Harshil Bhatt

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EDUCATION

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

EXPERIENCE

BeagleBoard, Google Summer of Code **Remote, KA**
Developer *May 2022 - Present*
- Develop Linux kernel drivers for mikrobus boards
- Enhance native POSIX target on Zephyr for Greybus message handling
- Improve logging and loopback test modules

Nokia Bell Labs **Remote, KA**
Intern *Feb 2022 - Aug 2022*
- Built applications for autonomous robots
- Added middleware for non-ROS robots to utilise ROS algorithms

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 – Aug 2022*
- 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).

International Rover Design Challenge **Feb 2021**

Mars Society South Asia

Finished 3rd worldwide at IRDC 2021. The International Rover Design Challenge is a competition for university students which challenges to design Mars rovers which shall be fully equipped and mission ready for Operation on Mars.

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

Adaptive Routing Algorithm for Underwater Wireless Sensor Networks *Nov 2021 – Present*

- Proposed novel routing algorithm with improved BER and throughput
- Develop algorithm for acoustic communications
- Optimise node distribution based on tetrahedral deployment

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, Zephyr
- Software: MATLAB, Simulink, Altium Designer, EagleCAD, LabVIEW, Proteus Design Suite, ROS, Gazebo

EXTRA CURRICULARS

Manipal Open Source Society

Technical Moderator *Oct 2021 - Aug 2022*

- 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 - Aug 2022*
- Worked with multi-agent systems and swarm robotics

RedX Manipal
Volunteer *Sep 2019 - Aug 2022*
- Conducted drives for at-risk population