Project Title: "ReassureAI: A Large Language Model–Based Healthcare Support System for Mental and physical Wellness, Medical Report Interpretation and Ayurvedic Guidance"

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Abstract:

Given literature reviews propose the solution of Mental health disorders, increasing social isolation among young people, that can be helpful for the doctors, psychiatrist - psychologist, along with supporting the rising traditional medicine system such as ayurveda, with modern clinical systems. Also we aim to solve the report interpretation for native and non-technical people.Recent advancements in Artificial Intelligence shows the potential to solve this problem using the Large Language Models and conversational agents, recent research and enhancements in LLMs and Chatbots are shows that they are capable of solving that problem. Here we survey recent research on AI based mental health support and wellness systems, LLM-driven medical report interpretation and the integration of AI and ayurvedic medication, and integrating those in a single chatbot. This review highlights potential ways to solve that problem with leveraging AI, existing methodologies, evaluation strategies, etc with the research gaps related to safety, cultural alignment, explainability, and system integration. On the basis of the gaps discussed, the need to develop ReassureAI is established in this research. It is an LLM-based comprehensive health support solution developed to tackle mental well-being support, healthcare report analysis, and Ayurvedic advice.

Keywords:

Large Language Models, Mental Health Chatbots, Medical Report Interpretation, Ayurveda, Healthcare AI, Conversational Agents, Chatbot

1. Introduction

The rapid developments in Artificial Intelligence (AI), especially Large Language Models (LLMs), has majorly influenced modern healthcare systems. AI-driven conversational chatboats (conversational agents and intelligent assistant systems) are increasingly being experimented with for mental health support - wellbeing, medical report interpretation, and personalized healthcare guidance. Simultaneously , conventional medicines such as Ayurved are being rediscovered because of their wellness, effectiveness and absence of side effects towards health. Integrating AI with both modern clinical practices with conventional medicine presents a promising direction for inclusive and accessible healthcare solutions.

This literature reviews, analyzes and evaluates existing research & developments activities on AI-based mental health chatbots, use of LLM in medical report interpretation, and the integration of AI with healthcare systems and Traditional medicine like Ayurvedic advice. The review identifies current advancements, challenges, and research gaps that support or provide backing for the development of ReassureAI.

2. Review Methodology

This literature review is prepared based on the "Narrative Review Concept" that is appropriate for an undergraduate as well as a postgraduate interdisciplinary research work. For collecting the literature, academic databases such as IEEE Xplore, Springer Link, Elsevier ScienceDirect online library, PubMed Central (PMC), ACM Digital Library, arXiv, JMIR publications and Google Scholar were used to collect relevant research articles based on the following parameters: (i) the research articles relevant to artificial intelligence-based mental health systems, medical report interpretations, or artificial intelligence-based traditional medicine, (ii) the research articles published from reputed sources, and (iii) the research articles published over the last 2 - 3 years.

The keywords that were used were related terms like "mental health chatbot", "LLM in healthcare", "AI medical reports interpretation", "AI use in Ayurveda", "AI in ayurveda", and "chatbots and mental wellness". The articles then grouped rather than described individually. The studies were analyzed considering parameters like methodology, domain of use, dataset, system architecture, advantages, and disadvantages.

3. AI based Mental Health Support Systems

Several studies have examined the effectiveness of AI chatbots in providing mental health support. Systematic reviews and meta-analyses have identified that chatbot-delivered interventions can reduce symptoms of depression, anxiety, and psychological distress, particularly among young adults and students.

Research indicates that conversational bots (agents) have advantages such as anonymity, scalability, and continuous availability. Studies such as Artificial Intelligence Chatbot for Depression [6] and Effectiveness and Safety of Using Chatbots to Improve Mental Health [5], shows positive engagement and short-term symptom relief among users.

However, the existing systems often face limitations such as a lack of emotional depth, cultural sensitivity, and clinical validations. Studies focused on Indian and adolescent populations emphasise socio-cultural challenges in designing-developing mental health chatbots that align with local values and communication styles.

