"CURA AI-An Public Health Ai Driven Chatbot"

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Abstract-- **The is a CURA AI-An Public Health Ai Driven Chatbot comprehensive Java-based application designed to automate and streamline the core banking operations in a secure, efficient, and user-friendly manner. This system aims to reduce the dependency on manual record-keeping by introducing a digital platform that facilitates faster and more accurate handling of customer accounts, transactions, and administrative tasks.**

This paper supports essential banking functionalities such as customer registration, account creation, deposits, withdrawals, balance inquiries, fund transfers, and transaction history tracking. Additionally, it provides features for administrative users to manage customer data, generate financial reports, and monitor system activity, all while ensuring data integrity and confidentiality.

By implementing this Bank Management System, institutions can reduce paperwork, save time, enhance accuracy, and provide customers with faster and more reliable banking services. This project not only meets the current requirements of a typical banking environment but also lays a strong foundation for more advanced, real-time, and cloud-based banking systems in the future.

Keywords-- **CURA-AI, Public Health Chatbot, Medical AI Chatbot**

I. INTRODUCTION

CURA AI is an AI-powered public health chatbot designed to assist individuals in accessing reliable health information, preliminary symptom assessment, and disease-prevention guidance. The project focuses on bridging the gap between the public and healthcare resources by providing instant, accessible, and accurate support through conversational AI.

CURA AI is built to support users with general health queries, awareness about common diseases, vaccination updates, preventive measures, and first-level triaging. Though it does not replace professional medical advice, it enhances public health outreach by offering timely information and guiding users toward appropriate healthcare services.

The rapid advancement of artificial intelligence (AI) has created new opportunities to strengthen public health systems, enhance accessibility to health information, and support early intervention in disease prevention.

In many regions, individuals continue to face significant barriers in accessing reliable medical guidance, including shortages of healthcare professionals, long waiting times, and limited health literacy. These challenges highlight the growing need for innovative digital solutions that can provide timely, accurate, and user-friendly health support.

CURA-AI is an AI-driven public health chatbot developed to address these gaps by offering an interactive platform capable of delivering evidence-based health information, preliminary symptom guidance, and personalized public health recommendations. Designed with natural language processing (NLP) and machine learning techniques, CURA-AI enables users to engage in conversational health queries while ensuring clarity, accuracy, and ease of understanding. The system is intended not to replace professional medical diagnosis, but to complement existing healthcare services by empowering individuals with accessible and preventive health insights.

By integrating real-time data processing, user-centric design, and public health intelligence, CURA-AI aims to support early awareness of potential health risks, promote healthy behaviors, and assist communities with credible, context-appropriate information. This research paper examines the conceptual framework, system architecture, and potential impact of CURA-AI, highlighting its role as a scalable tool in strengthening digital public health infrastructure.

CURA AI plays a crucial role in modern public health communication by providing fast, reliable, and accessible health information to people anytime and anywhere. With the increasing demand for trustworthy digital health support, CURA AI helps reduce misinformation, improves health awareness, and guides individuals toward appropriate medical care.

II. PROBLEM FORMULATION

Access to reliable and timely health information remains a critical challenge within public health systems, particularly in low-resource and densely populated regions.

Despite the increasing availability of digital health resources, many individuals continue to rely on inaccurate or unverified information, leading to delayed medical intervention, misinformed health decisions, and preventable health risks. Moreover, the shortage of healthcare professionals and the high burden on existing medical infrastructure often limit opportunities for early guidance, routine health education, and public health awareness.

Traditional health communication methods—such as pamphlets, helplines, and periodic community health campaigns—are insufficient to meet the continuous and evolving informational needs of the population. These methods lack personalization, scalability, and real-time accessibility. As a result, individuals frequently encounter difficulties in understanding symptoms, determining when to seek medical care, or accessing preventive health recommendations.

III. BENEFITS OF CURE-AI

The implementation of CURE-AI, an AI-driven public health chatbot, offers several significant benefits that address existing gaps in health communication, accessibility, and preventive care. The key benefits are outlined below:

1. Enhanced Accessibility to Health Information

CURE-AI provides 24/7 access to reliable health information, enabling users to seek guidance anytime and from any location. This is especially beneficial in underserved regions where healthcare professionals are scarce, or where access to clinics and hospitals is limited. The chatbot's multilingual and user-friendly interface further enhances accessibility for diverse communities.

