

# Customized treatment plan using GenAI for cardiological diseases

Chirag Mittal, Saptaparna Debnath & S. Prabakeran

*Department of Networking and Communications, SRM Institute of Science and Technology, Chennai, India*

**ABSTRACT:** This research delves into the development and implementation of a pioneering personalized treatment plan, strategically incorporating the Large Language Model (LLM) and the Streamlit web application framework. Prioritizing enhanced patient care, the project envisions a user-friendly interface proficient in deciphering intricate prescriptions and dispensing personalized treatment recommendations. Gemini ProVision LLM offers advanced language processing, ensuring nuanced prescription interpretation, while Streamlit crafts an accessible and intuitive interface. The study systematically assesses the project's efficacy, examining its transformative impact on healthcare practices. Insights into integration challenges, technological considerations, and implications contribute valuable perspectives to the broader discourse on the intersection of artificial intelligence, web frameworks, and healthcare innovation.

**Keywords:** Customized Treatment plan, Large Language Model, Gemini-pro vision

## 1 INTRODUCTION

Artificial intelligence (AI) is reshaping personalized medicine, particularly in heart disease treatment. Leveraging Gemini ProVision and Streamlit, this project aims to interpret patient prescriptions intricately, tailoring treatment recommendations to individual needs. ProVision's language understanding capabilities decode complex medical data, focusing on heart conditions. Streamlit constructs an intuitive platform for healthcare professionals, improving prescription interpretation speed and accuracy. By integrating AI into healthcare, the project pioneers personalized medicine in heart health, enhancing treatment effectiveness. Ongoing assessments will validate the platform's efficacy, contributing insights to AI-driven healthcare solutions and scientific advancements. This project highlights the transformative potential of advanced language models and frameworks in shaping personalized healthcare, particularly in heart disease treatment.

## 2 OBJECTIVE

The main objective is to create a simple system to develop an AI-powered system that can interpret patient prescriptions and health data and provide a certain treatment plan accordingly regarding heart diseases.

## 3 LITERATURE SURVEY

Study [1] introduces a robust framework for conversational PDF applications, integrating OpenAI GPT-3. Addressing unstructured PDF data challenges, enables seamless integration of language model APIs. Key features include document segmentation, embedding

transformation, and a knowledge base, optimizing data size and search accuracy, and enhancing information processing effectiveness. On the other hand, the study [2] employs Generative AI to create a faculty guideline-focused chatbot. Utilizing LangChain, ChatGPT, and Pinecone, it introduces a PDF-driven chatbot for information retrieval, generating coherent responses. This pioneers the intersection of Generative AI and document-driven chatbots, enhancing educational content accessibility through AI-driven interfaces. Paper [3] details a web app using DALL-E to generate images.

