

# Why Does AI Research and Development Seem Harder in Africa?



Seven years ago, I embarked on my journey into deep learning on a shoestring budget, armed with nothing but a personal laptop devoid of an AI-ready **General Processing Unit (GPU)**.

Back then, every AI competition I participated in felt like a **David vs. Goliath battle**. I would scrape by with a gaming laptop—upgraded a few years later to one equipped with a GTX 1060 GPU (6GB of VRAM)—while competitors wielded the power of GPUs like the Titan X (12GB VRAM) or the RTX 2080 (11GB VRAM).

Their computational edge was undeniable.

One critical lesson I learned during those competitions was that while GPU memory matters, **faster GPUs make the real difference**.

They enable rapid experimentation, helping researchers iterate through models and configurations more quickly to identify what works.

Conversely, a **slow experiment loop can kill creativity** and limit the scope of exploration. Many hackathons and competitions we joined were lost not due to lack of skill or ingenuity, but because of the sheer computational disadvantage we faced.





# Part 1

## The Compute Divide

Fast forward to 2021, when I joined Carnegie Mellon University (CMU) as a graduate student, this realization solidified further. As a teaching assistant for CMU's renowned "11785 Introduction to Deep Learning" course (shoutout to Prof. Bhiksha Raj!), I witnessed firsthand how compute resources could make or break a project. Again, deep learning thrives on experimentation—trying countless configurations, tuning hyperparameters, and retraining models to find optimal solutions. **Without adequate compute, this iterative process becomes painfully slow, hindering progress and discouraging innovation.**

Now, looking at the state of AI research in Africa, I remain deeply concerned. Compute scarcity continues to handicap researchers across the continent.

While some global institutions and companies provide cloud credits, they are often insufficient for sustained research efforts. High-performance GPUs like NVIDIA **V100s are rare**, and **even consumer-grade GPUs** like the RTX 3090 remain out of reach for many. In this rapidly evolving field, where hardware becomes outdated in mere years, this lag exacerbates the global AI gap





# Part 2

## Data: A Silver Lining with Challenges

Despite these challenges, there has been commendable progress in data initiatives across Africa. Many institutions are supporting the **creation of datasets tailored to local challenges**, from agriculture and health to infrastructure and linguistics. These efforts are essential in addressing the underrepresentation of African contexts in global AI systems. However, dataset creation is **just one piece** of the puzzle. Standardization, privacy concerns, and fragmented efforts often **limit the utility of these datasets** for broader AI research.



Moreover, **collecting and labeling data is an expensive** and time-consuming process. Without significant funding or support, many African researchers struggle to scale their efforts or produce datasets that meet global benchmarks.



THE PRACTICALITY TRAP.  
OPTIMIZING FOR  
CONSTRUED ENVIRONMENTS

# Part 3: The Practicality Trap: Optimizing for Constrained Environments



Another challenge unique to AI in Africa is the emphasis on developing models for deployment in **resource-constrained environments**.

While optimizing for efficiency is a worthwhile goal, it often forces researchers to **prioritize** practicality over innovation.

This focus on applied AI, while addressing immediate needs, limits opportunities to explore cutting-edge, **compute-intensive research** that could contribute to the global AI ecosystem.

At the same time, many AI engineers and researchers in Africa cannot leverage the competitive advantage of fast experiments that often lead to the **early identification of failure cases** or better hyperparameter combinations.

This is also supported by the **general belief** that having the same **constraints at both the training and inference stages**, forces engineers and developers to innovate in adapting and optimizing models for low-resource deployment.

Global trends show **this is much harder** to do and Kudos to those who are making this happen!



A digital illustration of a dimly lit computer lab. In the foreground, a young girl with dark skin and curly hair sits at a desk, resting her chin on her hand and looking thoughtfully at a laptop. On her desk are also an open book and a stack of CDs. In the background, several other people are seated at desks with computers. A man on the left is seen from behind, working on a laptop. A person on the right is also working. The room is filled with computer monitors displaying code and data. A large monitor in the center background shows a wireframe face and the text "Why is it so hard to do AI in Africa." The room has a warm, yellowish light, possibly from a window on the left. The overall mood is one of quiet concentration and intellectual pursuit.

