

Tele medicine a web-portal for patients to have an online consultation with doctors.

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ABSTRACT— Now a days most of the people faces many problems to take the consultation with the doctors, also many of the people has to travel a long distance to take the consultation with the doctor which takes a lot of time and money which cannot be afford by many people so we came up with an idea called tele medicine a web-portal for patients to take consultation with the doctors anytime anywhere they want. As in the rural areas most of the people faces problems to visit the clinics and take the medical consultation. So, in this portal the patient books an appointment with the doctors, patients also can upload the physical reports and images if have any skin related issues. The doctors can reject or accept the appointment. After the consultation the doctor can also create the report of the patient by just filling a simple form and the report will get generated in to the pdf format. Also, this portal contains a section of disease prediction which uses Naïve Bayes algorithm to predict the disease based on the symptoms which will help the doctors during the patient's diagnosis. And the system can also recognize that the doctor is fake or genuine using OPEN CV brute for cematcher.

Keywords—Telemedicine, Online Consultation, disease prediction, OPEN CV, brute force matcher, Naïve Bayes, verify doctoris fakeor genuine, secure.

I. INTRODUCTION

Telemedicine is an innovative way to deliver health-related services and information through electronic information and telecommunication technologies. It allows patients and clinicians to connect remotely for a range of purposes, including providing care, advice, reminders, education, intervention, monitoring, and

remote admissions.

One of the primary benefits of telemedicine is its ability to provide long-distance care, particularly in rural settings or situations where traditional healthcare delivery is limited or challenging. Patients who live in remote areas or have limited access to transportation can benefit greatly from telemedicine, as it enables them to receive medical care without having to travel long distances.

Telemedicine can also be useful in situations where patients have mobility issues or are at risk of exposure to infectious diseases. During disease outbreaks, for example, telemedicine can enable patients to receive medical care without having to physically visit a hospital or clinic, which can reduce the risk of spreading the disease.

Telemedicine has a long history, dating back to the 1960s when health professionals used telephones to provide advice and guidance to patients. However, with the introduction of new technologies, telemedicine has evolved significantly, and today, it encompasses a wide range of electronic information and telecommunication technologies, including the internet, wireless communication, satellite, and telephones.

Telemedicine applications vary widely, from remote consultations and diagnosis to remote monitoring and electronic prescribing. One example of a telemedicine application is a web portal that enables patients to receive consultations online. Patients can book appointments with doctors at their convenience and upload reports and images related to their health issues. After the consultation, the doctor can create a report of the patient, which will be accessible to other doctors if

the patient seeks consultations from them in the future. The platform also includes a disease prediction module that can assist doctors during the diagnosis process.

One of the main advantages of telemedicine is that it provides greater access to medical care, particularly for people who live in remote or underserved areas. Telemedicine can also help reduce healthcare costs by enabling patients to receive medical care without having to travel long distances or take time off work. It can also improve patient outcomes by enabling earlier detection and treatment of illnesses.

To ensure the authenticity of doctors registering with telemedicine platforms, the system includes features to verify their credentials and weed out fake doctors. This can help patients feel more confident that they are receiving medical care from qualified professionals.

In conclusion, telemedicine has the potential to revolutionize healthcare delivery by providing convenient and efficient access to medical care, particularly in situations where traditional healthcare delivery is limited or difficult. As technology continues to evolve, it is likely that telemedicine will become an increasingly important part of healthcare delivery.

II. LITERATURE SURVEY

[1] Telemedicine is the use of Technology (ICT) in health ecosystem with a provision of visual communication, patient data transfer & collaborative learning. Government of India is actively taking initiatives for establishing digital high-speed internet connectivity through National Knowledge Network (NKN), State Wide Application Network (SWAN) & National Optical Fiber Network (NOFN) to super- specialist center, medical colleges, research organizations, Primary Health Center (PHC)/ Community Health Center (CHCs) up to block level and panchayat levels. Wellness centers and 'DigiGaon' bring digital inclusion and it enables people in rural areas to be able to access services like telemedicine and skill enhancement with the use of digital technologies. High-speed fiber-optic based internet bandwidth has deployed under NKN in as many as 250 medical colleges around the country. Many medical institutions have migrated to NKN to enhance their capacity of telemedicine activity using telemedicine platform funded by central and state government agencies. Majority of telemedicine in India funded by Ministry of Health & Family Welfare (MOH&FW) for interlinking Medical Colleges across the country with the purpose of education and National Rural Telemedicine

Network (NRTN) for Healthcare. Medical super-specialty institutes for the National Resource Centers (NRCs) and Regional Resource Centers (RRCs) for NMCN has defined and medical colleges will soon link to RRCs. India has diversified geographical region with availability of variable bandwidth in different part.