4. Human–AI Collaboration in Mental Healthcare

The current literature emphasizes the significance of human - AI collaboration rather than relying on full automation and self-driven agents. Studies suggest that AI systems are most effective when used as supportive tools for human professionals, offering preliminary information, emotional support, and risk flagging while deferring the final decision for the clinician.

Performance evaluations of chatbot agents in detecting suicidal ideation shown promising outcomes but also emphasizing the necessity of ethical safeguards, and appropriate deployment procedures.

5. Large Language Models in Medical Report Interpretation

Medical documents are often complex and difficult for patients to understand. Recent research explores the use of LLMs to simply interpret medical documents, making medical terminology and other expertise-related pieces of information more accessible to non-expert users. Research on Medical Reports Simplification Using Large Language Models [18]. shows that LLMs can effectively translate technical terminology into easy-to-understand translations without significant loss of meaning or context.

Furthermore, LLMs have shown potential in clinical decision support, summarization, and contextual explanation, contributing to enhanced patient engagement in health literacy.

6. Integration of Artificial Intelligence & Ayurveda

The integration of AI and Ayurvedic systems is a rising interdisciplinary research area. Multiple studies discuss the application of AI in Ayurvedic diagnosis, medicine quality checking, and personalized treatment suggestions.

Studies emphasize the effectiveness of AI in organizing conventional, qualitative knowledge available in the field of Ayurveda, thereby achieving a systematic

approach without compromising the holistic aspect. However, the need to standardize and make available data on AI-based traditional medicine remains an issue.

7. Comparative Analysis of Existing Studies

Category	Year	Methods	Key Highlights	Papers Reviewed
Using Chatbots for Mental Health Support	2020-2025	Clinical reviews and technical experiments were the two ways the researchers tackled this. To find out what truly works for students, they systematically reviewed previous trials. Technically speaking, they tested novel approaches to data security (such as "Federated Learning") and even created "Artificial Users"—simulated patients—to put the chatbots to the test before allowing them to communicate with actual people.	Everyone agrees that chatbots can actually help people feel less depressed and distressed, particularly younger people who would rather text than speak. Safety is still a major red flag, though. Many of the bots in use today are unable to manage crisis situations (such as suicide risk) effectively. Additionally, there is a strong push to abandon "one-size-fits-all" designs, with recent research concentrating on developing bots that comprehend particular cultural quirks.	12
Integrating AI into Ayurvedic Healthcare	2024-2025	The majority of these studies concentrated on architecture and frameworks. They examined how AI could "digitize" the entire Ayurvedic system rather than focusing on testing a single tool. This included developing "RAG-based" chatbots that can directly quote ancient texts (Samhitas) and using computer vision to read facial features (Akriti	The main conclusion is that AI serves as a translator, converting subjective emotions (such as pulse reading) into objective information. This greatly aids in standardizing diagnoses and quality control (identifying counterfeit herbs). However, there is a caution: doctors who rely too much on screens run the risk of losing their intuitive abilities, and there	6

		Pariksha), ensuring the advice is real and not fictitious.	is a genuine fear of "biopiracy" (corporations stealing indigenous knowledge).	
Medical Data Simplification: Using LLMs to Improve Patient Literacy	2024	The group conducted useful experiments and examined the development of AI models (from earlier BERT models to GPT-4). In order to ensure that the medical facts were not lost in translation, they specifically trained AI to translate complicated "doctor-speak" into plain English and compare the results to standard text-matching scores.	Patient literacy is changing thanks to these tools, which enable non-medical professionals to comprehend their own medical records. Additionally, they save doctors a ton of time on paperwork. However, the papers stress that these tools still require stringent human oversight before they can be fully trusted in hospitals because AI can occasionally "hallucinate" (invent facts).	2

