MOHAMED EL SHATSHAT

MECHATRONICS ENGINEER

bigmanmo.github.io
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SKILLS

Software:
C, C++, JavaScript (ES6), Node.js, Python, Bash, MATLAB, HTML, CSS

Hardware:
FPGA, PLC, Rapid Prototyping, PCB Prototyping, Soldering

Tools:
Windows, Linux (Debian), Git, Arduino, ROS, CMake, Docker, OpenWRT, Polymer, RabbitMQ, FreeRTOS, AngularJS, Karma, Simulink, nw.js, QT, IntelliJ, SOLIDWORKS

EDUCATION

Bachelor of Applied Science Honours (Co-op)
Mechatronics Engineering
University of Waterloo

Relevant Courses:

- *Autonomous Mobile Robots*
- *Programming for Performance*
- *Algorithm Design and Analysis*
- *Automatic Control Systems*
- *Sensors and Instrumentation*
- *Microprocessor Systems and Interfacing,*
- *Computer Structures and Real-Time Systems*

WORK EXPERIENCE

Video Codec Engineer
NGCodec Inc, Waterloo, ON — *May - Aug '18*

» Developed a multi-format multi-platform bitstream analyzer used to expose video statistics to improve development of the latest video encoders
» Researched open source decoders to improve the performance of the analyzer and integrated new decoders for the VP9 decoding format the increased decode speed by 2x
» Significantly improved the VP9 deblocking filter speed while only reducing video quality by 0.05% and fixed bugs in H264 mode decision that increased the PSNR of encoded bitstreams by 2%
» Integrated the bitstream analyzer into QA's workflow by using acquired statistics as thresholds for automated tests that would alert developers of changes in video quality

Embedded Software Developer
Clearpath Robotics, Waterloo, ON — *Jan - Apr '18*

» Developed firmware for microcontroller to handle fan control, wheel control, and HMI display for a new line of autonomous mobile robots
» Developed a real-time operating system environment for the decentralized motor controllers to allow for message prioritization and guaranteed message passing from central microcontroller to motor drivers
» Upgraded simulation packages to be compatible with the latest version of ROS (Kinetic) and improved the Bluetooth connection package for robot joysticks

Software Developer
OpenText, Waterloo, ON — *Apr - Aug '17*

» Developed features for OpenText Core desktop client comprised of a Node.js client and the Python file synchronization engine
» Augmented features to enhance existing automated tests and identified several critical bugs in the synchronization engine
» Participated in code reviews to ensure alignment along the critical path and to facilitate knowledge sharing
» Integrated Core functionality into various OpenText software and presented the new features at Enterprise World 2017

IoT Software Engineer
Onion, Toronto, ON — *Sept - Dec '17*

» Created a streamlined web-based setup wizard for the Omega2 using the Polymer framework that simplified connecting to WiFi, account creation, and firmware updates
» Developed a Bash network manager for the Omega2 that sets up WiFi network connections and automatically connected to nearby saved networks on boot
» Wrote a Node.js application that parsed over 500,000 worldwide shipping orders and charged Kickstarter backers through Stripe and PayPal
» Documented the new features of the Omega2, and created several beginner tutorials for maker projects utilizing the device

SQA Developer
Imagine Communications, Waterloo, ON — *Jan - Apr '16*

» Performed manual testing for the Onyx Media Player and worked with developers to fix bugs found in the media player and the installer
» Wrote Python scripts that communicated through RabbitMQ to automate stress testing, and to test features not yet implemented in the UI
» Conducted weekly demonstrations of new Onyx features to developers and managers

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PROJECTS

Inspeksi – The Smart Defect Detector
http://inspeksi.me/ *Mar '18 - Dec '19*
» Designed a low-cost solution to generalize and automate manufacturing inspection using Deep Learning models
» Created a proof of concept that uses a 3D-printed robot arm with a web camera end effector to use captured images and Instance Segmentation to label and identify scratches, dents, scuffs, and discolorations
» Fabricated an enclosure to ensure consistent lighting and background for testing the AI model
» Developed a back-drivability mode with Python that allowed users to record movements for the robot arm motors and replay them
» Created a web server for a Raspberry Pi to notify the computer that new images are available to be processed to ensure stable images were captured by the arm
» Winner of the 2019 Autodesk Canada Capstone Design Award for exceptional software design

Remotely Operated Underwater Vehicle (ROV)
University of Waterloo, Waterloo, ON, Canada *Feb - Mar '17*
» Designed and constructed a small underwater autonomous vehicle from 3D printed parts
» Developed Arduino code for teleoperation mode that controls the vehicle using a PS2 controller, and autonomous mode
» Calibrated IMU, pressure sensors, and ultrasonic sensors for autonomous navigation through an underwater obstacle course
» Tested the autonomy code to ensure that calibration values worked under real conditions
» Documented design decisions and failures for future reference

Personal Website
https://bigmanmo.github.io/ *Dec '16*
» Developed a modern and interactive resume to host personal and professional information about myself
» Applied design principles to create an aesthetically pleasing webpage

Bridge Design
University of Waterloo, Waterloo, ON, Canada *May - Aug '16*
» Created simplified 2D finite element solver in MATLAB for rapid design evaluations
» Performed finite element analysis using ANSYS AIM and SolidWorks models

Line Following Robot
University of Waterloo, Waterloo, ON, Canada *May - Aug '16*
» Programmed and constructed line following robot on custom PCB board
» Characterized motors & constructed light sensors using IR LEDs and photodiodes
» Utilized oscilloscope to test and verify component operation
» Integrated multiple sensors including optical encoders, thermistors & hall effect sensors to direct action coded in C
» Calculated values for surface-mounted soldered circuit components to achieve necessary voltage gains in op-amps

Temperature Sensor
University of Waterloo, Waterloo, ON, Canada *Nov '15*
» Utilized thermistor for raw temperature readings
» Processed & calibrated data using Arduino and Thermodynamic formulas
» Programmed LED display interface with corrected temperature readings within 1°C accuracy

Symptom Tracker and Analysis Project
Hack4Health, Waterloo, ON, Canada *Sept '15*
» Designed GUI for multiple sclerosis patient survey of symptoms rated from 1 -10
» Data collected & stored in relational database using user friendly features coded in SQL
» Coded macro in VBA to automatically send warning emails to family members/caretakers
» Finalist at Hack4Health competition