# Part 4: But Why Is It So Hard to Do AI Research in Africa?

## Limited Compute Resources

High-performance **GPUs** are either **unavailable** or **prohibitively expensive**. Cloud services are an alternative, but their costs quickly escalate for large-scale projects.

## Infrastructure Gaps

Stable electricity, reliable internet, and robust cloud infrastructure are not universally **accessible**. These systemic issues compound the challenges faced by researchers.



## Brain Drain

Talented African **researchers often leave** for better opportunities **abroad**, further depleting local expertise and mentorship opportunities.

## Global AI Inequalities

Access to **pre-trained models**, proprietary tools, and state-of-the-art research often comes with **steep** financial and institutional **barriers**.

## Funding Constraints

All the aforementioned challenges could be easily reduced to a “**money issue**”.

Research funding in Africa is limited compared to global AI hubs. Even when looking at funding **trends in Francophone and Anglophone countries** across the continent, some academic institutions and independent researchers often lack the financial resources to **invest in hardware**, software, or skilled personnel; let alone local startups or SMEs.



The background image is a conceptual illustration. It depicts a person with a beard, wearing a plaid shirt, sitting at a desk in a dimly lit room. The room is filled with computer monitors displaying code, stacks of cardboard boxes, and various tools. A large, glowing blue sphere is in the background, surrounded by a network of lines and smaller padlocks. A large padlock in the center of the sphere is labeled 'OPEN' and 'OPEN-SOURCE'. The text 'THE HIDDEN BARRIER: OPEN-SOURCE CULTURE' is visible at the top. The overall theme is the challenges and barriers to open-source culture in African AI development.

# Part 5: The Hidden Barrier: Open-Source Culture Struggles in African AI Development



Open-source has been the backbone of global AI advancements, enabling **collaboration**, innovation, and accessibility. Open-source (and open-access) tools, platforms, and frameworks like *Github*, *Arxiv*, *PaperWithCode*, *PyTorch*, and *Hugging Face* have democratized access to cutting-edge innovations in various aspects including knowledge, data, and models.

However, in Africa, a **reluctance to embrace open-sourcing** is holding back AI development.

Many local researchers and organizations **hesitate** to share their work, often driven by **fears** of losing intellectual property, **limited funding** to sustain open projects, or concerns about **exploitation** by well-funded global entities.

This lack of open sharing **creates silos**, reducing collaboration and slowing progress.

Without a strong culture of open-source, **innovations remain isolated**, and others cannot build upon local solutions to address shared challenges.

A **shift** toward open-source collaboration could be transformative, fostering a more connected AI ecosystem in Africa and ensuring **local contributions** make a global **impact**.

Open-source contributions have been pivotal in global AI growth. Encouraging a **culture of sharing** in Africa—paired with improved access to compute and funding—could unlock vast potential.

Collaboration, not isolation, is key to bridging the AI divide. Without it, **Africa risks staying on the sidelines** of this transformative field.



THE PATH FORWARD  
A BRIGHTER FUTURE

# Part 6: The Path Forward

To bridge the AI divide, Africa needs targeted interventions. Subsidized **access to GPUs and cloud compute**, increased **funding** for AI research, and **partnerships** with global tech companies are critical.

Additionally, fostering a **local ecosystem of AI talent**—through mentorship, training programs, and incentives to retain researchers—can help build a **sustainable foundation** for innovation.



While the progress in **data collection** and localized AI applications is promising, it is not enough. Without adequate compute and resources, African researchers will remain on the periphery of global AI advancements.

For AI to truly become a **democratized** tool for solving the world's problems, the global community must prioritize **equitable access** to resources, starting with compute.

AI, specifically Deep learning, is **not just about algorithms and data**, it's also about having the appropriate tools to experiment, fail, and **innovate**.

Until the playing field is leveled, researchers in Africa will continue to face an uphill battle in realizing the continent's AI potential.



A futuristic, multi-level digital environment. In the foreground, several young people of diverse backgrounds stand with their arms crossed, looking towards the center. They are surrounded by computer workstations with large monitors displaying complex blue circuitry and data. Small, white, spherical robots with glowing blue eyes are positioned on the desks. In the background, two humanoid robots stand near more people. The upper levels of the structure are filled with more individuals, and the walls are covered in glowing blue circuit patterns and data. The overall atmosphere is one of high-tech innovation and collaboration.

# AI Reflections

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