Harsh Kachhia

3rd Year Mechatronics Engineering Student

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WORK EXPERIENCE

Mechatronics Engineer Co-op
Stackpole International Inc.

05/2022 - 09/2022 *Toronto, Canada*

Achievements/Tasks

- Created and implemented automotive-standard **Verification and Validation** testing procedures for mechatronic pumps, meeting IEC, ISO, and ASPICE requirements.
- Conducted **benchmark testing** and sensor calibration for mechatronic pump **characterization**. Analyzed results, mapping key performance parameters to environmental conditions and system requirements to drive future design improvements.
- Applied **GD&T** and reviewed 2D/3D mechanical drawings and manufacturer specification sheets to conduct tolerance analysis for pump parts, ensuring desired performance and functionality.
- Assisted warranty returns and conducted **RCA** (Root Cause Analysis) to develop effective resolution and mitigation plans for production pump issues, supporting studies and examinations.

Technology Camp Counsellor
Rexdale Community Hub

05/2021 - 09/2021 *Toronto, Canada*

Achievements/Tasks

- Facilitated workshops to educate teenagers about electrical circuit schematics and soldering. Used Velleman Mini-kits to introduce electronics and allow campers to make fun/educational hobbyist projects.
- Guided and instructed teens at the camp in Python programming and 3D printing, creating an interactive learning environment for elementary-level coding and additive manufacturing.

EDUCATION

B.Eng(Hons) Mechatronics Engineering
OntarioTech University

09/2020 - Present *Ontario, Canada*

Relevant Coursework:

- SOLIDWORKS **Mechanical Design Associate** Certified
- Lean **Six Sigma Yellow Belt** Certified
- President's List F2020 & W2021, Dean's List F2021 & W2022
- **Control Systems** , Machine Design, Structures & Properties of Materials, CAD, Kinematics & Dynamics of Machines, **Thermodynamics & Heat Transfer** , Solid Mechanics, Fluid Mechanics.
- **Actuators & Power Electronics**, **Sensors & Instrumentation**, Electronic Circuit Design, **Microprocessors & Digital Systems**, Object Oriented Programming, Probability & Statistics.

SKILLS

3D CAD Modeling & Simulation | MATLAB & Simulink | C/C++, Java & Python | HTML, CSS & JS | SQL & VBA | SOLIDWORKS, Siemens NX, AutoCAD & SketchUp | DFM | Analog & Digital Circuit Design | NI Multisim & LabVIEW | Communication Protocols (I2C, SPI, UART, CAN, LIN) | Benchmark Testing | Prototyping & Manufacturing | Use of Multimeter, Oscilloscope & Spectrum Analyzer | Kaizen & 6S | Lean Six Sigma | Jira | Xilinx FPGA | Control Systems Theory | Product Development

PROJECT EXPERIENCE

Personal Portfolio Website (01/2022 - Present)

- **URL:** harshkachhia.github.io/
- Coded a responsive personal website to showcase the Mechanical, Electrical and Software projects completed, along with their respective files, code & working video.

Electric Vehicle Driving/Regenerative Braking Model (02/2023 - 04/2023)

- Designed and tested a comprehensive software simulation of actuators and power electronics utilizing **MATLAB Simulink**, while developing a system model for efficient energy conversion. Implemented a hardware solution using Arduino, PM DC Motor, Buck Boost module, and integrated DC-DC and AC-DC converters.
- Successfully harnessed braking energy to recharge batteries, showcasing proficiency in system modeling and energy optimization techniques.

Microprocessor Digital Counter (03/2023 - 04/2023)

- Designed and developed a digital circuit system utilizing the **Xilinx FPGA** design tool and Verilog code to count the number of guests entering a restaurant's drive-thru for statistical analysis, incorporating various components such as logic gates, registers, storage elements, and counters, with the output displayed using a 7-segment display.

Smart Home Security System (03/2023 - 04/2023)

- Developed a miniature smart home security system with Arduino, integrating multiple sensors (photocell, PSD, infrared, sound, and touch) to detect light changes, motion, interruptions, noise levels, and physical contact for comprehensive intrusion detection.

Autonomous Mechanical Rickshaw (11/2021 - 12/2021)

- Lead a team which designed and constructed a humanoid robot pulling a rickshaw carriage(Meccano Kit) that incorporated a gearbox mechanism to upscale torque from a 6V motor by 150% and a carriage with passive suspension using **DFMEA & 8D's methodolgy** .
- Modelled physical prototype in SOLIDWORKS in a 1:1 scale to create a virtual model with an accurate motion analysis.

Disc Static Simulation (10/2021 - 10/2021)

- Performed a static simulation using **Finite Element Analysis**(FEA) of a disc solid body in SOLIDWORKS to find the optimum parameters for various functional environments.
- Produced a report which outlines the stress, displacement and strain on the solid body when a 150 N·m torque is applied about the disc's center.