Jimmy Bates

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Projects

jbateshobbies.ca - Portfolio programmed in PHP and JavaScript - The following projects can be seen:

Potentiometer-Bot | *Embedded 3D-printed SCARA robot* Oct. 2022 - Nov. 2022

- Realized virtual SCARA robot using a TI C2000 microcontroller running an RTOS to coordinate tasks
- UART used to communicate to a Raspberry Pi for X,Y coordinates taken from a marker on a ChArUco board
- ADCs with potentiometers applied to get alternative X,Y coordinates when Pi mode is turned off
- SPI used to communicate with secondary C2000 controlling an LCD display
- Inverse kinematics implemented to derive joint angles needed to set servo PWM duty cycles

Virtual SCARA Robot | *Augmented reality with virtual SCARA robot* Sep. 2022 - Nov. 2022

- Virtual SCARA robot created with C++ with interactive functionality from a GUI
- ChArUco board captured with camera in which physical coordinates were derived
- Rotation and translation matrices used to calculate from base to end effector position
- 5th order polynomial implemented to create smooth trajectories in robot

Ray's Ironman Costume | *Voice activated ironman helmet* Nov. 2021 - Dec. 2021

- An extracurricular group project featuring a voice activated helmet programmed with Python
- Designed and soldered gate driving circuits and MOSFET circuits to power 12V LEDs using 3.3V PWMs
- UART utilized to have interpreted voice commands from Pi defer actions to separate ESP32 microcontrollers

Education

British Columbia Institute of Technology Sep. 2019 – May 2023

Bachelor of Engineering in Electrical Engineering *Burnaby, BC*

- Competed and placed first in the senior design category of Western Engineering Competition 2023, exemplifying engineering and programming skills in a 8-hour timespan
- Used C to program TI C2000 microcontroller, referencing datasheets for registers to utilize ADC, SPI and UART and threading tasks via RTOS
- Gained signal processing techniques such as designing digital filters and discrete fourier transforms, implementing them with a TI MSP432 microcontroller
- Applied training in circuit analysis in laboratory sessions to use oscilloscopes, DMMs, power supplies, waveform generators, then creating circuits that exemplified skillset
- 3.82 GPA

Experience

Engineer in Training May 2022 - Present

Apex Motion Control *Surrey, BC*

- Programmed algorithms via Python for an object detection and profiling system to handle differing orientations of detected objects
- Altered the object detecting and profiling system's setup to use a Gocator camera, referencing datasheets to properly draw new schematic
- Designed a framework using the Gocator camera's SDK, written in C, to be interfaced with an existing framework for UR Robots, written in Python
- Commissioned 6 "Tray Feeders", which involved tuning PID loops for motors and tweaking PLC and HMI to integrate new user features
- Coordinated programming efforts with team using GitHub, using branches to add new features and fix issues

Student Peer Tutor Sep. 2020 - Present

BCIT Learning Commons *Burnaby, BC*

- Assisted students to identify areas of weakness in conceptual understanding, and provided support to help students overcome them
- Provided advice on study and note-taking habits when requested
- Kept up in fundamental courses to more effectively provide assistance to students