Transforming Healthcare Education: Harnessing Large Language Models for Frontline Health Worker Capacity Building using Retrieval-Augmented Generation

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Background

- There is a need to enhance medical education for frontline health workers, particularly in resource-constrained environments
- **SMART*health* Pregnancy** is a digitally supported tool for frontline health workers (ASHAs) to identify, screen and refer high risk pregnant women
- ASHAs and pregnant women asked us for support of their continuous learning and for a way to provide real-time answers to questions women want to know about their pregnancy

Aim

To develop, technically and clinically validate, an LLM suitable for community health workers in rural India to improve healthcare education and support guideline-based pregnancy care

Methods

1. Development of retrieval-augmented generation pipeline
2. Parameter optimization
3. Iterative technical and clinical validation

Phase 1: Clinician Evaluation

Rating of model generated answers to 180 questions based on accuracy, completeness, appropriateness, and presence of bias

Clinicians provide gold standard answers

Model improvement →

Phase 2: Iterative Superuser Evaluation

Technical evaluation

Superuser testing and feedback

Model improvement ↓

Phase 3: Beta Testing Evaluation by ASHAs

Rating of model generated answers based on clarity, readability, length and usefulness

Assessing the impact of the model on ASHAs' knowledge and confidence

← Model improvement

Phase 4: Field Evaluation

Observing the supervised LLM use of ASHAs interacting with pregnant women

Assessing how the LLM is used and received by pregnant women