

ARKAAN QUANUNGA

Software Developer ~
Machine Learning Engineer

 portfolio

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SUMMARY

With a diverse background in cutting-edge software development, AI-driven video compression, and scalable systems, I specialize in building impactful, high-performance solutions. At Roku I ship autonomous QA products and multi-agent platforms (Explorer, QANTUM, Forge) that turn exploratory testing and test automation into production workflows. Proficient in Python, JavaScript, AWS, and DevOps technologies, I've successfully integrated advanced tools to optimize AI workflows and automate complex processes. Passionate about collaboration and continuous improvement, I thrive in pushing technological boundaries and delivering innovative solutions.

ACHIEVEMENTS

Collaborated with NVIDIA to automate video analysis, contributing to a devblog published on the NVIDIA Developer Blog: Enabling Customizable GPU-Accelerated Video Transcoding Pipelines.
Excelled in analytical and problem-solving domains: *Silver Award in Senior Challenge UKMT.*
Achieved a perfect score in Fluids & Heat Transfer Module.
Highly Commended in the British Biology Olympiad.

SKILLS

Languages:	Python, JavaScript, SQL, C++, R, MATLAB, Bash, Linux, PowerShell
Web Dev:	React, Node.js, Flask, Bootstrap, FastAPI, Streamlit
Cloud Tech:	AWS (EC2, Lambda, S3, RDS), MySQL, PostgreSQL, Alembic, Boto3 <i>Certification:</i> AWS Solutions Architect Associate, AWS ML Specialty
DevOps:	Docker, Jenkins, Terraform, Kubernetes, Ansible, GitLab CI
ML:	TensorFlow, Pytorch, Scikit-learn <i>Certifications:</i> TensorFlow Developer, Advanced ML Specializations
AI Pipelines:	CLIP, Vision Embeddings, VideoBERT, YOLOv8, RAG (text/visual/multimodal), ChromaDB, Qdrant, LLM reasoning, RL (LSTM/PPO), Multi-Agent, MCP
Agents / Integrations:	LiteLLM, Claude Agent SDK, Cursor SDK, MCP, multi-agent orchestration; Slack, Jira, Confluence, GitLab, Entra SSO
Data:	Pandas, Numpy, Matplotlib, Plotly <i>Certification:</i> IBM Data Science Professional Certificate
Testing:	Pytest, Selenium, Cucumber, BDD, TDD <i>Certification:</i> ISTQB Certified Tester Foundation Level (CTFL)

EXPERIENCE

5/2025
Present

–Software Engineer, AI Innovation & Automation

Roku

- Shipped **Roku Explorer** as a production autonomous QA product now used by **multiple teams** for exploratory and focused testing on Roku device UIs — combining Reinforcement Learning (RL), Retrieval-Augmented Generation (RAG) with ChromaDB, and Large Language Models (LLMs) to navigate interfaces and surface functional/visual bugs with far less manual QA overhead.
- Built **change-driven exploratory testing**: analyse diffs landing in main development repos, generate targeted exploratory/focused scenarios for at-risk areas, and have Explorer execute them — closing the loop from code change → risk → automated device exploration.
- Building **QANTUM**, a Slack-native multi-agent QA orchestration platform that routes work across product tools (Forge, Explorer, BOLT, and others) via a capability protocol — including shared agent memory, user memory, Explorer MCP tooling, and automated MR create/validate flows (Grand Central first: TRC + Live).
- Building **Forge**, an AI automation agent that investigates product-area workstreams, creates automation tickets, and generates/runs tests in `automated_tests` / `roku_automation` — with multi-ticket orchestration (git worktrees), delivery gates (review/CI/integration), and semantic indexing of the automation corpus.
- Scaled AI-assisted delivery across these platforms (EC2/Docker deploys, GitLab CI, Jira/Slack integrations, parallel agent pipelines) so Explorer stays production-ready while QANTUM and Forge expand agentic QA coverage.
- This work represents a **patent-pending innovation (US/EU)** aimed at transforming manual QA into a data-driven, autonomous process that surfaces functional and visual bugs faster while reducing engineering overhead.

Python, PyTorch, TensorFlow, LiteLLM, OpenAI GPT, ChromaDB, Qdrant, RL (PPO/LSTM), Streamlit, Flask, FastAPI, MySQL, PostgreSQL, Alembic, Docker, Kubernetes, Multiprocessing, Vision-Language Models, RAG, Multi-Agent Systems, MCP, Claude Agent SDK, Cursor SDK, LLM Reasoning, Autonomous QA, GitLab CI, Jira, Slack, Entra SSO

9/2022
5/2025

–Software Engineer, AI & Video Technologies

V-Nova

- Delivered a PaPeR to Meta, innovating in video compression testing and improving testing scalability by providing an automated framework. This helped accelerate the integration of V-Nova's technology into Meta services like WhatsApp, Instagram, and XR platforms.
 - Managed a project to certify clients on V-Nova's technology Integration, moving from concept to PoC by automating video quality measurement and function tests at scale.
 - Collaborated with NVIDIA on VC6 performance analysis, integrating VC6 to be launched at scale in distributed computing environments, enabling efficient analysis of compression jobs and enhancing AI-driven video compression technologies.
 - Led the evolution of V-Nova's in-house infrastructure, transitioning from a monolithic to a microservices architecture, achieving a 40% enhancement in system scalability and a 50% reduction in maintenance overhead, significantly accelerating deployment cycles.
 - Fostered a culture of excellence and innovation through mentorship, improving team productivity by 15% and strengthening the company's technical capabilities and service delivery.
 - Enhanced cross-platform SDK performance tracking on Windows, Linux, and macOS by developing a KPI measurement system, improving reliability and cross-platform functionality.
 - Initiated the integration of DRIVE (Devices Routing Integration for Video Encoding), enabling seamless encoding on Android and iPhone devices. This led to an 800% increase in the speed of video analysis on phones, with encoding and setup times reduced by 86%. The project was later extended to include power, battery, and decoding performance tests, further enhancing mobile testing capabilities.
- Python, JavaScript, Flask, C++, React, Pytorch, TensorFlow, Numpy, Pandas, ETL, MySQL, MongoDB, Linux, AWS (EC2, Lambda, S3, RDS), Docker, Kubernetes, Terraform, Ansible, Jenkins, boto3, FFmpeg, Video Codecs, ADB, Plotly, Matplotlib, Distributed Computing, Multi-Modal LLM Training, Neural Networks, ChatGPT API Integration