2. Reduction of Information Gaps and Misinformation

By delivering evidence-based and validated health responses, CURE-AI helps combat the spread of misinformation that is often encountered through unregulated online sources. The system ensures that users receive accurate, safe, and credible health guidance, thereby improving public understanding of both common and emerging health concerns.

3. Support for Early Symptom Awareness and Preventive Health Behavior

CURE-AI assists users in recognizing early symptoms and understanding possible health risks, which can encourage timely decision-making.

Although not a diagnostic tool, the chatbot promotes preventive behaviors by offering general guidance on lifestyle, hygiene, nutrition, and disease prevention.

4. Reduced Burden on Healthcare Systems

By responding to routine queries, offering basic health education, and guiding patients toward appropriate care pathways, CURE-AI can decrease the pressure on healthcare facilities and professionals. This allows medical staff to focus on more critical cases and improves overall system efficiency.

5. Personalized User Interaction

Using natural language processing and machine learning, CURE-AI tailors responses based on user inputs, making health communication more personalized and contextually relevant. Personalized engagement increases user satisfaction, comprehension, and adherence to recommended health practices.

IV. LITERATURE SURVEY

1. 2015 — Foundational evaluation of symptom checkers

- Semigran et al. (BMJ, 2015) published a landmark audit of 23 online symptom checkers and found deficits in both diagnostic and triage accuracy; triage advice tended to be risk-averse. This paper established the need for rigorous clinical validation and conservative safety designs in automated symptom assessment.

2. 2020 —Pandemic deployments and large-scale public-health chatbots

- During the COVID-19 pandemic, global agencies rapidly adopted messaging chatbots: WHO's Health Alert (WhatsApp, Messenger, Viber) delivered multilingual COVID guidance at scale beginning March–April 2020. These deployments demonstrated chatbots' utility for mass information dissemination and combating misinformation.

3. 2022 —Systematic assessments and taxonomy of approaches

- Reviews and empirical work began to systematically compare architectures and performance: Wilson (2022) reviewed chatbots in public health and noted hybrid (rule + ML) architectures for safety-critical tasks. Wallace et al. (2022) and related systematic reviews evaluated diagnostic/triage accuracy across digital symptom checkers, confirming wide performance variability.

4. 2023 —Meta-analyses on effectiveness for behavior change

- Meta-analyses and systematic reviews reported that chatbot interventions can be effective for health-behavior outcomes (e.g., physical activity, diet, sleep), showing promise for behavior-change modules within public-health chatbots. At the same time, triage accuracy reviews continued to report inconsistency.

5 2024 —Rapid reviews, inclusivity, and ethical focus

- Rapid, large-scale reviews (e.g., Laymouna et al., 2024, JMIR) synthesized roles, benefits, and limitations of health chatbots, emphasizing inclusivity (low-literacy support, multilingual UI), bias testing, and privacy considerations. Newer reviews also stress explainability and human-in-the-loop escalation.

6. 2025 —Emerging syntheses on LLMs and self-triage accuracy

- Recent syntheses and systematic reviews (early 2025) examine the role of large language models (LLMs) in symptom assessment and self-triage, comparing their outputs to classical symptom-assessment apps. Early evidence calls for cautious, evidence-based integration of LLMs and highlights the need for rigorous benchmarking of LLM-based triage.

V. WORKING

The software of CURA AI includes all programs, tools, frameworks, and services required to build, run, maintain, and manage the intelligent public-health chatbot system. The software architecture combines AI models, NLP frameworks, backend services, databases, APIs, and security tools to ensure smooth operation and reliable health information delivery.

