granting awards to any paper published / Tutorial offered in recognized conference/journals (during Jan 2020 - Sep 2021) by IEEE student member/member/non-member (as the first author to be IEEE member, non-Member).

ONGOING RESEARCH

Energy Balancing in Swarm Robots using Wireless Power Transmission *Mar 2021 - Present*

- Built custom wireless charging circuit based on magnetic induction
- Programmed low level drivers of sensors and actuators for ROS2
- Devised novel algorithm for peer-to-peer charging
- Designed navigation and path planning algorithm for swarm control

Improving Security in Wireless Body Area Networks *Oct 2021 – Present*

- Formulated novel algorithm for encrypting sensor data
- Designed a scalable sensor network
- Optimised the sensor nodes for low power

PAST PROJECTS

7 Degree of Freedom Robotic Arm *May 2020 – Oct 2020*

- Built motor control interface
- Designed end-effector position control system
- Developed firmware for PIC18 and ATtiny

Self-Balancing Inverted Pendulum *Apr 2020 – May 2020*

- Designed control system using Simulink
- Simulated in Gazebo with ROS1 interface
- Implemented controller on STM32

TECHNICAL SKILLS

- Programming Languages: C, C++, Python, Rust, Verilog, ARM Assembly
- Protocols/Interfaces: UART/USART, SPI, I^2C, CAN, MQTT, FreeRTOS
- Software: MATLAB, Simulink, Altium Designer, EagleCAD, LabVIEW, Proteus Design Suite, ROS, Gazebo

EXTRA CURRICULARS

Manipal Open Source Society

Technical Moderator *Oct 2021 - Present*

- Worked with other members to incubate projects, contribute to new projects.
- Coordinate any and all events held by the society.
- Grew the community to over 60 members.

Research Society Manipal

Robotics division *Sep 2021 - Present*

- Worked with multi-agent systems and swarm robotics
- Organization aims to promote research, provide resources and research guidance to students and form a stronger connection with professors and alumni.

RedX Manipal

Volunteer *Sep 2019 - Present*

- Conducted drives for at-risk population