

Healthsathi : AI Based Voice Assistant for Rural Healthcare Support

Shiwangi Pandey¹, Netra Singh², Aayush Mohan³, Nandini Jagtap⁴, Smita Dandge⁵

¹Department of Computer Engineering, Thakur Shyamnarayan Engineering College, Mumbai, Maharashtra

²Department of Computer Engineering, Thakur Shyamnarayan Engineering College, Mumbai, Maharashtra

³Department of Computer Engineering, Thakur Shyamnarayan Engineering College, Mumbai, Maharashtra

⁴Department of Computer Engineering, Thakur Shyamnarayan Engineering College, Mumbai, Maharashtra

⁵Professor, Department of Computer Engineering, Thakur Shyamnarayan Engineering College, Mumbai, Maharashtra

Abstract - Rural areas face significant challenges in accessing basic health advice due to limited healthcare facilities and a shortage of doctors. Many existing digital health tools require typing skills, which can be difficult for people who are not familiar with technology. This paper presents HealthSathi, an AI-based voice assistant designed to provide basic healthcare support. Users can interact with the system by speaking, typing, or selecting symptoms, and the assistant responds in both voice and text formats. This makes the system easy to use, especially for individuals who are not tech-savvy. HealthSathi utilizes speech recognition, natural language processing, and text-to-speech technologies to understand user input and generate appropriate responses. The system also supports multiple languages, helping to overcome communication barriers. HealthSathi provides guidance for common health problems and promotes awareness through simple and clear suggestions. It is designed to be user-friendly, cost-effective, and suitable for use in areas with limited resources. This makes HealthSathi a valuable tool for improving access to basic health information in underserved communities.

Key Words: Voice Assistant, Rural Healthcare, Natural Language Processing, Speech Recognition, Text-to-Speech, Artificial Intelligence.

1. INTRODUCTION

Access to basic healthcare support remains a significant challenge in rural areas due to the shortage of medical facilities and healthcare professionals. People often need to travel long distances to seek medical assistance, even for minor health issues such as fever, cold, or headaches. As a result, many individuals delay seeking timely help, which can lead to worsening health conditions and increased healthcare risks. In addition to limited access to medical services, there is a lack of awareness regarding preventive healthcare practices. Many individuals are not

fully informed about how to manage common illnesses or maintain good health, which contributes to frequent health problems and places additional pressure on the healthcare system.

In recent years, various digital healthcare solutions such as mobile applications and telemedicine platforms have been developed to improve accessibility. However, these systems often require users to navigate complex interfaces, read instructions, and type inputs, making them difficult to use for individuals who are not familiar with technology, particularly elderly users. To address these challenges, this is proposed as an AI-based healthcare assistant designed to simplify user interaction. The system allows users to communicate by speaking, typing, or selecting symptoms through a simple interface. This flexible interaction model ensures ease of use for a wide range of users. HealthSathi utilizes speech recognition, natural language processing, and text-to-speech technologies to understand user input and generate meaningful responses. The system provides responses in both voice and text formats, making it more accessible and user-friendly. Additionally, it supports multiple languages, enabling users to interact in their preferred language.

2. LITERATURE REVIEW

There have been a lot of developments in Artificial Intelligence and Natural Language Processing. These developments have helped to create healthcare support systems. This is especially true for people who live in areas. Several studies have looked at creating Artificial Intelligence based assistants. These assistants can give people medical advice and help them communicate with healthcare providers. They can also reduce the need for healthcare systems.

Umesh R and Praveen Kumar [1] made an Artificial Intelligence voice assistant in 2025. This assistant is meant for people who live in areas and it can work without the

internet. It uses speech recognition and simple language models. The system is pretty accurate. Can respond quickly. It shows that Artificial Intelligence systems can work well on devices that do not have a lot of power. They can also keep user information private.

Nagesh Algoni [2] made a multilingual voice Artificial Intelligence assistant in 2025. This assistant can help people who speak languages communicate with healthcare providers. It can translate what people say in time. However it does not work well in places and it needs good audio quality to function properly.

