Pholo Motshidisi

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GRADUATE ELECTRONICS ENGINEER

C++ software | Automotive | Robotics | Communications

A highly motivated ***MEng (Hons and Industrial Project) in Electronic Communications*** graduate, driven by **innovation** and **efficiency**. With special interest and knowledge in **embedded software, robotics, automotive electronics,** and **communication technologies.** My skillset and technical knowledge are in **software development** in **C/C++** and **Python**, robot **prototyping**, DSP techniques, **communications and IoT**, and **Circuit design**, stated under projects section along with the specific skills applied in the projects. Looking to obtain an engaging position within a stimulating environment, and an opportunity leverage my *ready skills*, *core strengths*, *specialty knowledge* and learn the latest industry standard technologies to develop solutions to satisfy client needs and service standards, which directly or indirectly benefit an organization. I aspire to work towards engineering chartership and postgraduate research in communications eventually.

Core Strengths

- Strategic approach to Complex Problems
- Creative designs and solutions
- Attention to detail
- Can-do mindset
- Eager to learn and upskill

Other specialties

- Digital Signal Processing
- Telecommunication Networks
- PLC and Automation
- Power Electronics
- Machine Vision and Image Processing
- Signals and Communications

Professional Experience

Hindley Circuits | Cramlington, UK June 2022 – August 2022

Assembly Line Worker

This position has improved my commercial awareness in the production and population of commercially acceptable PCBs and communication with mates and superiors**.** The following skills I demonstrated for this position:

- **Interpreting circuit diagrams** from work instructions and BOM as per client specifications.
- **Soldering** and **desoldering THT** and **SMD components** to pass for **IPC-A-610 Class 3 standard**.
- **Coordinate** with other workers and communicate back and forth along production chain for adjustments.
- *Inspection* and *rework* of minor faults and deformities on PCBs before the next production stage.

Newcastle University | Newcastle Upon Tyne, UK September 2021- January 2022

Communications Systems Industrial Project

- Researched and compiled comprehensive reports on the status of **5G rollout** and emerging techniques used by Internet Service Providers to improve 5G coverage.
- Developed a MATLAB test script for simulation and analysis of **OFDM and MIMO techniques** in 4G.
- Demonstrated through live presentation how OFDM and Massive MIMO potentially satisfy the set standards of 5G IMT-2020 using **MATLAB 5G** package.
- Delivered the finding to a panel of examiners in a live presentation and as documented.

Projects Undertaken and Skills Applied

- **C++ Software Design**: designed an application that emulates a simple Bank capable of storing saving transaction data in encrypted files. A logbook for capturing names, contact, temperature, and time stamp for a convenient COVID-19 contact tracing by venues. These projects incorporated advanced **C/C++** concepts such as classes, inheritance, error handling and file handling. Used **Git** and **GitHub** for version control.

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- **Robot Prototyping**: *Led* a team of 4 in the design of a self-driving vehicle using multiple Arduino microprocessors, aim being to use it for unmanned missions in hostile environments or for stealth surveillance. Onboard systems include DC motors with speed encoders, motor driver, power converter, battery, ultrasonic sensors for obstacle detection, GPS and IMU for navigation. Communication between sensors and microprocessors used include **I2C, UART, SPI and interrupts** using custom and published libraries. Project included **documentation** of the design, **debugging**, **testing** and **performance analysis** with iterative improvements.
- **Digital Signal Processing:** Designed Low Pass, High Pass, Bandpass and Band stop filters using Rectangular, Hanning, Hamming and Blackman windowing techniques in **MATLAB** and C++. **Testing** and **verification** of results was carried on MATLAB and **Audacity**, respectively. Implemented a hardware low pass filter on a DE1 SoC Cyclone V **FPGA**, programmed in **VHDL**, on Quartus, simulated in Altera ModelSim. A frequency sweep from a **signal generator** was used as test input and the resulting frequency response captured on an **oscilloscope**.
- **Communications and IoT Devices:** Designed a low power radio transmitter with a limited range to demonstrate filtering, modulation, and demodulation of **RF analog signals**. Performed a simulation of the performance of OFDM and MIMO techniques in a noisy and multipath fading channel on **MATLAB**. Explored ways of monitoring room temperature on a **mobile phone** online via **WIFI** and **Bluetooth** using an MBED LPC1768, a **32-bit ARM microprocessor** running MBED OS.
- **Circuit design:** Designed a battery powered bicycle blinker to retain both hands on the controls while signaling for a turn by a push of a button, *aim being to improve safety and confidence of cyclists*. The design uses a DIL THT PIC **microprocessor** programmed in C/C++, passive components, and LEDs. **LT-SPICE**, **KiCad**, **Tinkercad** were used for **schematic capture** and **circuit simulation**, **PCB design** and **3D print**ed mounts design, respectively.

Volunteer Work

Part-time Domestic Work | Lightning Estates | Jan 2022- June 2022

Managed and maintained household communal areas in a hygienic state as scheduled weekly.

Newcastle Student Representative | Botswana Students Union UK | May 2020-April 2021

Liaised and negotiated with the Botswana embassy on policies affecting Batswana students.

Electrical Engineering Ambassador | Engineering Outreach (part-time) | Oct 2019- Mar 2020

Delivered a simplified introduction to engineering presentation to elementary school students.

Crew Member | Newcastle University Fresher's Crew | 2019

Organized, planned, and supervised social events for new university students alongside other crew members.

Notable Achievements

- Selected as captain of Maruapula Volleyball club, 2018.
- Excellence Award: Top 10 Best achievers in the 2015 BGCSE series by Botswana Examinations Council.
- Excellence Award: Best in the Northwest Botswana Region by Ministry of Education, Botswana, 2014.

Education

MEng (Hons and Industrial Project) Electronic communications, 2:1 | Newcastle University | 2018-2022

AS and A Levels | Maruapula School | 2016-2018

Botswana GCSE| Shakawe Senior Secondary School | 2014 – 2015

Language Skills

English *(Proficient*) **| Setswana** (*Proficient*)