

## Connect 2 Cure - Telehealth Platform

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**Abstract:** In some areas of India there is lack of facilities in the telemedicine field and there are a smaller number of doctors and medicinal supplies available. To address, these issues and overcome this types of problem Connect2Cure is built on the base of MERN stack and Gemini API. On this platform doctor and patient can seamlessly communicate with each other in two different modes through chat as well as video calling. The Connect2Cure help to securely diagnosis respective patient in secure way and maintaining their privacy.

These platform websites ensure to provide telemedicine services seamlessly on mobile phones as well as PC's and laptops. People have tested this website to ensure they can take advantage of this platform to advantage and receive access to telemedicine services.

**Keywords:** Telemedicine, MERN Stack, Gemini AI, Mobile Health, Privacy, Real-time Communication, Digital Health

**Introduction:** In India accessing healthcare is major issue in remote areas as there are less amount of doctors and medical facilities present to provide respective services. This can result in delays in providing respective services to the patient can takes the patient into critical condition. This Telemedicine platform is built to close the gap between the lack of healthcare services available in the remote areas and it help the people to access the best healthcare services through our platform by booking doctor's appointment and communicating with the doctors through taking advantage of our chat and video calling features on our platform.

This telemedicine platform enables to access these telemedical platform from any remote location in India through an internet connection. The services like Artificial Intelligence, Cloud Computing and Web Technologies have made feasible for people to access the telemedicine services at their doorstep. There is no requirement to travel to the hospital to people can take prescription virtually by using our platform. People in these areas are benefiting from telemedicine since they can receive the necessary medical care without having to travel far. A system called Connect2Cure enables people to get medical care from the comfort of their own homes. It makes use of the internet to allow people to communicate with physicians and obtain the necessary medical care. The MERN system consists of a set of technologies that work together effectively: MongoDB, Express.js, React.js, and Node.js. It also incorporates Gemini technology to enhance the system's functionality. An overview of the project, including background data, the goal, the problem domain, and the role of technology in telemedicine applications, is provided in this chapter.

These days, telemedicine is a good option for healthcare, particularly for those who live in rural areas and find it difficult to access medical facilities. There are certain issues with the traditional approach to healthcare.

Now that we have things like cloud computing and artificial intelligence and websites, we can get healthcare without going to the hospital. Telemedicine is a way for people to talk to doctors from home get advice from doctors and keep track of their records on the computer. This means people can get healthcare from anywhere.

Having people with smartphones and access to the internet has helped more people use this kind of healthcare.

The main problems are how to use technology to make healthcare easier to get and more efficient and reliable. Connect2cure is trying to solve these problems with a system that lets people talk to doctors online. This system uses intelligence to figure out what is wrong with the patient. It also keeps the patient's information safe. Has a simple way for the patient and their doctor to look at the patient's information. Connect2cure is trying to make healthcare easier with this system. Telemedicine and connect2cure are making it possible for people to get healthcare, from their homes.

### Telemedicine and Healthcare Challenges

Traditional healthcare systems have a lot of problems that make it hard for them to give people the help they need when they need it. One big problem is that there are not skilled doctors in rural areas. Doctors with a lot of experience like to work in

Connect2Cure is a healthcare platform that lets people get medical help from home. It uses the internet to connect

patients with hospitals in cities because they have facilities and more opportunities to advance in their careers. So, people who live in areas do not have access to good medical care [1].

Another big issue is that it takes time for people to get to healthcare centres and people who live in rural areas have to travel a long way to get to the nearest health centre. This takes a lot of time, efforts and also very expensive especially for older people or people who are sick. Also, people have a time getting help right away because hospitals are too crowded. The way medical records are managed is also a problem in healthcare systems. Many healthcare facilities still use paper records, which are easy to lose or damage. It's hard for doctors to get all the information they need about a patient because it's hard to share these records with healthcare providers. This can lead to diagnoses and treatment plans that do not work well [2].

Now we have telemedicine, which lets doctors talk to the patients in online through various means such as video calls, chat messages, and mobile apps on telemedicine platforms and it store the patient data stored. Digital medical records have made it easier for healthcare providers to manage records. Telemedicine has also made healthcare services better. Doctors can use computers to look at symptoms and give people advice, on how to stay healthy, which makes healthcare services more efficient [3]. Traditional healthcare systems have a lot of problems. Telemedicine platform is to solve the delayed medical care to save a life.

