1. Libre Software in Africa

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https://tuvutepamoja.africa
2. Outline

- Background
- Digitization and Libre Software
- Language Data, Machine Learning and Privacy
3. Introduction

- Africa
  - 1.39 billion people [WEA]
  - $2260 Nominal GDP per capita [WEA]
  - 3.9% Real Economic GDP growth rate [WEA]
  - 10.7% of households have a computer [ITUFF19]
4. Overview of Internet Connectivity

- 0.4 fixed broadband internet subscriptions per 100 people [ITUfF19]
- 34.8 active mobile internet subscriptions per 100 people [ITUfF19]
- 17.8% of households have internet access [ITUfF19]
5. Percent Individuals Using the Internet

- Percent of individuals in each country using the internet in 2021 [ITUDH]
6. Mobile Broadband Bandwidth Subscriptions

- Mobile broadband bandwidth subscriptions per 100 people in 2021 [ITUDH]
7. Fixed Broadband Bandwidth Subscriptions

- Fixed broadband bandwidth subscriptions per 100 people [ITUDH]
8. Language Diversity

- Continent with largest language diversity
- 2000-3000 languages
  - Language Diversity Index [WLDI]
9. Per Capita Gross Domestic Product

- Per capita GDP 2021 in US$
10. Per Capita Gross Domestic Product Growth Rate

- Per capita GDP growth rate in 2021
11. Education

- Adult literacy rate [WBLR]
12. Infrastructure

- Significant infrastructure investments
  - Roads
  - Telecommunications
- Some foreign investment to improve trade
  - Natural resource extraction
  - Labor
13. Digitization Challenges

- Local needs secondary
  - Addressing local needs required for successful digitization
  - Successful adaptation of radio for information dissemination
  - More needed for internet and computers
    - Due to costs, schools and internet cafes are first contact points
    - Smart phones are the secondary contact point

How are you? Kedụ?
14. Challenges of Libre Software

- Poorly marketed
- Governance is often unclear
- Poor incorporation in legal and procurement systems
- Relatively high barriers to involvement when primary community is external
- Large time investment required to understand well
15. Opportunities Provided by Libre Software

- Auditable
- Easy to adapt and update
- Community driven learning
- Many packages that work well on limited hardware resources
16. Challenges of Mobile First

- Low memory and low performance devices
- Privacy is challenging
- Mindset is usually that of software consumer not co-creator
- Wide variety of device capabilities
- Technological ecosystem is designed elsewhere
17. Opportunities of Mobile First

• Cloud can overcome some deficiencies
• Large potential user base
• Opportunity to develop new use cases - mobile money
• Can reuse old libre software designed for older computers
18. Collecting Machine Learning Language Data

- English, French and Arabic are dominant official languages
- Many other languages primarily used orally
- A starting point is collecting a corpus suitable for early education
- Enable translation of commonly used terms
- Enable easy engagement
- Motivates an online short story competition
19. Evaluating Machine Learning Language Data

• Language experts are few
• Community consensus for many languages is missing
• Use a voting system, if you submit you can rate
• Voting privacy and anonymity is challenging
20. What Language Data Was Collected?

- Submissions by language for the competitions

[Diagram showing submissions by language for competitions 1 and 2]
21. Where can the Stories be Read?

- Countries where stories can be read
22. Using Machine Learning Language Data

• Language Learning Games
  ◦ https://tuvutepamoja.africa/Igbo-Wordle/
  ◦ https://tuvutepamoja.africa/Kinyarwanda-Wordle
  ◦ https://tuvutepamoja.africa/Kiswahili-Wordle
  ◦ https://tuvutepamoja.africa/Setswana-Wordle/
23. Relevant Libre Software

- Data collection platform [https://tuvutapamoja.africa](https://tuvutapamoja.africa)
  - Open source [https://notabug.org/tuvutepamoja](https://notabug.org/tuvutepamoja)
  - Written in PHP
  - Easy to deploy on shared hosting
  - Soft keyboard to enable correct orthography
  - Minimize some of the privacy concerns
  - Hard to find libre shared hosting
24. Keyboards

- Easy customization possible today
- More difficult on typewriters
- Open source projects include
  - https://keyman.com
  - https://www.freedesktop.org/wiki/Software/XKeyboardConfig/
  - https://github.com/eyedol/kasahorow-Keyboard-For-Android
  - https://giellalt.github.io/
25. Summary

- Libre software can do well in Africa
- Largest challenges are mindset and regulation
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