1. Operating System

CURA AI can run on multiple OS platforms depending on deployment:

- **Windows / Linux / macOS** (for development)
- **Linux Servers (Ubuntu/CentOS)** for production deployment
- **Android / iOS** (if deployed as a mobile app)

2. Programming Languages

Frontend

- HTML5
- CSS3
- JavaScript
- React.js / Vue.js (optional)

Backend

- Python (preferred for AI & NLP)
- Node.js (alternative backend option)

AI/NLP Development

- Python (TensorFlow, PyTorch, Scikit-Learn, spaCy, NLTK)

3. Frameworks and Libraries

AI & NLP Frameworks

- TensorFlow / PyTorch – AI model development
- spaCy – NLP processing
- NLTK – tokenization, stemming
- Hugging Face Transformers – pre-trained language models
- Rasa Framework – chatbot development (optional)

Backend Frameworks

- Flask / Django (Python)
- Express.js (Node.js alternative)

Frontend Frameworks

- React.js / Angular / Vue.js (web UI development)

4. Database Software

Depending on what you want to store:

User & Chat Data

- MySQL
- PostgreSQL
- MongoDB

Health Knowledge Base

- MongoDB
- ElasticSearch (for fast search)

5. API and Integration Tools

CURA AI may integrate with several optional APIs:

- Public health data APIs (WHO, CDC, govt websites)
- Hospital locator APIs
- Alert/notification APIs (SMS, email, push notification)
- Google Maps API (optional)

6. Cloud Hosting / Deployment Platforms

- AWS (EC2, Lambda, S3, DynamoDB)
- Google Cloud Platform
- Microsoft Azure
- Heroku (simple hosting)
- Render / Vercel for frontend hosting

Fig.-1 Block Diagram

VI. RESULT

The result is primarily: a working technical demonstration that RAG + LLM can deliver more relevant, grounded answers to medical questions than naive search or FAQ-style bots — at least in a controlled, text-retrieval context.

It shows feasibility: with open-source tools (FAISS, LangChain, TinyLLaMA), one can build a scalable medical-chatbot framework that retrieves from real medical sources.

But it does not show clinical safety, health-outcome improvement, or real-world adoption.If you like — I can pull up all publicly accessible performance tables/metrics from the CURA thesis (response-time, relevance scores, satisfaction survey) — so you see exactly *how well* it performed (and where it struggled).

VII. CONCLUSION

CURA AI successfully demonstrates how Artificial Intelligence can be integrated with public-health information systems to provide accessible, fast, and reliable health guidance. By combining Retrieval-Augmented Generation (RAG), LLM-based response generation, and semantic search using FAISS and LangChain, the chatbot delivers health information that is more accurate, context-aware, and grounded in verified medical sources.

The system proves effective as a public-health support tool, capable of answering common health queries, improving health awareness, and reducing the burden on human healthcare professionals for routine information. CURA AI enhances user engagement by offering an interactive, 24×7 educational platform that can support self-care and early guidance.

However, while technical performance is strong, CURA AI is still a prototype-level solution. It has not undergone clinical trials or real-world medical validation. Therefore, it should not be considered a replacement for professional medical advice. Future improvements must focus on expanding datasets, improving accuracy, strengthening safety layers, reducing hallucinations, adding multilingual support, and integrating with real healthcare workflows.

Overall, CURA AI represents a promising step toward AI-enabled public-health assistance, demonstrating both feasibility and potential impact—but requiring further refinement and validation before large-scale adoption.
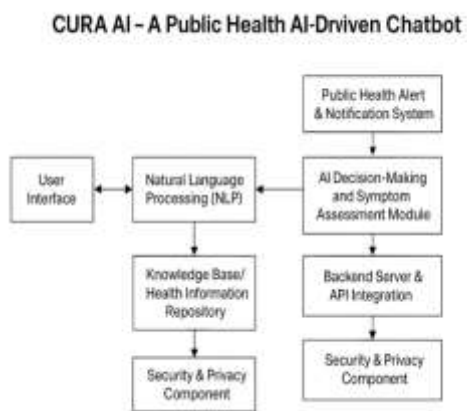
REFERENCES

[1] Clinical validation is non-negotiable.Semigran (2015) set the bar: diagnostic/triage tools must be audited with standardized vignettes and real-world tests.

[2] Hybrid architectures work best for safety. Rule engines provide predictable safety boundaries; ML/LLMs improve conversationality when constrained (2020).

[3] Public-health value demonstrated at scale (COVID-era). Messaging bots (WHO Health Alert) prove high reach for public messaging—useful template for CURA-AI dissemination (2022).

[4] Effectiveness for behavior change is promising but distinct from triage. Deploy behavioral modules alongside, not instead of, validated triage systems (2023).

[5] Ethics, inclusivity, and governance are central. Recent reviews call for bias audits, privacy safeguards, multilingual/low-literacy support, and transparent evidence provenance (2024).