Developing a Trustworthy AI Chatbot for Personalized HIV Care

Shiv Patel[1], Sreeja Patnala[1], Ruosi Shao[1] Ph.D.

FSU FLORIDA STATE UNIVERSITY

FSU UNDERGRADUATE RESEARCH OPPORTUNITY PROGRAM
CENTER FOR UNDERGRADUATE RESEARCH & ACADEMIC ENGAGEMENT

I. Background

- **Current Problems in HIV Care:**
  - People with HIV (PWH) face high barriers to accessing quality healthcare.
- **Current in Traditional Care:**
  - Lack o**Gaps**f scalable, accessible, and on-demand support
- **Our Solution – Personalized HIV Care with AI Chatbot:**
  - AI chatbots offer scalable, real-time, personalized guidance for HIV care.
  - Integrates clinically validated recommendations to enhance accuracy and inclusivity

II. Methodology

- **Curating HIV knowledge bank for LLM fine-tuning and benchmark**
- **Synthesized 6 modules covering 36 chapters**, each structured as:
  - **Educational Materials:**
    - Compiled 1,080+ pages of medically validated, peer-reviewed information.
    - Transcribed all figures and tables into text descriptions using ChatGPT, verified by researchers.
  - **Quiz Bank:**
    - Structured with 450+ questions, each containing:
    - Question: Scenario-based or factual.
    - Answer: Evidence-based and peer-reviewed.
    - Explanation: Detailed reasoning with supporting charts and clinical context.
- **Modules focused on:**
  1. Screening & Diagnosis
  2. Basic HIV Primary Care
  3. Antiretroviral Therapy (ART)
  4. Co-Occurring Conditions
  5. HIV Prevention Strategies
  6. Key Populations & Social Determinants of Health

II. Results

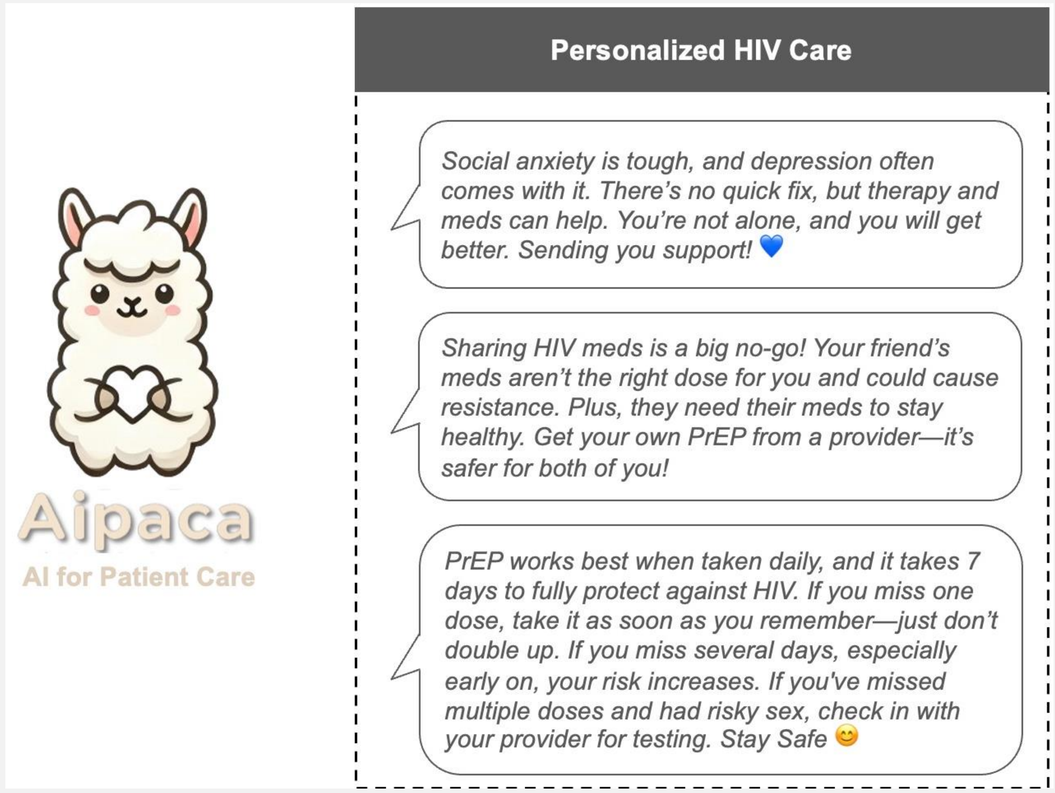

Figure 1: Illustrative Example of Chatbot Interaction

- *Demonstrates how the AI-driven chatbot (Aipaca) interacts with users through text-based conversations.*
- *Provides personalized HIV care with tailored advice on mental health support, medication safety, and PrEP usage.*

- **Curated an HIV Knowledge Bank** covering the **HIV care continuum**:
- **Knowledge Bank Includes:**
  - 1,080+ pages of peer-reviewed, evidence-based clinical information.
  - 450+ quiz questions designed to benchmark clinical understanding.
  - 1.2 million+ words/tokens synthesized for AI training datasets.
- **Benchmark multiple AI models:**
  - **Open-source:** Llama, Mistral.
  - **Closed-source:** GPT-4, Gemini.
- **Evaluating chatbot performance in:**
  - Accuracy of clinical reasoning and personalized recommendations.
  - Patient-centered communication and clinical applicability.

III. Future Steps

- **LLM fine-tuning and benchmark** HIV knowledge bank
- **Pilot test and semi-structured** interview with HIV specialists to access clinical applicability
- **Optimize chatbot design** to address expert feedback
- **Conduct small-scale feasibility test** with PWH
- **Ongoing testing** to validate accuracy, safety, and scalability for clinical use.

V. References

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