**Project Overview - Connect2Cure** doctors. Patients can sign up on the Connect2Cure platform tell the doctors what is wrong with them and then talk to the doctors through this platform. The platform is easy to use so patients and doctors can talk to each other easily.

One of the things about Connect2Cure is that it has a computer system that can look at what is wrong with a patient. Patients can tell the system what is wrong with them and then the system uses computer code to give them some ideas about what might be wrong. This helps patients understand what is wrong with their body before they talk to a doctor.

It is very important to remember that a computer system is not a doctor. It cannot tell patients what is wrong with them. It is a tool to help patients understand what might be wrong. The platform also lets patients and doctors talk to each other in time. Patients can send messages to doctors. Have video calls with them. This makes it easy for patients to get help from doctors. All of the conversations between patients and doctors are saved on computers called clouds [4]. This means that patients can look back, at what the doctors told them

The main goal of Connect2Cure is to make a platform that lets a lot of people get medical help from home. Connect2Cure wants to make it easy for people to get help and they want to make sure that all of the information is safe and secure. Connect2Cure is a healthcare platform that wants to help people get the medical help they need.



## Technologies Used

The Connect2Cure telemedicine platform is built with the help of MERN Stack. The MERN Stack consists of four technology MongoDB, Express, React, and as well as NodeJS. The MERN Stack help in building both frontend and backend of the web application by only one language called JavaScript. The MERN is famous for building web applications that can handle a lot of traffic because its flexible and efficient. React.js is used to create the user interface for the system which is also called as frontend. This technology helps developers build interactive and responsive user interfaces which user can access on multiple devices like mobile or computer devices. A dynamic user interface can enhance the user experiences in a good way. React is used to build a frontend and prevent using repeatable code instead it uses component-based architecture.

Node.js is a JavaScript runtime engine used to run javascript on computer devices as well as browser. Node.js is used by web-developers to build backend for the web-application which established communication between frontend and the database in a secure way [5]. It is reliable to build web-application to handle large amounts of traffic seamlessly without crashing. Express.js is used as the web framework for building the systems backend. It is used together with Node.js to build applications. Express.js is a web framework that helps developers build robust applications with the help of REST API. Instead of writing heavy lines of code we can build API and integrate with

the frontend which makes it easy to routes the frontend requests to specific path. MongoDB Atlas is used as the cloud database for the system. The MongoDB supports wide range of cloud providers like Google cloud, AWS and as well as Microsoft Azure. This database stores user profiles, patient medical records, consultation records, and chat messages. A cloud database ensures scalability and robust data storage for the system. The MongoDB Atlas database stores user profiles both for the patient and the doctor as well. The MongoDB Atlas database also stores medical records. The platform uses the Gemini API for AI-based symptom analysis which is provide by the tech giant called Google. The Gemini AI API analyses the report uploaded by patients and gives specific result in the form of the report which includes charts and graph which helps the patient to give an idea about the medical problem which he has.

The Gemini API provides health suggestions based on the report uploaded by the respective patient. For real-time communication Socket.io is used. Socket.io enables messaging between doctors and patients. Video consultation feature is integrated with the help of WebRTC. WebRTC enables peer-to-peer communication using web browsers. The system uses WebRTC for video consultation.

### System Architecture

The Connect2Cure platform is based on client-server architecture. This means the system is divided into two different layers. These layers include user interface, the backend processing layer and the database layer

The frontend layer is what patients and doctors see and use. It has things like dashboards and interfaces for talking to each other which the patient can used to information.

The Connect2Cure platform has an AI module. This module looks at symptoms and gives suggestions. These suggestions are then shown to the patient, in the user interface. The platform will also have real-time chat and video consult services. This is done using communication protocols which use two tools Socket.io and the WEBRTC [6].

Book doctor appointments. Patients can also use this layer to tell the system about their symptoms and send messages. The frontend layer talks to the backend server using API requests.

The backend layer does all the work. It has interfaces that handle the business logic and talk to parts of the system. When someone uses the system the backend server talks to the database to get or send

The database stores all the information. This includes data, doctor profiles, chat logs and consultation records. The Connect2Cure platform uses MongoDB Atlas to store all the system data which includes the patient and doctors' data and it also uses the Uptash (Redis) for secure token storage. This is database secure and efficient for token management as compare to the MongoDB.