Sumaiya Tasnia Khan and Shyamasree Saha [3] made a voice health application called AmarDoctor in 2021. This application can analyze symptoms. Give people advice. It is very good at diagnosing illnesses. It is easy to use. However, it only supports a languages, which means it is not useful for everyone. Dr. Seedha Devi [4] and others made an Artificial Intelligence assisted healthcare portal in 2024. This portal uses machine learning to predict illnesses. It also lets people consult with doctors online. However it needs the internet to work, which means it is not suitable for areas with internet connectivity. P.Jhansi Lakshmi [5] and others made an offline virtual voice assistant in 2025. This assistant uses Artificial Intelligence and Natural Language Processing. It is fast and private. It works well in areas with poor internet connectivity. However it does not have a lot of knowledge which means it is not very useful for complicated health issues. Sathiyaseelan Balasundaram [6] looked at how Artificial Intelligence can help healthcare workers in areas in 2025. Artificial Intelligence can help with health checks and decision making. However it is not a replacement for medical diagnosis. G.Shobana [7] and others made a multilingual healthcare chatbot in 2025. This chatbot can be used with voice or text. It has a lot of features. However some of these features need the internet to work, which means it is not very useful in areas with internet connectivity. Juliet Johny and Abhishek Singh Tomar [8] did a survey on Artificial Intelligence based chatbots in 2025. They found that Natural Language Processing and machine learning are very important for these systems. However there are still a lot of challenges such as keeping user information private and making sure the systems are reliable. Arulmangainayaki [9] and others made a chatbot for rural areas in 2020. This chatbot can give people advice and connect them with healthcare providers. However it is not very useful for health issues, which means it has limitations. Seethu Kurian [10] looked at how Artificial Intelligence driven health chatbotsre used in rural India in 2025. These chatbots can give people advice on symptoms

and health education. They can also support government healthcare systems. However they need the internet to work. They do not support a lot of languages.

From these studies it is clear that Artificial Intelligence systems have improved healthcare for people in areas. However there are still a lot of problems, such as the need, for internet connectivity and limited language support. These problems mean that we need to create a offline voice-based health support system that is easy to use and supports many languages. This system should be designed for rural areas. Artificial Intelligence and Natural Language Processing can help to create this system. The system should be able to work without the internet. It should be able to support many languages. It should also be easy to use. It should be able to provide people with the help they need.

3. METHODOLOGY

The HealthSathi system is an AI-based healthcare assistant designed to provide basic health guidance through an interactive and user-friendly interface. It is a voice-enabled application that allows users to communicate using speech, typing, or by selecting symptoms, making it accessible to a wide range of users. The system architecture is divided into two main components: hardware and software. The hardware component includes a smartphone or computer equipped with a microphone and speaker. These components enable users to interact with the system through voice input and receive responses in audio form, ensuring a smooth and natural user experience. The software component is developed using the Python programming language, which provides flexibility and ease of implementation. The system uses the Flask framework to manage application flow and handle user requests efficiently. For speech processing, the system utilizes the Vosk speech recognition engine to convert spoken input into text. Additionally, the pyttsx3 library is used to convert generated text responses into speech output.

To understand user queries, the system incorporates Natural Language Processing (NLP) techniques such as text normalization, keyword extraction, and intent recognition. These processes help in accurately identifying user symptoms and requests. The system is supported by a structured database that stores information related to common symptoms, health conditions, precautions, and basic remedies. When a user provides input, the system processes the request, matches it with relevant data in the database, and generates an appropriate response. The final output is delivered to the user in both text and voice

formats, ensuring better accessibility and ease of understanding. This modular design enables efficient interaction and reliable performance while maintaining simplicity and usability.

3.1. Materials: HealthSathi system is made to work with basic computer parts so it is easy to use and does not cost a lot of money. It can work on a smartphone or a personal computer that has a microphone and speaker or headphones. The microphone is used to listen to what the user says and the speaker is used to play the HealthSathi systems responses so the user and the HealthSathi system can talk to each other smoothly. The people who made the HealthSathi system used the Python programming language to build it because Python is easy to use and has a lot of tools that can help. They used the Flask framework to manage the behind the scenes work and to handle what the users ask for. The HealthSathi system can understand what people say because it uses the Vosk engine, which turns voice into text and it uses the pyttsx3 library to turn text into speech that people can hear.

When people talk to the HealthSathi system it uses ways to understand what they mean like making the text normal finding important words figuring out what is wrong with them and knowing what they want. These things help the HealthSathi system understand what people say correctly. The HealthSathi system also has a database that was made using SQLite, which stores information about common problems people have basic health issues things people should be careful about ways to feel better and general tips, for being healthy. This database helps the HealthSathi system find the information quickly and answer peoples questions efficiently. The whole HealthSathi system is designed to be simple not expensive and easy to use on devices.

3.2. Methods : The system we are talking about is made up of parts that work together. Each part of the system does a job to help the system understand what the user is saying and to give a good response. The system can take input from the user in ways like when the user talks to it types something or picks a symptom from a list. This makes it easy for the user to use the system. When the user talks to the system the system uses a microphone to hear what the user is saying. A special tool called Vosk to turn the users voice into text. If the user types something the system can understand that too. The system also lets the user pick from a list of symptoms, which makes it easy for the user to tell the system what is wrong. All of these ways of giving input

are then sent to a part of the system called the Natural Language Processing module.