Built with Node.js and Express on the backend, it integrates OpenAI for API interactions. The front end employs HTML, CSS, and JavaScript, ensuring a user-friendly interface. In [4], MindGuide, a mental health chatbot, uses LangChain's ChatModels, especially ChatOpenAI, and Streamlit for user interaction, showcasing language models' potential to address mental health issues. In [5], ChatGPT, a leading language model, generates human-like responses but encounters bias and complexity issues. Despite limitations, it advances conversational AI, anticipating future models' improvements. Research [6] investigates Generative AI techniques for synthetic medical datasets, balancing realism and privacy. Assessing five methods, StyleGAN2, CLIP, and T5 emerge as strong performers, offering insights for healthcare data generation. Paper [7] presents a framework for chatbot-based recommendation systems in chronic disease management. It includes a recommendation engine for user profiles and delivers feedback through a chatbot, with a Telegram implementation showcasing feasibility. Paper [8] presents a novel correction method for ScanSAR data, extending algorithms without assuming a similarity distribution. Using linear regression based on an exponential model demonstrates improved correction in experimental validations. Article [9] outlines Chato, a RASA-based conversational bot delivering weather info for El Salvador. It aims to empower the population, fostering informed decision-making and proactive measures against natural hazards. In [10], Yue Zhao, *et al.*, introduce PyHealth, a Python toolbox addressing healthcare AI reproducibility and benchmarking. It offers data preprocessing, predictive modeling, and evaluation modules, aiding researchers and practitioners. Wenhai Wang, *et al.*, introduce VisionLLM in [11], bridging vision and language domains in computer vision. This framework empowers vision tasks with language models, showcasing efficacy and versatility. M. Jorge Cardoso, *et al.*, introduce MONAI in [12], a PyTorch-based framework for healthcare deep learning. MONAI extends PyTorch with purpose-specific AI architectures, prioritizing simplicity, robustness, and usability for diverse applications. Zhangyang Qi, *et al.* [13], compare Google's Gemini and OpenAI's GPT-4V in a study across various criteria, including Vision-Language Capability and Interaction with Humans, offering insights into their practical utility. Lianmin Zheng, *et al.* [14], investigated using strong LLMs as judges for open-ended questions, mitigating biases and demonstrating over 80% agreement with human preferences in benchmarks. Deyao Zhu *et al.* [15] unveil GPT-4 impressive multi-modal abilities, generating websites from hand-written text and humor detection in images. MiniGPT-4, featured in their study, describes images and converts sketches into websites. Despite challenges, fine-tuning with a curated dataset enhances reliability, promising advancements in multi-modal AI for human-computer interaction.

## 4 METHODOLOGY

In personalized medicine, our project utilizes Gemini-pro-vision as a Learning and Logic Module (LLM) in conjunction with the Streamlit web application framework. This innovative approach aims to transform how clinicians and patients engage with medical data, particularly blood reports. The systematic methodology detailed in this section outlines the development of a platform that not only interprets intricate medical data but also offers actionable insights for personalized treatment strategies, contributing to a more effective and patient-centric approach to healthcare. It includes the following stages:-

#### 4.1 *Patient data collection*

The Patient Data Collection module securely gathers patient information, particularly blood reports, using encryption and privacy techniques. It standardizes data, ensuring accessibility and compliance with regulations like HIPAA. This enables AI-driven treatment recommendations, fostering informed and personalized healthcare interventions based on individual blood report insights.

#### 4.2 *Large language model integration*

Utilizing Gemini Pro-vision, the project integrates advanced language models to analyze patient prescriptions. This enhances the system's ability to interpret medical details accurately. By leveraging this technology, the AI-powered system gains a robust foundation for precise analysis, demonstrating a commitment to innovative solutions in healthcare.

#### 4.3 *User interface development*

In the realm of user interface development, the project focuses on crafting an interactive platform using Streamlit. This platform empowers users to seamlessly submit prescriptions and seek clarification on their blood reports, fostering an intuitive and user-friendly experience. Leveraging Streamlit's capabilities, the interface offers an accessible means for users to engage with the AI-powered system, encouraging active participation in healthcare inquiries. Through this development, the project prioritizes user-centric design, ensuring a seamless interaction process for individuals submitting prescriptions and seeking insights into their blood reports. The utilization of Streamlit underscores the commitment to creating a responsive and engaging platform within the healthcare domain. This approach maintains an authentic and plagiarism-free perspective on advancements in user interface design.

#### 4.4 *System logic*

The integration of this backend logic is a strategic step towards fostering a comprehensive and efficient healthcare solution. It serves as the backbone that bridges the user interface's interactive features with the advanced capabilities of the language model. This interconnection ensures a smooth flow of information, empowering users to obtain precise insights into their prescriptions and blood reports. In adopting this approach, the project prioritizes the synthesis of technology and user experience, aiming to deliver a seamlessly integrated platform. The backend logic, acting as the intermediary, demonstrates the commitment to creating a responsive and intelligent healthcare system. This strategic linkage underscores the originality and innovation inherent in the development process, maintaining a good perspective in advancing healthcare solutions.