Aspect	Existing System	Proposed System (Connect2Cure)
<b>Accessibility</b>	Limited accessibility because patients must physically visit hospitals or clinics for consultation.	High accessibility since patients can consult doctors remotely using the internet from any location.
<b>Consultation Method</b>	Only face-to-face consultation is available, which requires waiting time.	Provides a real-time chat and video consultation through the online platform.
<b>Medical Record Storage</b>	Medical records are stored in paper form, which will get damaged or difficult to access in due time.	Medical records are stored securely in a cloud database making them easier to access and manage.
<b>Diagnosis Support</b>	No automated support system for analyzing patient symptoms.	AI-powered symptom analysis using Gemini API helps provide preliminary medical suggestions.

<b>Communication</b>	Communication between doctor and patient occurs only during hospital visits or through phone calls.	Real-time communication is enabled in an instant through messaging using Socket.io.
<b>Video Consultation</b>	Video consultation is generally not available in traditional healthcare systems.	Live video consultations are supported using WebRTC technology.
<b>Security</b>	Limited security measures and manual verification processes.	Secure authentication and authorization using JWT or Firebase authentication.
<b>Data Accessibility</b>	Medical records are difficult to share between hospitals and healthcare providers.	Patient records can be accessed anytime and shared digitally through the platform.

### System Implementation

The Connect2Cure telemedicine platform was put together in a series of steps. This included designing the system building the end putting together the back end managing the database and testing the system. The Connect2Cure system was built one piece at a time, which made it easier to work on each part. The Connect2Cure system was built using something called the stack. This includes MongoDB, React.js, Express.js and Node.js. These were technologies chosen because they are flexible and can handle communication in real-time.

The front end of the Connect2Cure system was built using React.js. This allows users to create interfaces that change and respond to what they do. With React.js developers can make parts of the interface that can be used again. This helps with interfaces like dashboards and consultation screens. The Connect2Cure interface has parts, like a dashboard for patients a dashboard for doctors a screen for checking symptoms with AI, a screen for chatting and a screen for video consultations. The application was styled using Tailwind CSS [8], which makes sure it looks good on devices like computers, laptops, and smartphones. The application talks to the server using something called REST API and sends and receives data from the database smoothly. The back end of the Connect2Cure platform was built using Node.js and Express.js. Node.js lets JavaScript run on the server. Express.js is a framework that helps manage the routes for the application programming interface and server-side operations like authentication. The back end does things like manage user registration, login sending consultation requests chatting and database operations. The server gets requests from users checks their credentials and does database operations.

The Connect2Cure system uses a cloud-based database called MongoDB Atlas to store all the data. This includes profiles, doctor profiles, medical history, consultation data, chat data and suggestions from AI. MongoDB was chosen because it can store a lot of data and is flexible. Since it is a cloud-based database all the data can be. Is secure from anywhere. The Connect2Cure system and MongoDB work together to store and manage all the data, for the Connect2Cure platform.

The system uses intelligence to help figure out what is wrong with a patient. When a patient types in their symptoms the system sends that information to the intelligence using a special kind of request. The artificial intelligence then looks at the information. Sends back a response that includes ideas about what might be wrong with the patient and what they can do. These ideas help patients understand what is going on before they talk to a doctor and doctors can use them to do some checks before the patient comes in.

To let doctors and patients talk to each other in time the system uses something called Socket.io. This technology lets users send messages to each other away with hardly any delay. When a patient sends a message the system looks at it. Sends it to the doctor's screen right away. This makes sure that the conversation goes smoothly.

For video chats the system uses something called WebRTC. This technology lets users talk to each other using video in their web browser. The patient and doctor do not need to install any software to use this feature. This technology also helps keep the video chats secure so patients and doctors can feel safe talking to each other.

When a patient needs to have a video chat with a doctor the system sets up a connection just between the two of them. Security is very important so the system uses codes called JSON Web Tokens and Firebase authentication to make sure that only the right people can log in and use the system. These codes check to make sure that users are who they say they are and they keep people from looking at sensitive medical information. The system also has rules, about what features each user can access so patients and doctors can only see what they are supposed to see. The Connect2Cure system shows how artificial intelligence, cloud computing and other modern technologies can be used to create a way for patients and doctors to communicate remotely. The system is designed to be flexible and secure so it can handle users at the same time and keep their information safe. Artificial intelligence is used throughout the system to help patients and doctors. It is an important part of what makes the system work.

## Results and Discussion

The Connect2Cure system is really works well for both the patient and doctors. It is doing what it is supposed to do, which is to give people living in remote areas of India a good way to get medical help from far away. The Connect2Cure system has a tool that uses artificial intelligence to check symptoms. This tool is very helpful especially when people first start using the Connect2Cure system and they do not need to talk to a doctor away. The Connect2Cure system also has a way for doctors and patients to talk in time using chat and videocalls. This makes it feel like the doctor and patient are in the room.