In the Natural Language Processing module the system looks at the input. Tries to understand what the user is saying. It does this by looking for words figuring out what the users symptoms are and trying to understand what the user wants. This helps the system give a response to the user. The system then uses a framework called Flask to help all the parts of the system work together. The system talks to a database called SQLite, where it looks for information about the users symptoms and finds out what might be wrong and what the user can do to feel better. The system is designed to be flexible and easy to use. It uses many different tools and parts to make sure the user gets a good response. The Natural Language Processing module and the database are parts of the system and they help the system give the user a response that is accurate and helpful. The system uses the Flask framework and the pyttsx3 tool to make sure everything works together smoothly.

3.3 System Flow : The HealthSathi system is really easy to use. It helps users get basic health guidance. It does this through an interface that users can interact with. The HealthSathi system starts working when a user gives it some information. This can be done in a ways: the user can talk to it type something or pick from a list of symptoms. This way the HealthSathi system is flexible and easy for different kinds of users to use. When a user talks to the HealthSathi system it uses a microphone to hear what they are saying. Then it turns that into text. If the user types something the HealthSathi system just uses that text. If the user picks symptoms from a list the HealthSathi system uses those symptoms. The HealthSathi system then puts all of this information into text and sends it to the next step. The HealthSathi system then looks at the text using techniques to understand what the user means. This includes making sure the text is correct finding words figuring out what symptoms the user has and understanding what the user wants to know. This helps the HealthSathi system give the user an answer.

After the HealthSathi system understands what the user wants it talks to the part of the system. The backend part was made using the Flask framework. The backend part manages everything and talks to a database to get the information. The HealthSathi system looks at the symptoms the user has. Tries to figure out what might be wrong. It then gets information about what the user can do to feel better like what precautions to take or what remedies to try. Once the HealthSathi system has all the information it

needs it makes a response that's easy to understand. The HealthSathi system then turns this response into speech using an engine. Finally, the HealthSathi system gives the user the response in both text and audio so the user can choose how they want to get the info

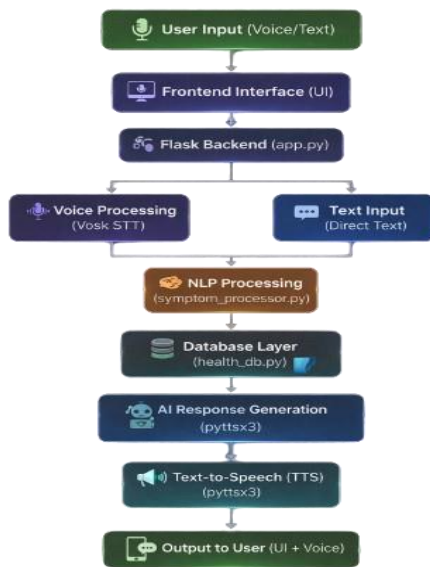


Fig-1: Architecture of Healthsathi

4. TECHNOLOGY USED

The HealthSathi system is developed using a combination of modern technologies and tools that help in building an efficient, user-friendly, and interactive healthcare application. Each technology plays an important role in enabling smooth communication between the user and the system, as well as in processing and generating accurate responses.

- 1. Python:**
Python is the main programming language used for developing the HealthSathi system. It is chosen because of its simple syntax, flexibility, and strong support for artificial intelligence and natural language processing.
- 2. Flask Framework:**
Flask is a lightweight web framework used to build the backend of the application. It is responsible for handling user requests and managing the flow of data between different parts of the system.
- 3. Vosk Speech Recognition:**
Vosk is used as the speech recognition engine in the system. It converts the user's spoken input into text, allowing users to interact with the system through

voice commands. This makes the application more accessible, especially for users who are not comfortable with typing.

- 4. pyttsx3 (Text-to-Speech):**
The pyttsx3 library is used to convert text responses generated by the system into speech output. This allows the system to "speak" to the user, creating a more interactive and user-friendly experience.
- 5. Natural Language Processing (NLP):**
Natural Language Processing is used to understand and interpret user input. It helps the system analyze the text, identify important keywords, and determine the user's intent.
- 6. SQLite Database:**
SQLite is used as the database for storing healthcare-related information such as symptoms, diseases, precautions, and remedies. It is a lightweight and efficient database that allows quick data retrieval.

