Microsoft Imagine Cup 2024

HIRO

Your personal healthcare companion

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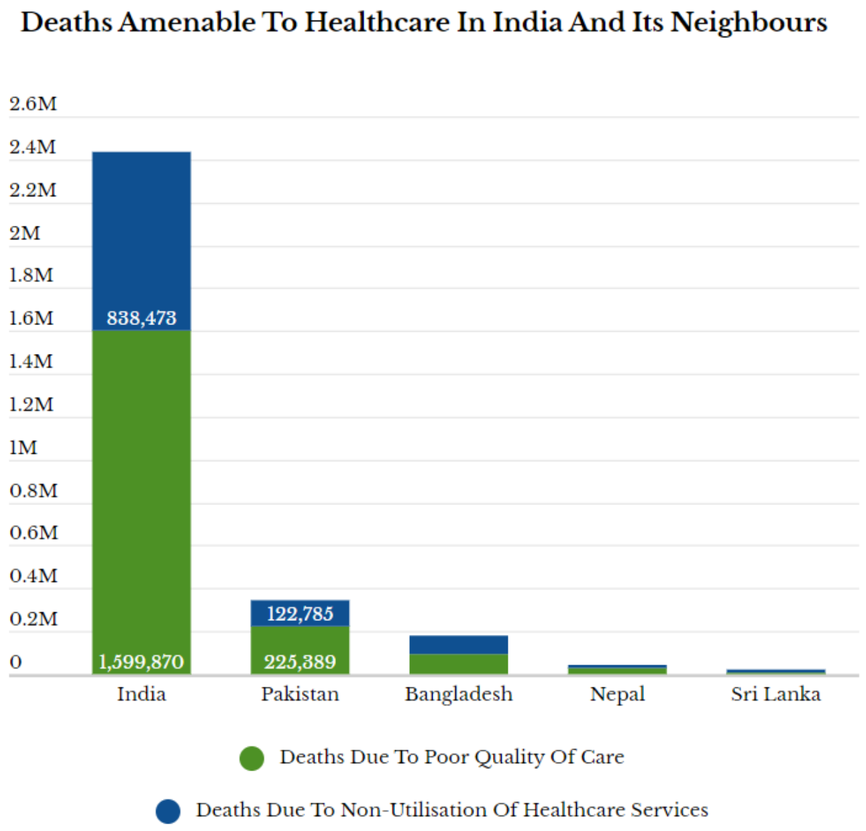
PROBLEM
STATEMENT

