Pranshu Malik

Robotics Enthusiast

pranshumalik14 pranshu-malik
pranshu.malik@mail.utoronto.ca

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: 3.87/4.0 *Sept. '17 – June '21 (Exp.)*

- Engineering International Scholar: Received full tuition-fee waiver for the entire duration of the program
- Key Courses: Digital Systems, Signals & Systems, Intro. Electronics, E&M Fields II, Dynamics, Linear Algebra
- Minoring in Robotics and Mechatronics; candidate for Certificate in Engineering Leadership

Research & Professional Experience

Software Engineering Intern, Rocscience Inc. Toronto, ON
Geotechnical Software Tools Design *May '19 – Present*

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Hardware Team Member, aUToronto Toronto, ON
Univeristy of Toronto's Self Driving Car Team *Feb. '19 – Present*

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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 *May '18 – Aug. '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

Projects

CollabBots: A collaborative robotic system, built entirely from scratch.

openPSU: A cheap, programmable, and variable benchtop power supply unit (PSU) with a uniuque continuous current and voltage graphing on a TFT display.

SIMEA: Simple Meshing and Engineering Analysis, is a hackable FEA tool being developed for quick prototyping and scriptable modeling & analysis of geometry.

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.

Skills

Programming Languages:

Proficient: C, C++, C#, MATLAB, Verilog, Arduino

Intermediate: Python, Java, ARMv7, Visual Basic, LaTeX, PHP, HTML, CSS, JavaScript

Packages and Libraries: OpenCV, ROS, Git, CMake, .NET, WPF, GTK, Eyeshot, ParaView, DevExpress

Softwares:

EDA and Simulation Tools: KiCad, EAGLE, LTspice, Pspice, NI Multisim, ModelSim, Quartus Prime

3D CAD and CAE: SolidWorks, Autdesk Inventor, Autodesk Fusion 360, ANSYS, COMSOL Multiphysics, CATIA

Graphic design: Photoshop, Illustrator, Inkscape, GIMP

Hardware famliarity:

Modules and Sensors: 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), Zigbee (Xbee PRO)

Hardware Development Platforms and Boards: 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

Data Acquisition and Computing Platforms: Muse headband, NI myDAQ, redpitaya, Hantek 6022-BL

Professional Development & Certifications

Fundamentals of Image and Video Processing, Coursera: 2D signals and systems, sampling and filtering, motion estimation, color representation and processing; image enhancement, recovery, and compression

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

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

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

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

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

Awards & Achievements

First Place	GM/SAE Autodrive Challenge	2019
First Year Summer Research Fellowship	Faculty of Applied Science and Engineering	2018
Runner Up	NASA Space Apps Hackathon, New Delhi	2017
Pete Conrad Scholar Finalist	Conrad Spirit of Innovation Challenge	2016
First Prize (Grade XI, Large Team)	NASA Ames Space Settlement Contest	2016
First	Intel Make-a-thon, New Delhi	2015
Second	Google Developers Group (GDG) College Hack	2014

Other Interests & Activities

Sports: Love playing cricket and 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.