Wambui **Karuga**

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Work Experience

Jangala   *Nairobi*

SOFTWARE ENGINEER   *June 2020 - Present*

Jangala is a UK-based charity dedicated to enabling internet access for people in need of humanitarian aid using two different router systems (Big Box and Get Box)

- Wrote a Device Tree for the Get Box to move from the ar71xx architecture to the newer ath79 architecture to facilitate use of newer Linux kernels and latest OpenWRT features.
- Implemented a low signal utility using Netlink sockets interfacing with the nl80211 kernel driver to maintain only connected clients above a specified threshold signal to the Get Box's Wi-Fi to improve user experience.
- Added support for the Get Box board to the U-Boot boot loader to take advantage of various boot and run time configurations that U-Boot provides.

Outreachy   *Nairobi, Kenya*

LINUX KERNEL INTERN - GPU SUBSYSTEM   *January 2020 - April 2020*

Outreachy is a programme through which selected interns can contribute to various open source software projects

- Optimized various drivers in the GPU subsystem by implementing fixes found using semantic checkers suchas sparse and coccinelle.
- Incorporated new logging mechanisms into the various GPU drivers for consistency and improved performance.
- Refactoring of the core DRM debug filesystem implementation and subsequent integration of the changes across the subsystem's drivers.
- Accepted patches can be seen in the queries here.

BRCK   *Nairobi, Kenya*

EMBEDDED SOFTWARE ENGINEER   *September 2018 - December 2019*

BRCK LTD is a telecommunications company that provides rugged Wi-Fi routers (SupaBRCKs) for connecting frontier markets to the internet

- Implemented a client network traffic logger in C that utilized connection tracking data in the Linux kernel using the Netfilter subsystem and Netlink sockets, thereby improving the accuracy of reported client metrics in the SupaBRCK's Wi-Fi network.
- Implemented a client session logger in C using the Netlink interface with the nl80211 driver to interface with the RTL8821AE Wi-Fi chip to track client connects and disconnects as reported by the Wi-FI chip kernel driver.
- Designed and developed a Linux kernel module in C that controlled and interfaced with General Purpose Input/Output(GPIO) pins used for detecting, switching and controlling SIM cards on the SupaBRCK. This increased the efficiency of SIM related functionality by having direct access to the hardware pins in kernel space.
- Writing and maintaining device firmware in C for an MSP430 Texas Instrument smicrocontroller that provided various low-level functionality of the SupaBRCK such as automatic powering on and off, and power and battery management.

Education

Jomo Kenyatta University of Agriculture and Technology   *Nairobi, Kenya*

BSc IN MECHATRONIC ENGINEERING GRADUATING WITH SECOND CLASS HONORS, UPPER DIVISION.   *September 2013 - August 2018*

- **Mathematics Coursework:** Calculus, Ordinary and Partial Differential Equations, Numerical Methods.
- **Programming Coursework:** Embedded applications using C, C++, and x86 Assembly language, Control Systems Engineering.
- **Electrical Coursework:** Circuits and Logic Design, Digital Electronics, Microprocessors and Microcontrollers.

Projects

MTX

- MTX is an ongoing implementation of a file explorer designed to sort files according to their frequency of use on each day of the week.
- MTX has a graphical user interface written using the QT framework.
- **Technologies:** C++, QT

Languages and Technologies

Programming Languages	C, C++, Python, Shell Scripting
Technologies	Git, OpenWRT, MongoDB, Linux, GNU Build System
Spoken Languages	English, Swahili