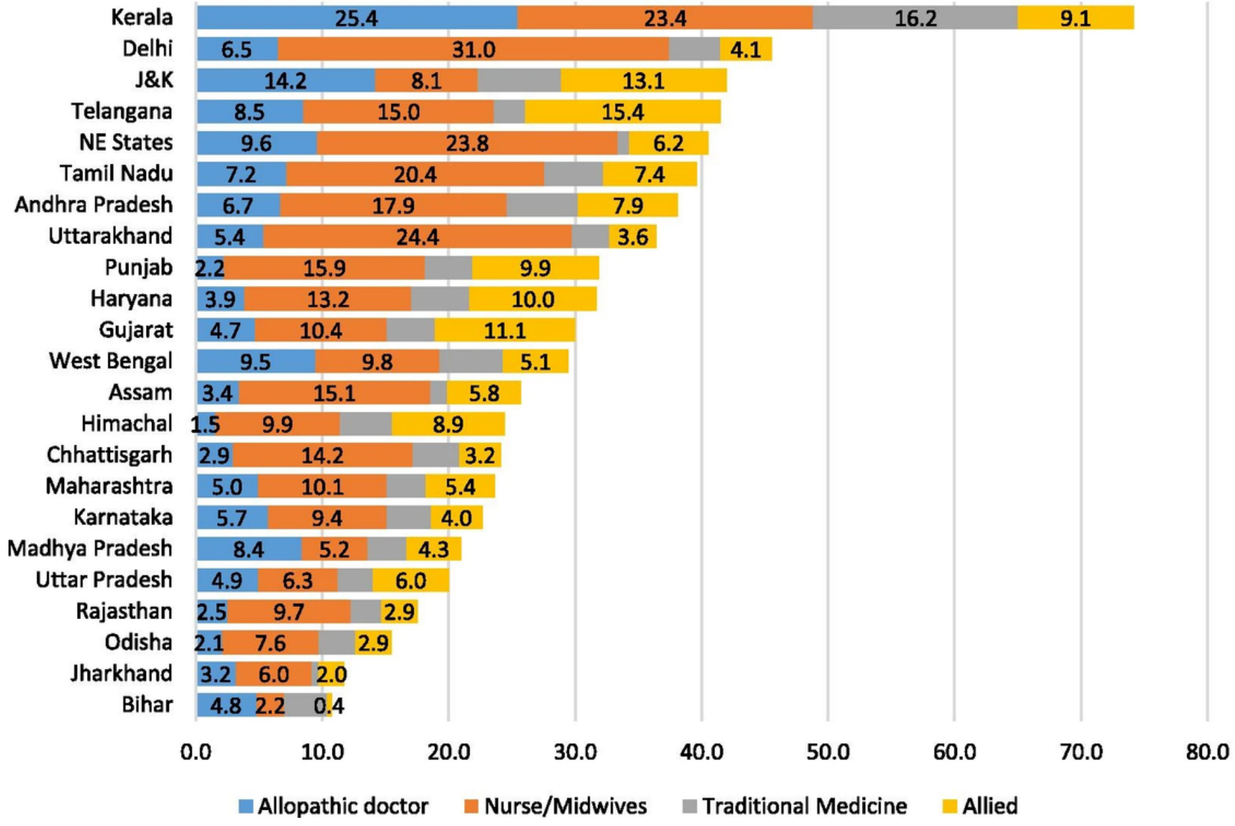
In India, the scarcity of well-educated doctors and limited access to proper medical guidance in rural areas pose significant challenges for the local population. Here's how these issues impact people living there:

- **Limited Healthcare Access:** Remote and rural areas often lack adequate healthcare facilities and personnel. The absence of well-trained doctors means that people have to travel long distances to access medical care, leading to delayed treatment or neglect of health issues.
- **Health Disparities:** The disparity in access to healthcare services between urban and rural areas exacerbates health inequalities. Those in rural regions face a higher risk of preventable diseases due to the lack of timely diagnosis and treatment.
- **Quality of Care:** In areas where doctors are scarce, the quality of healthcare suffers. Patients may receive care from individuals with limited medical training or resort to self-medication, risking incorrect diagnoses or inappropriate treatments.
- **Health Education and Awareness:** A shortage of medical professionals means there are fewer opportunities for health education and guidance. Communities may lack awareness about preventive healthcare measures, leading to a higher prevalence of diseases that could otherwise be prevented.
- **Economic Impact:** Health issues not only affect the well-being of individuals but also impact the local economy. Illnesses can lead to decreased productivity, increased medical expenses, and a cycle of poverty due to the financial burden of seeking healthcare in distant or private facilities.

OVERVIEW OF PROBLEM



Source: The Lancet
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31668-4/fulltext



Source: Biomedical Center - Human Resources Health
https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-021-00575-2/figures/2

OUR APPROACH FOR SOLUTION

Here we are introducing , **“HIRO - Your personal healthcare companion”.**

The Idea is to develop an AI model which is trained on disease dataset that can talk to peoples through chat and diagnose there problem and provide them proper medical guidance. So, everyone can access the AI through web app and share their problem and get correct medical guidance to their health related issues and conditions.

Project IDEA : HIRO - Your AI Healthcare Companion

HIRO is an innovative AI-based healthcare companion designed to bridge the gap in medical guidance and support in India, especially in rural areas. Leveraging advanced machine learning models and a user-friendly chat interface, HIRO enables individuals to discuss their health concerns, receive symptom-based diagnoses, and access relevant medical guidance.

