Pranshu Malik
Robotics Enthusiast

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Interests

Robotic Systems & Automation · Medical Devices · Computer Vision · Signal Processing · Circuit Design

Education

University of Toronto   Toronto, ON
Bachelor of Applied Science in Electrical Engineering GPA: 3.85/4.0   *Sept. '17 – present*
- Engineering International Scholar: Received full tuition-fee waiver for the entire duration of the program
- Key Courses: Digital Systems, Programming Fundamentals, Dynamics, Circuit Analysis, Linear Algebra
- Minoring in Robotics and Mechatronics; candidate for Certificate in Engineering Leadership

Research & Professional Experience

Vice President, Biomedical Engineering Competition 2019   Toronto, ON
Club for Undergraduate Biomedical Engineering   *July '18 – Present*
- Planned logistics and budget while effectively communicating with club members, judges, and sponsors
- Composed and evaluated problem statements to ensure design feasibility, and tested potential solutions
- Revamped competition's concept with hopes to promote innovation and improve learning experience

Teaching Assistant, Calculus 1A (MAT 135)   Toronto, ON
Department of Mathematics   *Sept. '18 – Dec. '18*
- Held weekly tutorials and office hours to help students learn various concepts in calculus
- Graded weekly assignments and midterm examinations; also assisted with exam invigilating duties

Undergrad. Research Assistant, Rehabilitation Engineering Lab, TRI   Toronto, ON
Advisors: Prof. Kei Masani and Prof. Paul Yoo   *Summer '18*
- Developed finite element models (FEMs) of lower leg for computational study of neurostimulation applications
- Streamlined workflow for developing FEMs using Autodesk Inventor, COMSOL Multiphysics, and MATLAB
- Documented the framework for developing FEMs from (Magnetic Resonance Imaging) MRI data sets, with a view of adaptability for other bio-electric studies

President, Roboknights (Robotics club)   New Delhi, India
Delhi Public School, R.K. Puram   *Apr. '16 – Mar. '17*
- Led a team of 15+ students to overall 11 competition wins; also organized a national-level robotics symposium
- Co-designed and organized introductory workshops on machine design to promote maker culture in school
- Scholar and exchange student at the Sakura Science Program for Robotics, 2016, held at Saitama University

Projects

Eagle-eye: Aims to make EEG as a reliable control interface. Differential electrode pairs are worn on the forehead to obtain EEG, which is processed in real-time for recording & finding patterns. Currently, the design primarily works with strong EOG & EMG artifacts in the signal; work is ongoing to reject external artifacts for processing pure EEG.

Object-tracking robotic arm: Programmed to locate a cup in its radius and drop a coin into it; video from a camcorder, mounted on the arm, is processed in real-time by an FPGA which communicates with an Arduino to control the robot's actions. The system allows for calibration of thresholds to suit any environment.

TRAECY: Traffic and Emission Control System, aims to conjoin traffic management with real-time vehicle emission tracking & regulation, to ultimately reduce air pollution; it comprises of 3 disparate devices embedded in vehicles and street infrastructure that collect data for traffic-light control & traffic rerouting algorithms, and update users' quota.

Gurb: An IoT-based Garbage Collection System. The design has a network of smart garbage bins which helps optimize collection routes and frequency of collection based on predicted disposal rates and area-specific population density.

Skills

Softwares:

<u>EDA and Simulation Tools</u>: KiCad, EAGLE, LTspice, Pspice, NI Multisim, ModelSim, Quartus Prime

<u>3D CAD and CAE</u>: SolidWorks, CATIA, Inventor, Fusion 360, ANSYS, COMSOL Multiphysics

<u>Graphic design</u>: Photoshop, Illustrator, Inkscape, GIMP

Programming Languages:

<u>Proficient</u>: C, C++, MATLAB, Verilog, Visual Basic

<u>Intermediate</u>: Python, LaTeX, PHP, HTML, CSS, JavaScript

Hardware famliarity:

<u>Modules and Sensors</u>: Zigbee (Xbee PRO), Adafruit PCA-9685 (12bit-PWM servo driver), HC-05 (serial Bluetooth transceiver), MQ-135 (gas sensor), LTC-3108 (ultra-low voltage step-up), LTC-3588 (nano-power harvesting)

<u>Hardware Development Platforms and Boards</u>: DE1-SoC, ESP-8266, ESP-32, Arduino (Due, Mega/Uno/Nano, MKR-1000, Intel Galileo Gen-2), Raspberry Pi 3B, STEM-Du RDC-102 MCU

<u>Data Acquisition and Computing Platforms</u>: Muse headband, NI myDAQ, redpitaya, MSOX-3012T (Keysight)

Professional Development & Certifications

<u>A Hands-on Introduction to Engineering Simulations, edX</u>: Finite-element analysis and computational fluid dynamics simulations on ANSYS for real-world problems; verification and validation of results

<u>Mechanical CAD Certification (in SolidWorks), CadZone India</u>: Solid and sheet-metal modeling, advanced modeling tools, assembly modeling, SolidWorks Motion and Simulation tools

<u>CATIA Certification, Institute for Multidisciplinary Design & Innovation, UofT</u>: Solid part design, assembly design, and drafting workbench for models

<u>Basic, Advanced Machining, & Machining III, George Brown College</u>: Machine shop safety; use of hand tools, lathe, mill, grinder, drill press, band saw; machine feed rates and cutting speeds

<u>Introduction to Welding, George Brown College</u>: Oxy-acetylene, manual-arc (stick), and gas-metal-arc (MIG) welding techniques; safety training

Awards & Achievements

<u>Silver Medal</u>	Intl. Genetically Engineered Machine (iGEM)	2018
<u>First Year Summer Research Fellowship</u>	Faculty of Applied Science and Engineering	2018
<u>Runner Up</u>	NASA Space Apps Hackathon, New Delhi	2017
<u>Pete Conrad Scholar Finalist</u>	Conrad Spirit of Innovation Challenge	2016
<u>First Prize (Grade XI, Large Team)</u>	NASA Ames Space Settlement Contest	2016
<u>First</u>	Intel Make-a-thon, New Delhi	2015
<u>Second</u>	Google Developers Group (GDG) College Hack	2014

Other Interests & Activities

Sports: Love playing cricket and some racket sports like squash and badminton; enjoy cycling, hiking, camping activities, and going on long walks. Have also played cricket competitively at the state level.

Spiritualism/Culture: Have been attending Bhagavad Gita classes each week at ISKCON Temple for the past 12 years. Also associated with the Institute for Science and Spirituality at ISKCON; actively contribute to the newsletter and attend scientific conferences on the matter.