Explainable AI for Breast Cancer Diagnosis in Nigeria: Accuracy, Trust, and Mobile Integration

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Research Methods and Professional Practice Module

Background

1. **Breast cancer is the leading cause of cancer deaths in Nigerian women (**IARC, 2021)
2. **Limited access to screening and radiologists.**
3. **AI can help, but trust and accessibility are major barriers**

Research Question

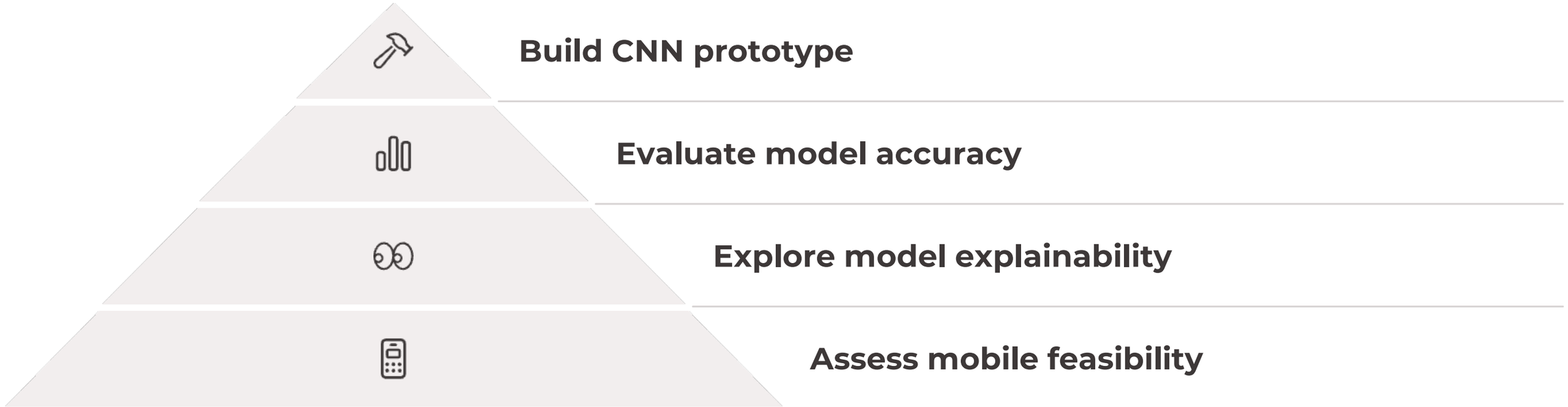
What is the potential of explainable deep learning models in enhancing breast cancer diagnosis accuracy and clinician trust in Nigeria,

and how can mobile-compatible or low-cost tools support clinical integration in resource-limited settings?

Aim:

Evaluate explainable deep learning for breast cancer diagnosis in Nigeria.

Objectives:



Key Literature: Deep Learning in Diagnosis

CNNs achieve high accuracy in medical image classification.

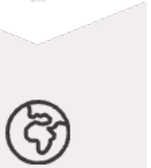
Deep learning often outperforms traditional ML models.

Limitations in generalizability to diverse populations.

Key Literature: Explainability & Local Context

Clinicians often distrust “black box” AI.

Explainability tools (e.g., Grad-CAM) offer insight into AI decision-making.



Few studies explore XAI in African medical contexts.

Methodology/Design: Model & Data

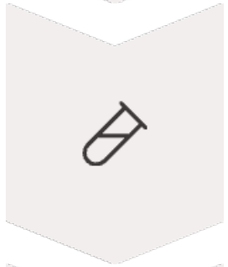
CNN-based image classifier

IDC Breast Histopathology & CBIS-DDSM datasets

Tools: Python, TensorFlow, Keras

Methodology/Design: Evaluation

Accuracy, Sensitivity, Specificity



Performance tested on classification task

Confusion matrix, ROC analysis

Methodology/Design: Explainability

Grad-CAM heatmaps

Support clinician trust

Show the “why” behind predictions

Expected Artefacts

- CNN-based diagnostic model (prototype)
- Grad-CAM visual explainability module
- Technical report and research documentation

Ethical Considerations & Risks

- Dataset bias (non-African data)
- Data privacy & security
- Clinical safety and trust
- Not a replacement for diagnosis

Proposed Timeline

Conclusion

Research addresses diagnostic challenges in Nigerian healthcare

Research employs explainable AI for transparency and trust

Research proposes context-aware, low-resource integration

Research contributes to equitable AI in medical diagnostics

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