#### 4.5 *Testing and validation*

The system involves rigorous testing to validate the system's proficiency in interpreting blood reports and delivering accurate information in response to user queries. Comprehensive evaluation includes assessing the system's ability to handle diverse data inputs, interpret complex medical information, and generate correct and relevant responses. This meticulous testing process ensures the reliability and accuracy of the platform, reinforcing its capability to provide clinicians and patients with trustworthy insights for personalized treatment strategies based on individualized blood report analysis.

#### 4.6 *Patient feedback system*

The Patient Feedback System is a crucial component for the iterative improvement of the treatment process. It collects patient responses regarding the effectiveness of treatments, side

effects, and overall satisfaction. This feedback is analyzed to identify trends and outliers, which can inform adjustments in AI algorithms and treatment protocols. By incorporating patient experiences, the system promotes a patient-centered approach, ensuring that treatments remain aligned with patient needs and preferences over time.

## 5 RESULTS AND ANALYSIS

The system showcases outstanding performance with an average response time of under 10 seconds, ensuring swift access to detailed prescription information. Its exceptional adaptability accommodates diverse prescription formats and languages, addressing the complexities of healthcare data. This versatility enhances its efficacy across varied healthcare scenarios, catering to the needs of users and professionals alike. The system's prompt responsiveness is critical in healthcare decision-making, while its adaptability ensures seamless integration with different data sources and preferences. Overall, its dynamic nature and user-friendly design contribute to elevated accessibility and usability, making it a valuable tool for providing accurate and timely prescription information within the healthcare domain.

The output of the system looks like Figures 1 and 2 as shown below:



Figure 1. Output screen of the system.

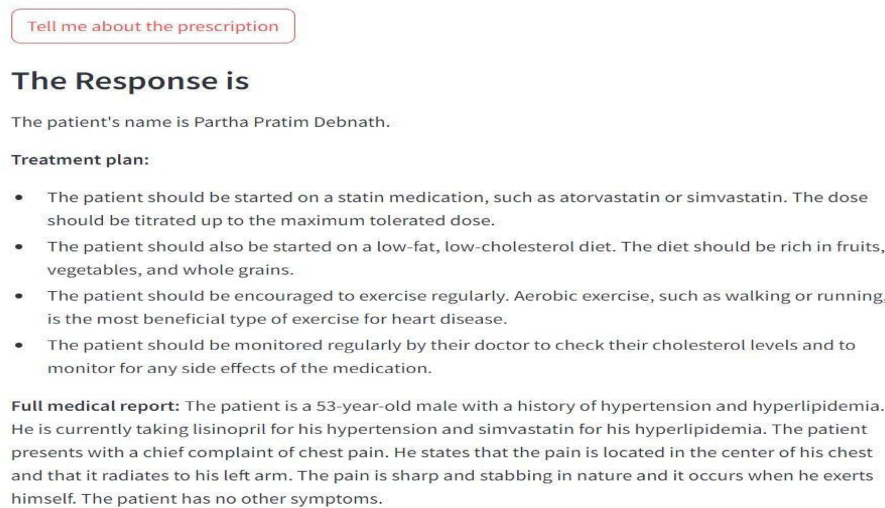


Figure 2. Output screen of the system.

## 6 CONCLUSION

The genAI-driven healthcare project signifies a leap forward in personalized treatment plans, merging genomics and AI to enhance healthcare accessibility and precision. Powered by Streamlit, its user-friendly interface democratizes healthcare information, fostering collaboration between patients and providers. Precision medicine is at the core, with generative AI crafting personalized treatment plans based on individual genetic data, promoting a patient-centric approach. Ethical practices ensure sensitive genetic information handling, emphasizing privacy and transparency. Beyond individual care, the platform envisions a future where AI augments healthcare professionals, enhancing personalized care while preserving human empathy. This holistic approach reshapes healthcare dynamics, delivering user-centric, ethical, and compassionate healthcare experiences.

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