- **Base Papers:**

Work/Paper	Author (Year)	Domain	Dataset/ Methods	Key Results	Advantages	Limitations
Chatbot-Delivered Interventions for Improving Mental Health Among Young People [2]	Jiaying Li, Yan Li, Yule Hu, Dennis Chak Fai Ma, Xiaoxiao Mei, Engle Angela Chan, Janelle Lyn Yorke (2025)	Digital Mental Health	Systematic review and meta-analysis of randomized controlled trials (RCTs)	Chatbots reduced depressive symptoms with a moderate-to-large effect size (Hedges' g=0.61).	**High Relevance:** Proves chatbots work particularly for the "youth/student" demographic (our target audience).	Studies used different types of chatbots (CBT vs. General), making it hard to pinpoint which feature worked best.
Integration of	Soniya	Clinical	Literature	AI	Converts	Heavy reliance

Artificial Intelligence in Ayurveda Diagnostics [1]	Seshan, Man Mohan Sharma, Ved Prakash (2025)	Diagnostics / Personalized Medicine (Prakriti Analysis)	review of AI applications including **Computer Vision** (for *Akriti Pariksha*/ face analysis) and **Ensemble Learning** techniques on questionnaire data.	models (specifically ensemble techniques) achieved higher accuracy in predicting **Prakriti** (body constitution) compared to single algorithms.	subjective "clinical sense" (e.g., pulse feeling) into objective numerical values.	on the quality of the "ground truth" (diagnoses made by human Vaidyas) used to train the models.
Integration of Artificial Intelligence with Ayurveda: Future scope and impending challenges [12]	Pooja Rani, Aishwarya Joglekar, Mahesh Kumar Vyas, Anandaraman Sharma Pv (2025)	Future Trends / Healthcare Systems	Perspective/Review paper focusing on the **"AI for Health"** global initiative.	AI is identified as a critical tool for optimizing traditional **purification procedures** (like *Vamana* and *Virechana*) by monitoring patient vitals in real-time.	Integration with wearables to track *Dosha* imbalances throughout the day.	Risk of reducing holistic traditions to mere data points.
Medical Reports Simplification Using Large Language Models	Dr. Khaled Almezhghwi, Morad Ali Hassan,	Medical Informatics / Natural	**Indiana Chest X-ray Collectio**	The fine-tuned T5 model	The T5 architecture proved capable	The dataset (3,800 reports) is relatively small for

[18]	Adel Ghadedo, Fairouz Belhaj (2024)	Language Processing (NLP)	n (OpenI), consisting of approximately 3,800 medical reports paired with X-ray images.	achieved high **ROUGE scores** (a metric for text similarity), indicating it could successfully capture the core medical meaning while reducing complexity.	of handling unseen medical sentence structures better than older RNN/LSTM models.	training deep learning models, leading to potential overfitting.

8. Research Gaps and Motivation

Despite significant progress, existing literature reveals several gaps:

- Limited systems that includes the mental health support, medical reports interpretation, and guidance on traditional medicine within a single platform

- Insufficient culturally adaptive AI health care systems tailored for Indian - Bhartiya society as well as society that follows Natural Ayurvedic School of thoughts.

- Lack of unified LLM based frameworks that combine modern clinical and Ayurvedic insights.

- Ethical and safety concerns related to applying AI to the sensitive application domain of mental health.

These gaps motivate and provide backing for the development of ReassureAI, which aims to offer a unified, culturally aware, LLM based healthcare support system.

9. Future Research Directions

Future work should be directed towards integrated, multimodal health support systems using LLMs with domain-specific fine-tuning. Cultural adaptability, ethical safeguards, clinical validation, and cooperation between the AI systems and human healthcare experts are the main emphasis. The integration of Ayurveda with state-of-the-art AI frameworks represents a promising research direction for holistic healthcare solutions. Also, in the future, we can integrate it and create a Medical Management System (MMS) for Doctors and Patients. For research purposes, and many possibilities are there.

10. Conclusion

This literature review showcases the increasing potential of AI and Language Models (LMs) in mental healthcare, medical data interpretation, and integration with traditional medicine. While existing research validates the effectiveness of individual components, there remains a need for an integrated, patient-centric system that combines these functionalities together in a responsible manner. ReassureAI will address this need by leveraging Large Language Models to provide support for mental wellbeing, easy interpretation of medical reports, and consultation on Ayurvedic health-all within one coherent and orchestration framework.

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