Abstracts

From CDs to Connected Centres: Hybrid Online Candidate Registration for Exam Centres

Louisa Muparuri, ZIMSEC

National examination agencies often rely on legacy, offline desktop registration systems, which at the Zimbabwe School Examinations Council (ZIMSEC) created high operational risks and costs across over 11,000 centres. Physical data submission via removable media caused regional congestion and delayed bank reconciliations, leading to late underpayment detection and increased bad-debtor volumes. To address this, ZIMSEC implemented a hybrid candidate registration platform that supports offline capture for low-connectivity communities while requiring centres to submit a validated "final registration" online. This approach improves national visibility and accelerates near real-time reconciliation without excluding underserved areas. The paper describes the platform's architecture and pilot plan—covering centre onboarding, role-based access, and integration with payment workflows—and notes promising early results, including reduced congestion and faster discrepancy detection. It concludes with a practical evaluation framework focusing on reduced costs, faster cycles, lower debtor rates, and equitable participation.

Contrastive and Transfer Learning for Enhancing Contextual Representations in Shona News Classification

Phyliss Shamiso Mavedzenge, Bindura University of Science and Technology

LLMs have revolutionized NLP, but fine-tuning them for niche, domain-specific projects remains challenging—especially for low-resource languages with sparse digital archives. In Zimbabwe, Shona is spoken by over 10 million people, yet it lacks the massive electronic corpus required to train highly accurate models, causing it to be left behind by mainstream NLP developments.

This research addresses this gap by introducing a novel fine-tuning approach using a dynamic margin-based triplet loss function with a lambda parameter. Instead of relying on vast datasets, this method focuses on understanding underlying contextual relationships to effectively separate articles into distinct classes.

Using the MasakhaNEWS dataset (369 articles across four categories) and transfer learning, the proposed model generated embeddings for a separate dataset, which were then fed into a classification algorithm. Compared to a heavily trained base model evaluated on the same dataset, this context-focused approach improved classification accuracy by 14%, alongside improvements in other key metrics.

The findings demonstrate that massive training datasets are not strictly necessary for successful fine-tuning in low-resource settings. Instead, optimization techniques that prioritize deep comprehension of underlying contextual relationships offer a highly effective alternative when large scale electronic archives are unavailable

Transforming Official Energy Statistics through Data Science, Artificial Intelligence and Digital Innovation

Salome Maheya, African Energy Commission (AFREC), African Union

The growing demand for policy-relevant official statistics on sustainable development, energy transitions, and climate action is severely hindered in low-resource settings by fragmented, paper-based, and manual reporting systems. This presentation details how digital transformation modernizes public institutions by strengthening the entire statistical lifecycle—from collection to policymaking. Drawing on the African Energy Commission's (AFREC) collaboration with African Union Member States, it showcases practical digital solutions tailored for resource-constrained environments, including electronic data collection, integrated energy data warehouses, automated quality assurance, interactive business intelligence dashboards, and AI-driven data extraction. Using energy statistics as a case study, we illustrate how harmonized systems accelerate national planning, SDG 7 monitoring, and AU Agenda 2063 implementation. Ultimately, this abstract demonstrates that digitalization is a strategic investment in governance, highlighting the critical roles of data governance, institutional collaboration, and change management, with special emphasis on the rising leadership of women statisticians and data scientists driving public service delivery across Africa.

From Manual to Measurable "Digitalisation of Public Institutions in Low-Resource Settings

Lerdinia Mapepa, Women's University in Africa

Living in an era where data has become one of the world's most valuable resources practically Data in now referred to as the "The New Gold'. Governments are no longer judged solely by the policies they formulate but increasingly by how effectively they use data and digital technologies to improve the lives of their citizens. The ability to deliver faster, smarter, and more transparent public services has become a defining characteristic of modern governance. The digitalization of public institutions has become central to improving governance, public service delivery, and evidence-based decision-making. While numerous studies have examined digital transformation from policy and technological perspectives, limited empirical research has investigated how artificial intelligence (AI) machine learning (ML) and predictive analytics can enhance digital decision-making within resource-constrained public institutions.

Digitalization should therefore not be viewed merely as replacing paper with computers or digitizing existing processes. True digital transformation involves fundamentally rethinking how institutions operate, make decisions, and engage with citizens. It is about creating intelligent public institutions that use data to anticipate problems, allocate resources effectively, and deliver services that are responsive, transparent, and inclusive.