Key Features:

- **Chat-based Interaction:**
  - HIRO provides a natural and intuitive chat interface where users can describe their symptoms and engage in a conversation about their health concerns.
- **Symptom-based Diagnosis:**
  - The AI model, trained on a comprehensive disease dataset, analyzes user-provided symptoms to make accurate predictions about potential health conditions.
- **Web App Accessibility:**
  - Users can access HIRO through a web application, making it widely available to people with internet access, regardless of their location.
- **Disease Dataset Training:**
  - The underlying machine learning models, including Support Vector Classifier, Naive Bayes, and Random Forest, are trained on a diverse dataset of diseases to enhance the accuracy and reliability of diagnoses.
- **User-friendly Experience:**
  - HIRO incorporates a user-friendly design to ensure that individuals with varying levels of technological proficiency can easily interact with the system.
- **Disease Information and Precautions:**
  - HIRO not only diagnoses health conditions but also provides detailed information about the identified diseases, along with recommended precautions.
- **Voice and Text Output:**
  - The system offers both text and voice outputs, enhancing accessibility for users with different preferences or varying levels of literacy.

WORKING OF PROJECT

1. **Getting the user prompt**

get the user message through input field or a voice message

2. Extract the symptoms

Extract the symptoms in user message with Natural language processing.

3. Prediction of disease

Then all the data is feed to classification models. Multiple classification model works together to make an exact prediction

4. Getting the disease info and precaution

Then model gets the disease description and precaution for the condition

Result

IMPACT OF HIRO :

HIRO aims to democratize healthcare access by providing timely and accurate medical guidance to individuals, particularly those in rural areas with limited access to healthcare professionals. This project has the potential to improve early diagnosis, reduce health disparities, and empower individuals to take informed actions regarding their health.

- **Accessible Healthcare for All:**
  - HIRO addresses the challenge of limited access to well-educated doctors, particularly in rural areas. By providing an AI-driven healthcare companion accessible through a web app, individuals, regardless of their geographical location, gain access to timely and accurate medical guidance.

- **Early Diagnosis and Prevention:**
  - The AI model's ability to analyze symptoms and predict potential diseases facilitates early diagnosis. Early detection is crucial for preventing the progression of certain health conditions, leading to more effective treatment outcomes.

- **Reducing Health Disparities:**
  - In regions with disparities in healthcare accessibility, HIRO plays a vital role in reducing the gap. It ensures that individuals in remote or underserved areas have the opportunity to receive medical guidance comparable to that in urban centers.

- **Empowering Individuals:**
  - HIRO empowers individuals to take control of their health by providing them with information about their symptoms and potential health conditions. Informed users are better equipped to make decisions about seeking further medical attention and adopting preventive measures.

Current Challenges

While the HIRO - Your Personal Healthcare Companion project holds great promise for improving healthcare accessibility, there are several challenges that need to be addressed:

- **Data Privacy and Security:**
  - Handling sensitive health data raises concerns about privacy and security. Ensuring compliance with data protection regulations and implementing robust security measures is crucial to gain user trust.
- **Limited Access to Reliable Data:**
  - Acquiring a diverse and comprehensive dataset of diseases, symptoms, and patient profiles for training the models can be challenging. Limited access to reliable healthcare data may hinder the accuracy and generalizability of the AI models.
- **Ethical Considerations:**
  - Ethical concerns arise around the use of AI in healthcare, particularly in making critical health-related decisions. Ensuring transparency, fairness, and accountability in the AI decision-making process is essential.
- **Multilingual Support:**
  - Providing support for multiple languages is crucial, especially in a diverse country like India. Adapting HIRO to understand and respond in regional languages ensures broader accessibility.

TEAM HIRO

Hello everyone!, Let me introduce my team. Our team consist of 3 amazing peoples - Vivek Kumar (Me) , Rahul Raj and Dainwi Choudhary. Since we share a common interest and passion about technology. So this time we team up to solve a major problem in India’s ruler area.

Vivek Kumar
(Lead/ML Model Designer)

Rahul Raj
(Backend Developer/Database Manager)

Dainwi Choudhary
(UI/UX Designer & Developer)