

Group 43: Futuristic Proposal

Prompt: AI-powered cancer diagnosis, personalized therapies, neural interface devices.

Problem Statement

Non-communicable diseases, such as cancer, are increasing at an alarming rate in low-income countries such as Kenya. According to the Global Cancer Observatory, the annual incidence is estimated at 44,726 new cases, with a five-year prevalence of 102,152 (2022). Also, the top cancers are cervical, breast, prostate, and colorectal, with cervical and breast cancer accounting for 44% of the cases, followed by esophageal cancer (Hanly & Sharp, n.d). Unfortunately, 70-80% of cancer cases in Kenya are diagnosed in late stage, and this is primarily attributed to inadequate diagnostic and treatment facilities, high cost of diagnostic equipment, combined with low awareness and high poverty levels in the population. AI can be used to address the diagnosis and treatment gaps via use of its analytical power, early cancer detection, analysis of tumor microenvironment and metastasis, more accurate diagnosis via deep learning, random forests, and neural networks, and use of AI in cancer medical imaging for skin, lung, prostate, breast, colorectal, and gastric cancer diagnosis (Sufyan et al., 2023).

AI workflow (data inputs, model type).

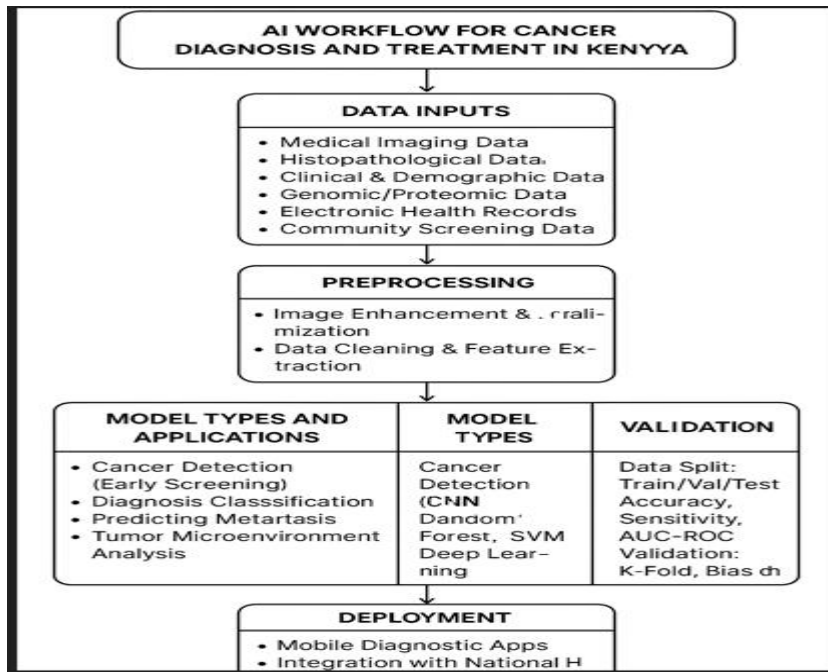


Figure 1: Cancer diagnosis and treatment workflow

Societal risks and benefits.

Societal benefits include improved morbidity and mortality rates, productivity, healthcare cost reduction, and socio-economic burden. Cancer causes a significant burden not only to the individual patients and their families, and the entire country in terms of productivity, poverty levels, healthcare costs, and economic growth. Early diagnosis and personalized therapies will improve these metrics across the board. However, it is essential to note that the implementation of AI raises significant ethical questions on data privacy, transparency, high reliance of AI, biases, and inequity in cases where the AI models are trained on non-African/unrepresentative data, job displacement, and infrastructure gaps.

References

- Global Cancer Observatory. (n.d.). *Statistics at a glance, 2022 Top 5 most frequent cancers*
Number of new cases 44 726.
<https://gco.iarc.who.int/media/globocan/factsheets/populations/404-kenya-fact-sheet.pdf>
- Hanly, P. A., & Sharp, L. (n.d.). The cost of lost productivity due to premature cancer-related mortality: an economic measure of the cancer burden. *BMC Cancer*, 14(1).
<https://doi.org/10.1186/1471-2407-14-224>
- Sufyan, M., Shokat, Z., & Ashfaq, U. A. (2023). Artificial intelligence in cancer diagnosis and therapy: Current status and future perspective. *Computers in Biology and Medicine*, 165, 107356 <https://www.sciencedirect.com/science/article/pii/S0010482523008211>