The Connect2Cure system stores all the information in the cloud which means people can get to it from anywhere. It is safe. This makes the Connect2Cure system very easy to use. It works well and is also very secure because it uses something called JWT authentication with Firebase. The Connect2Cure system is flexible new things can be added to it later like devices that can connect to the internet and tools that can help with languages and diagnose problems. Overall, the Connect2Cure system is a way to get good medical help to people who do not have access to it normally. It is a digital healthcare platform that can make healthcare better for people, in areas that do not have a lot of medical help.

## Conclusion

The success of the Connect2Cure telemedicine platform proves that modern web technologies and artificial intelligence have the potential to increase healthcare accessibility in remote and underprivileged areas. The MERN stack and Gemini integration in this application provide efficient communication between doctors and patients, symptom analysis using AI, digital patient records, and real-time communication through chat and video calls.

The application has successfully completed all its main goals, such as implementing JWT/Firebase for authentication, MongoDB Atlas for cloud storage, Uptash (Redis) for access and refresh token management, Socket.io for real-time communication, and WebRTC for peer-to-peer video calls. The user-friendly interface in this application provides clear navigation for both patients and doctors, and the QR code sharing option increases healthcare accessibility.

In summary, Connect2Cure shows that telemedicine systems can be scalable, reliable, and impactful, if the right technology mix is used in the design process. The successful implementation shows the feasibility of providing quality digital healthcare services, which can enhance medical experience for users in various locations.

## Results

### Patient Dashboard

Displays symptom-entry section, AI chatbot, appointment options, and medical history panel.

### Doctor Dashboard

Allows viewing patient profiles, accepting consultation requests, updating diagnoses, and tracking patient history

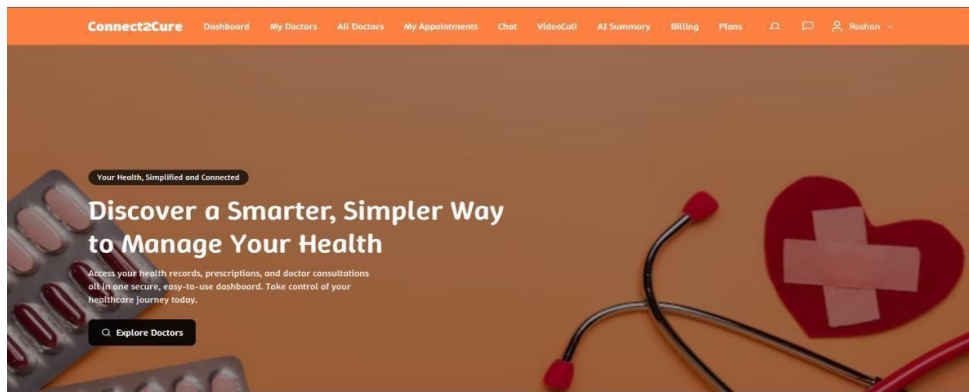


Fig 1.1: Home Page

### AI Consultation Screen

Shows the input symptom form and AI-generated suggestions retrieved via the GeminiAPI.

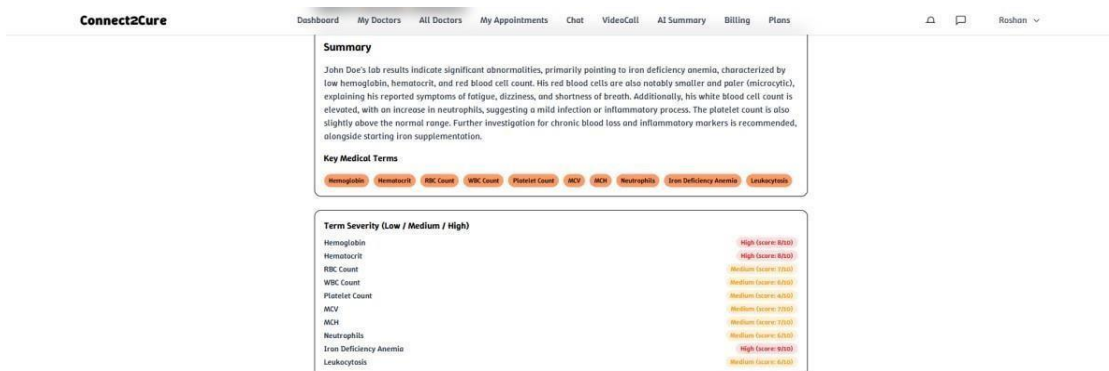


Fig1.2: AI Consultation Page

### Real-Time Chat Screen

Displays a two-way communication interface between doctor and patient with instant message delivery using Socket.io.