5. FEATURES OF HEALTHSATHI



Fig-2: Core Components of Healthsathi

5.1 User-Friendly Interface : The HealthSathi home page is made to be simple and easy to use. It has a layout where you can see all the options and they make sense. The HealthSathi home page does not have a lot of words on it which makes it easy to look at. The HealthSathi home page also has icons that're easy to understand. This makes it easy for people to use the HealthSathi home page even if they do not know a lot about technology. The HealthSathi home page only has the healthcare things on it so it is not too complicated. This makes the HealthSathi home page a better experience, for people who use it. The HealthSathi home page is designed for people who use the HealthSathi home page.

5.2 Voice Assistant: The HealthSathi system has a voice assistant that lets users talk to it in a way. This means users

do not have to type anything. It is very easy for people who have trouble reading or writing. The HealthSathi system uses the microphone to hear what the user is saying. It tries to understand what the user wants. Users can simply tell the HealthSathi system how they are feeling. The HealthSathi system will give them a helpful answer. The HealthSathi system is very useful, for people because they can just talk to it and it is easy to use. This makes the HealthSathi system feel like talking to a real person.

5.3 Chatbot: The chatbot feature is for people who like to type. It lets users type in what's wrong, with them and get answers right away. The chatbot uses Natural Language Processing to figure out what users are trying to say about their health. The chatbot feature can tell what users want when they type in their symptoms. Then the chatbot feature gives users some advice and tells them what might be causing their symptoms. This makes it easy for users to talk to the chatbot feature if they like typing. The chatbot feature is a way for people to get some help when they need it.

5.4 Symptom Identification Module: The symptom identification part is important because it looks at what the user says and tries to figure out what might be wrong with their health. It takes the symptoms that the user gives whether they talk, type or pick them from a list and finds the information in them. The system looks for health words and matches what the user says with the information it already has so it can give good ideas about what the problem might be. This part of the system helps it understand what the user is worried about and gives them health advice, about their symptoms and possible health conditions.

5.5 Emergency Assistance: The emergency assistance feature provides quick access to essential helpline services during critical situations. The home page includes important contact options such as ambulance, police, and fire services, allowing users to access help instantly without external searching. This feature is particularly useful in urgent health conditions where immediate response is required. By integrating emergency support within the system, HealthSathi extends beyond advisory functions and offers practical, real-world assistance to users.

6.ADVANTAGES OF HEALTHSATHI



Fig-3: Key Components of Healthsathi

7.LIMITATIONS OF HEALTHSATHI

1. **Not a Replacement for Doctors:**
The system provides only basic health guidance and cannot replace professional medical diagnosis. Users should consult a doctor for serious conditions.
2. **Limited to Basic Symptoms:**
It mainly handles common symptoms like fever, cough, and headache, and may not accurately support complex medical cases.
3. **Accuracy Depends on User Input:**
The response quality depends on how clearly the user describes symptoms. Incorrect input may lead to less accurate results.

8. FIGURES OF HEALTHSATHI

HealthSathi is an AI-powered health assistant that allows users to describe their symptoms through voice or chat. As shown in the interface, users can speak e.g., “sir dard ho raha hai” and the system listens, processes the input, and provides simple health advice instantly

