Chukwuemeka Nkama

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WORK EXPERIENCE

Carnegie Mellon University **May. 2023 – Present**
Computer Vision Researcher *Kigali, Rwanda*

- As a computer vision researcher, I oversee the task of leveraging computer vision, deep learning and image processing techniques to efficiently generate 3D models of real world objects at the right scale.
    - Developed a codebase from scratch utilizing principles of linear algebra and OpenCV to accurately estimate the real-world size of objects depicted in images
    - Performed object detection using YOLOv8
    - Performed instance segmentation and contour conversion to dxf files for use in CAD softwares
    - Evaluate the results of different popular 3D reconstruction model architectures such as Neus and Occupancy networks

Trigga Technologies Limited **Sept. 2020 – July 2022**
Frontend Developer *Lagos, Nigeria*

- Website management and search engine optimization of web pages for different clients
- Development of MVP demos using no-code tools (Appsheet, Adalo and Bubble)
- Design and development of a commercial retail product
- Product research and Ad management

Dgazelle Digital Agency **Jan. 2020 – Sept. 2020**
Website Administrator *Lagos, Nigeria*

- Backend management of websites
- Search engine optimization of web pages

EDUCATION

Carnegie Mellon University Africa **Dec, 2023**
MS, Engineering Artificial Intelligence *Kigali, Rwanda*

- 3.99/4.0 GPA

University of Lagos **Nov, 2018**
B.Sc, Mechanical Engineering *Lagos, Nigeria*

- 4.58/5.0 CGPA (First Class)

PROJECTS

- Development of Arco, a sound synthesis server
    - Bug fixing for Serpent and the communication protocol server
    - Implementation of Resound pieces using Serpent
    - Code testing of Reverbs and granular synthesizer

- Development of O2 protocol libraries for Linux using p5.Js and Puredata
    - Development of CMake files to build o2 libraries for Pd
    - Building of static web pages with P5.Js and controlling Pd remotely
    - Development of Pd Patches for live-testing of remote control over different continents

- Piano Music Transcription using Auto-regressive Models
  - Implementation of the polyphonic piano transcription paper by Taegyun Kwon et al
  - Testing the effect of label smoothing on piano transcription
  - Methodology development for transcription assessment between two midi files

- 3D Reconstruction of residual arms for prosthetics using machine learning
  - Class definitions using linear algebra to overcome OpenCV's limitations with images
  - Real-world estimation of the size of residual arms from images
  - Contour segmentation and generation of 2D CAD files using Python
  - Automation of past research work using Python and Blender
  - Evaluation of popular 3D reconstruction machine learning models

- Livestock identification using Biometrics and Machine Learning
  - Implementation of the ResNet model on the Beef Cattle Muzzle print database
  - Development of a Siamese architecture to solve issues of scalability
  - Running of several experiments on the Siamese model to draw relevant insights

- Synthetic data generation for malaria detection in developing countries
  - Research into Africa's issues with malaria
  - Implementation of a CNN model to correctly identify malaria parasites in images
  - Generation of synthetic data using generative adversarial networks to simulate the paucity of african-based malaria image datasets

TECHNICAL SKILLS

Programming Languages & Libraries
Linux, Arduino, Raspberry Pi, C, C++, Python, GNU Octave, Javascript, Matlab, Lua, Serpent, Angular, Pytorch, Tensorflow, Numpy, Pandas, Matplotlib, Sklearn, Scikit, OpenCV, Pillow, HTML, CSS, CMake

Cloud & DevOps
Git, Docker, Prometheus, Kialis, Grafana, Kubernetes, Microsoft Azure, AWS, GCP

Music Technology
Csound, Pure Data, JUCE

Scrum/Agile
Jira, Git

CERTIFICATIONS & COURSEWORK

Certifications
Google Africa Developer Scholarship, Machine Learning (Stanford), Digital Signal Processing (EPFL), Arduino Platform and C programming (University of California, Irvine)

Coursework
AIOps, Introduction to Machine Learning, Introduction to Deep Learning, Applied Computer Vision, Data Inference and Applied Machine Learning, Programming for Data Analytics, Applied Stochastic Processes, Data structures & Algorithms, AI System Design, Big Data Science, Principles and Engineering of Artificial Intelligence

INTERESTS

Music Production, Music composition, Piano performance, Football, Basketball, Reading