Dilip Rana

Electrical Engineering at Tribhuvan University Institute of Engineering

About me

I have a bachelor degree in electrical engineering from Tribhuvan University Institute of Engineering, Pulchowk Campus, which I completed in 2022. The challenges and applications of the power electronics and electrical engineering have always fascinated me and I believe there are much more exciting things to be learned yet. I am looking forward to growing and expanding my knowledge in this area.

Education

Bachelor in Electrical Engineering (2017 - 2022)

Tribhuvan University Institute of Engineering, Pulchowk Campus
Term Average: 74.99%

Higher Secondary Education, +2 Science (2015 - 2017)

Premier Higher Secondary School
Term Average: 73.29%

Experience

Embedded Hardware Engineer: Yatri Motorcycles (Dec 2022 - Present)

- ➔ Prototyped and designed of different parts of the vehicle embedded system
- ➔ Performed signal integrity analysis of different boards designed and optimized the circuits
- ➔ Power management system designed with different filters with improved noise immunity and greater system reliability
- ➔ Designed, compared and tested of different methods of user input sensing in industry standard testing conditions
- ➔ Designed and implemented the various parts of the vehicle charging embedded system
- ➔ Supported all stages of embedded system development and collaborated with electrical and mechanical teams of the company

Embedded Hardware Engineer Intern: Yatri Motorcycles (Sep 2022 - Nov 2022)

- ➔ Completed the internship task within specified time and appreciated result
- ➔ Analyzed and designed noise shield for wiring of the vehicle
- ➔ Measured and verified different parasitic parameters of vehicle auxiliaries
- ➔ Designed and tested prototype of the noise filter for different noisy auxiliaries

Projects

Inductive Power Transfer: Electric Scooter based Design (Jun 2021 - Apr 2022)

- ➔ Performed 2D & 3D electromagnetic simulations and calculated the parameters of various coil designs using COMSOL Multiphysics
- ➔ Manually designed coil with stranded wires and matched up simulated parameters
- ➔ Half bridge inverter with gate driving transformer
- ➔ Power transfer up to 150W within the distance of 20cm and achieved maximum efficiency of 90%
- ➔ Presented the final report to the department with hardware model

Induction Heater Model Design (Nov 2021 - Dec 2021)

- ➔ Prepared the hardware model compatible with market standard coils
- ➔ Presented the hardware prototype at ‘Energy Hackathon 4.0’
- ➔ Achieved ZVS by resonance oscillation of the LC tank
- ➔ Power transfer up to 36W with efficiency of 70% compared to resistor heater

Inductive Wireless Phone Charger (Feb 2019 - Mar 2019)
- ➔ PCB embedded pancake coil designed for both transmitter and receiver
- ➔ Colpitts oscillator designed with class-A amplifier to feed the coil
- ➔ Maximum power transfer achieved up to 5W

GSM based GPS Tracker for Electric Vehicle (Jan 2021 - Mar 2021)
- ➔ GPS module and SIM9000 GSM module used with Arduino
- ➔ Auto SMS reading and replying feature with encoded request protection

LCR Meter (Oct 2020 - Nov 2021)
- ➔ L, C & R measured in different port for each type of components
- ➔ LCD display interfaced with AVR to calculate and display the component values

Spherical Hybrid Black Body Solar (Feb 2018 - Mar 2018)
- ➔ Utilized parabolic reflector to concentrate the light rays to array of spherically arranged 12V solar panels
- ➔ Solar insolation increment up to 50% was achieved

Participations and Awards

Efficiency Theme Hackathon Winner : Energy Hackathon 4.0 - LOCUS (Dec 2021)
- ➔ National level hackathon organized by LOCUS
- ➔ Detailed analysis of 'Transition from LPG to Induction Cooker in Nepal' was done and presented
- ➔ About 30 teams participated within the total of five different themes

Participations : LOCUS Exhibition 2018, 2019 & 2020 - LOCUS
- ➔ National level project exhibition and competition organized by LOCUS every year
- ➔ Presented the hardware model of 'Spherical Hybrid Black Body Solar' at LOCUS 2018
- ➔ Presented 'Inductive Wireless Phone Charger' at LOCUS 2019
- ➔ Designed and Presented 'LCR Meter' at LOCUS 2021
- ➔ More than 100 teams participated every year

Participation : e-Yantra Robotics Competition (eYRC 2019-20)
- ➔ International level robot building competition organized by IIT bombay
- ➔ Developed an automatic object picking and transporting robot within predefined routes

Honorable Mentions : NASA Space Apps Challenge - NASA (Oct 2020)
- ➔ International level online apps challenge
- ➔ Developed 'Solar Sailer', space exploration simulation tool with simulated solar system and effects like time dilation, doppler effect and view distortion

Overall and Health Theme Hackathon Winner : Quantum Hackathon - NxtGen (Sep 2020)
- ➔ National level online hackathon organized by NxtGen
- ➔ Worked on and presented 'Masked', a python based face mask detecting application

Skills

1. Hardware Design: Circuit Design, Modelling, Analysis & Troubleshooting
2. Simulation Tools: MATLAB Simulink, LTSpice, Proteus, Multisim, Circuit Wizard
3. Circuit Fabrication: KiCAD, Altium Designer, EasyEDA, Circuit Wizard
4. FEA Tools: COMSOL Multiphysics
5. CAD Tools: SOLIDWORKS, AutoCAD
6. Programming Languages: C, C++, Java, MATLAB, Embedded C
7. Project Management Tools: Notion, Github

Publications

- ➔ "INDUCTIVE POWER TRANSFER: ELECTRIC SCOOTER BASED DESIGN", Final Year Project Report, Apr 2022 ↗

Research Interests

- ➔ Electric Vehicles and Motor Controllers
- ➔ AC and DC Power Converters
- ➔ Wireless Power Transmission
- ➔ Energy Storage and Transfer System
- ➔ Power Electronics and Hardware Design
- ➔ Low power Analog and Digital Circuit Design
- ➔ Power Management of Embedded System

Involvements

- ➔ MATLAB Simulink Workshop (Nov 2021) : Lecturer
- ➔ Basic Electronics and Proteus Workshop (Jan 2022) : Lecturer

Organizations

Event Manager : Electrical Club - Pulchowk Campus (Nov 2019 - Nov 2020)

- ➔ College club to teach and inspire students to hardware projects
- ➔ Organized various workshops like ‘Power Supply Design’, ‘Inverter Design’, ‘Basic Power Electronics’ and competitions like ‘PCB Fabrication’, ‘Buck Converter Design’ etc.