8/2021
9/2022

–Graduate Software Automation Test Engineer

The Software Institute

- Contributed to consulting projects with Qualitest and British Telecom (BT), leading to a 20% increase in project delivery efficiency.
 - Developed and implemented automation test frameworks using Java, JavaScript, Selenium, and Cucumber, increasing test coverage by 40% and halving regression testing time.
 - Optimized CI/CD pipelines with Jenkins and AWS, reducing deployment times by 35% and doubling deployment frequency.
 - Led e-Sim architecture integration testing across Smart Watches, iOS, and Android, achieving 99.9% system uptime.
 - Supported the development of cutting-edge architectures for Apple and Google smartwatches, positioning BT at the forefront of wearable OS technology.
- Java, JavaScript, Selenium, Cucumber, Spring Boot, Jenkins, AWS, CI/CD, SQL, Excel

5/2018
6/2020
Internship

–Junior Engineer

Riztech Construction Ltd

- Provided essential support to senior engineers, streamlining organizational operations and enhancing daily function efficiency.
 - Developed a Python-based program to automate structural cost estimation, significantly improving accuracy and efficiency.
 - Collaborated with senior engineers to analyze and validate energy savings calculations, aligning project outcomes with sustainability goals.
 - Prepared and delivered high-level presentations and meetings, effectively communicating complex information to key stakeholders and fostering team collaboration.
 - Enhanced team productivity by 21% through the automation of routine tasks, earning commendation for innovation and efficiency.
- Python, Hyperworks, CAD, Project Management, Team Collaboration, Energy Efficiency Analysis

PROJECTS

Core Developer
Autonomous QA

Roku Explorer

May 2025 – Present

Shipped a production autonomous exploratory testing platform used by multiple teams for exploratory and focused testing. Combines RL, RAG/ChromaDB, LLM reasoning, and vision to navigate Roku UIs, surface bugs, and support human-in-the-loop QA via dashboards and device fleets.

Software Engineer
Change-Driven Testing

Exploratory Scenario Generation

2025 – Present

Built the pipeline that analyses diffs landing in main development repos, generates specific exploratory/focused testing scenarios for at-risk areas, and has Explorer execute them — closing the loop from code change to automated device exploration.

Software Engineer Multi-Agent QA	QANTUM Building a Slack-native multi-agent QA orchestration platform with a capability protocol across Forge, Explorer, BOLT and related tools; shared/user memory, MCP integrations, and automated MR create/validate flows (Grand Central first: TRC + Live).	2026 – Present
Software Engineer AI Test Automation	Forge Building an AI agent that investigates product-area workstreams, creates automation tickets, and authors/runs tests in <code>automated_tests</code> / <code>roku_automation</code> , with multi-ticket git worktrees and delivery gates for review, CI, and integration.	2026 – Present
AWS Backend Developer & DevOps Engineer	PaPeR - Parallel Performance Runner - Built AWS backend infrastructure and Terraform script development for PaPeR, collaborating with SPIE, Meta, and Intel to automate and enhance video quality data processes. - Achieved a 99% reduction in SPIE methodology setup times on AWS, slashing initial setup durations from up to 3 hours to seconds and saving over 1800 hours across 600 experiments. - Designed and implemented a scalable system using Flask and MySQL, boosting session submission efficiency and automated AWS instance management, resulting in a 50% increase in operational throughput for parallel processing tasks. - Leveraged Terraform for comprehensive AWS infrastructure automation, improving project security and scalability by 40% and cutting resource provisioning times by 75%. - Played a key role in evolving PaPeR into an essential tool for generating large-scale machine learning datasets and developing innovative video compression solutions, accelerating data preparation and analysis workflows by 60%.	Nov 2022 – Dec 2023
Portfolio Projects	Showcasing Diverse Technical Expertise Data Science Projects, Automation Projects, Machine Learning Projects	

EDUCATION

9/2017 - 7/2020	Bachelor's degree, Mechanical Engineering Graduate with first-class honors (76%) (GPA equivalent: 4.0/4.0)	Coventry University
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PROFESSIONAL CERTIFICATES

Operating System	Complete Linux Training Course (Udemy), Linux Specialisation (Coursera)
Cloud Computing	AWS Certified Machine Learning, AWS Certified Solutions Architect Associate (AWS)
System design	Software Architecture & Design of Modern Large Scale Systems
GPU Programming	CUDA Basics & High Performance Computing (Udemy)

ML CERTIFICATES & SPECIALIZATIONS

Core-ML	Machine Learning (Stanford Online)
Deep-Learning	Deep Learning Specialization (DeepLearning.AI), TensorFlow Developer Certificate (Google Developer Certification)
MLOps	Machine Learning DevOps Engineer (Udacity)
LLM	Building Systems with Chat GPT API (DeepLearning.AI)