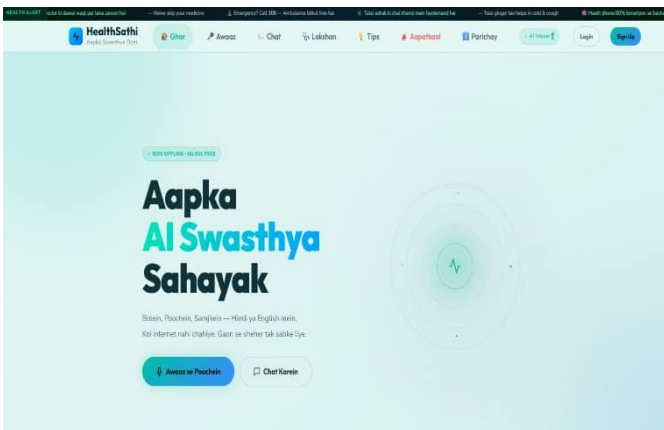


Fig-4 : Landing page of Healthsathi

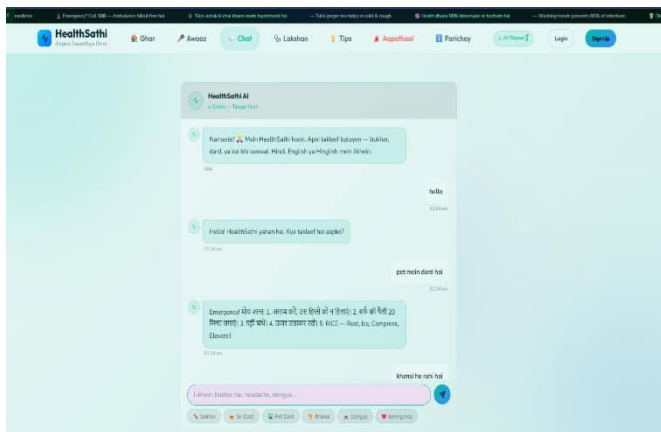


Fig-5 : Chatbot Interface

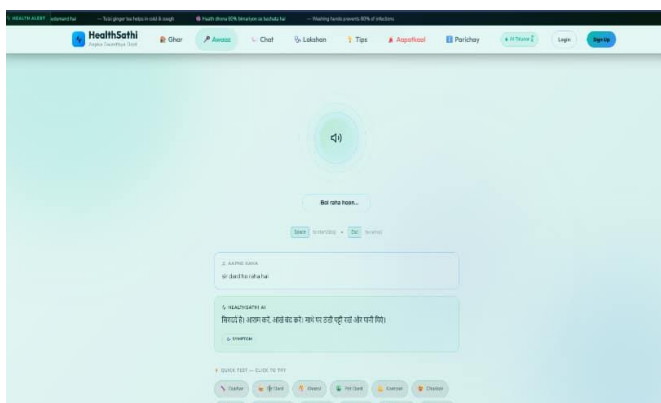


Fig-6 : Voice Assistant of Sathi

9. RESULTS AND DISCUSSION

The HealthSathi system was. It worked really well. It was tested to see how well it performed. If it was easy to use. The HealthSathi system had parts that worked smoothly together. These parts included talking to the system using text to chat with the system and figuring out what was wrong with the user. When the system was tested the part that listened to the users voice worked well. It could understand what the user was saying and turn it into text. The HealthSathi system was good at understanding health questions and giving good answers. The part that used text to chat with the user also worked well. Users could tell the system what was wrong with them and get an answer away.

The part of the HealthSathi system that figured out what was wrong with the user was reliable. It could look at what the user said and match it with information in the database. Then it could say what might be wrong and give some ideas about what to do. The system could give answers quickly and in a way that was easy to understand. Users could get these answers by listening or by reading. Overall the HealthSathi system did what it was supposed to do. It was an efficient way for users to get healthcare help. The system used different technologies, like speech recognition and database management. These technologies helped make the HealthSathi system work well and be reliable. The HealthSathi system was a way for users to get the healthcare help they needed.

CONCLUSION

The HealthSathi system provides an easy and effective way for users to access basic healthcare guidance. By using voice, text, and symptom-based interaction, the system ensures accessibility for users with different levels of technical knowledge. It successfully combines modern technologies like speech recognition and natural language processing to deliver quick and understandable responses. Overall, HealthSathi is a practical solution that improves access to basic health information and enhances user experience. The system successfully uses technologies like speech recognition and natural language processing to understand user input and provide clear responses in both text and voice formats.

10. FUTURE SCOPE

1. Integration with Hospitals and Doctors:
In the future, the system can be connected with hospitals and healthcare professionals so that users can directly consult doctors when needed.

2. Use of Advanced Artificial Intelligence:

The system can be improved by using advanced AI and machine learning models to better understand user symptoms and provide more accurate and personalized health suggestions.

3. Multilingual Support Expansion:

The system can be extended to support more regional languages, making it accessible to a larger population and removing language barriers.

4. Image-Based Diagnosis:

Future versions can allow users to upload images (such as skin issues or injuries) for preliminary analysis, enhancing diagnostic capabilities.

5. Health Monitoring Integration:

The system can be connected with wearable devices to track vital signs like heart rate, temperature, and activity levels for continuous health monitoring.

11.SOME HELPFUL HINTS

When you talk to the system you should say things in a way so the system can understand what is wrong with you. When you use the voice feature you should talk slowly and clearly. Try to be in a quiet place so the system can hear you better. To get results you should choose the right symptoms when you are picking them from the list of symptoms. You should. Listen to what the system says all the way to the end before you do anything. The system is made to give you advice about your health and some general ideas. If you have a health problem or an emergency you should go see a doctor right away.

Also, you should make sure the microphone on your device and the speaker are working properly so the system can hear you and you can hear the system. You should use the system to get some help with your health and the system will try to give you some ideas, like the symptom selection option to help you figure out what is wrong, with you, the symptoms.

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