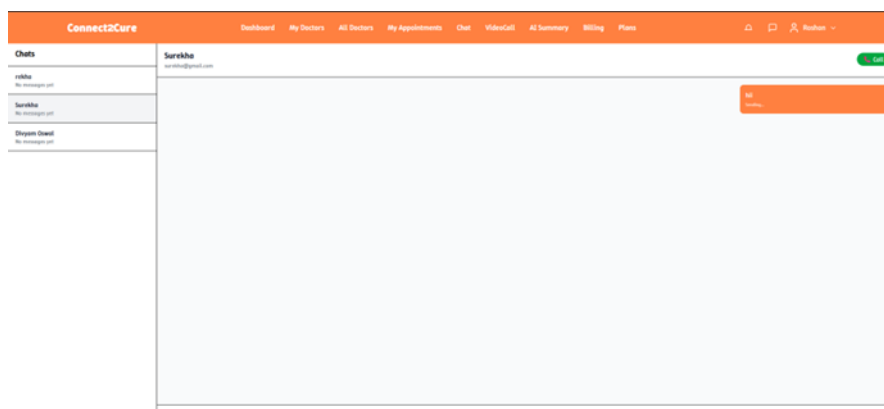
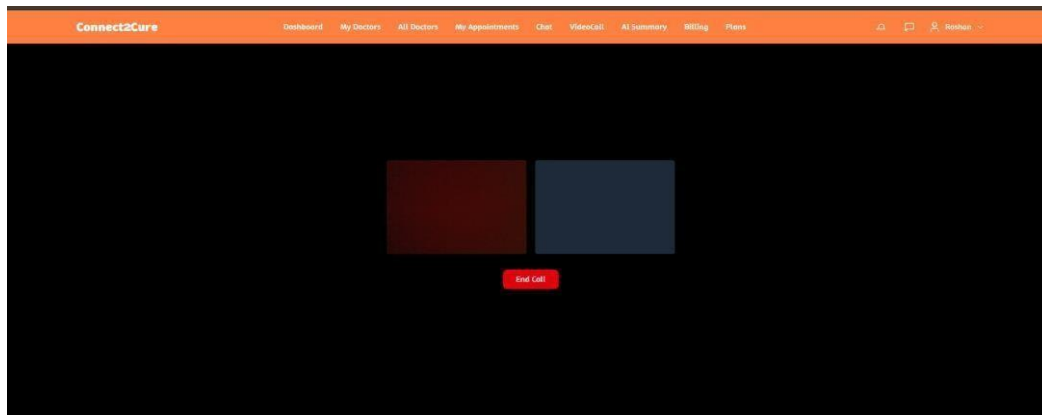


Fig1.3: Text Chat

## Video Consultation Screen

Shows a WebRTC-based interface enabling real-time audio-video calls for remote consultation.



**Fig1.4: Voice Chat**

## References

- [1] OpenAI, "GeminiAPI Documentation," 2024.
- [2] MongoDB Inc., "MongoDB Atlas Documentation," 2024.
- [3] Meta, "React.js Official Documentation," 2024.
- [4] Node.js Foundation, "Node.js v18 Documentation," 2024.
- [5] Express.js, "Express Framework Documentation," 2024.
- [6] WebRTC Project, "WebRTC Developer Guide," 2024.
- [7] Socket.io, "Socket.io Real-Time Engine Documentation," 2024.
- [8] Tailwind Labs, "Tailwind CSS Documentation," 2024.
- [9] J. D. Cipresso, M. B. Serino, "Telemedicine: Applications and Overview," *Journal of Medical Systems*, vol. 45, no. 2, pp. 1-10, 2021.
- [10] T. K. Sharma, "The Role of Digital Healthcare in Rural Development," *International Journal of Health Informatics*, vol. 12, pp. 45-56, 2022.
- [11] A. Gupta and R. Verma, "A Study on AI-Powered Medical Systems," *IEEE Access*, vol. 9, pp. 65892-65905, 2021.
- [12] M. Patel, "Real-Time Patient Monitoring Systems using IoT," *International Journal of Computer Applications*, vol. 182, no. 4, pp. 12-18, 2020.