[2] Now-a-days, people face various diseases due to the environmental condition and their living habits. So the prediction of disease at earlier stage becomes important task. But the accurate prediction on the basis of symptoms becomes too difficult for doctor. The correct prediction of disease is the most challenging task. To overcome this problem data mining plays an important role to predict the disease. Medical science has large amount of data growth per year. Due to increase in the amount of data growth in medical sector and healthcare sector field the accurate analysis on medical data which has been benefits from early patient care. With the help of disease data, data mining finds hidden pattern information in the huge amount of medical data. We proposed general disease prediction based on symptoms of the patient. For the disease prediction, we use K-Nearest Neighbor (KNN) and Convolutional neural network (CNN) machine learning algorithm for accurate prediction of disease. For disease prediction we required disease symptoms dataset with disease dataset. In this general disease prediction the living habits of person and checkup information consider for the accurate prediction. And the time and the memory requirement is also more in KNN than CNN. After general disease prediction, this system able to gives the risk associated with general disease which is lower risk of general disease or higher.

[3] The State of Wyoming is developing a series of demonstration projects on the use of telemedicine technology to improve health care accessibility and quality in a frontier region. The Network for Telehealth or healthcare will focus on increasing the awareness and usage of technology for patient cure. The need for this project was established through a number of data collections, including a statewide survey of health care and telehealth providers on the topic of using technology to improve delivery of health care survey in the state. The research showed a general lack of awareness of or experience with telehealth in the state. Nonetheless, there was considerable interest in developing partnerships to support a network of telehealth services. This paper will present the results of this data collection and how they are being used to guide the development of the project.

[4] Tele medical information systems (TIS's) form the basis for telemedicine services as well as for health information services. This paper gives an introduction to the wide scope of TIS's and discusses examples for the different types of TIS's: patient- related TIS's, knowledge-related TIS's, and meta- TIS's. It concludes that for patient-related TIS's there is the need for a better integration of TIS's with other patient-centered information systems. For the other types of TIS's, more sophisticated retrieval techniques and better user interfaces for ordinary users are required. Furthermore, short descriptions of our own projects are given: the patient-related TIS of the project TECSAC (distributed electronic patient record for cardiology) and the domain-specific knowledge-related TIS's ODITEB (radiological Internet textbook) and ENDOTEL-EIS (endoscopy information system)

[5] Telemedicine started its journey over several decades. But still it could not mark a remarkable contribution to neither rural nor urban areas. People realized its impact when it saved a life from becoming an extinct. Telemedicine connects patient and specialized doctors remotely and also allows them to share the sensitive medical records. Irrespective of the mode of data exchange, all types of media are vulnerable to security and performance issues. Remote data exchange during an emergency situation should not be delayed and at the same time should not be altered. While transit, a single bit change could be interpreted differently at the other end. Hence telemedicine comes with all the challenges of performance and security issues. Delay, cost and scalability are the pressing performance factors whereas integrity, availability and accountability are the security issues need to be addressed. This paper lights up on security without compromising quality of service. Telemedicine is on track from standards, wireless devices like Mobile phones and satellites, etc. Secure Cloud based Telemedicine (SCT) uses Cloud which could free the people from administrative and accounting burdens.

[6] The paper discusses the development of a lower cost portable telemedicine tool that can collect patient data remotely for the diagnosis of patients. The researchers were successful in collecting seven vital signs of patient data in an automated manner, including blood pressure, pulse, oxygen in blood, blood glucose level, patient position and falls, body temperature, and electrical and muscular functions of the heart through ECG and airflow. They developed an Android app for collecting the patient data from the device, controlling the device, and sending data to the

server for telemedicine applications. The portable telemedicine tool kit can be a useful and integrated component of any telemedicine model, which will assist researchers in their applications.

[7] The paper investigates the effects of various environmental factors on Type-2 diabetes and develops an analytical model of disease risk prediction. The researchers preprocessed all the environmental factors into categorical values and calculated the max/min odds ratios of all the categorized environmental factors. Then, they chose the top-n ranked factors as input features for the prediction model. The disease risk prediction model was developed with SVM classifiers, and the training data were built based on Ansan/Ansong Cohort 2 Data obtained from the Korean National Institute of Health (KNIH). They used the SMOTE approach to generate the training data to handle the data imbalance problem, which is often observed in reality. The proposed method was employed to predict the risk of only Type-2 diabetes disease.

[8] The paper discusses the significance of using telemedicine and virtual care for remote treatment of patients during the COVID-19 pandemic. The pandemic has caused a significant strain on many medical centers' resources, and medical practitioners are responding to COVID-19 through rapid adoption of digital tools and technologies such as telemedicine and virtual care to provide diagnosis, treatment, etc. Telemedicine is expected to deliver timely care while minimizing exposure to protect medical practitioners and patients. The paper provides theoretical and practical evidence on the significance of using telemedicine and virtual care for remote treatment of patients during the COVID-19 pandemic.

[9] The paper describes the technological approach and guidelines to build a fully functional prototype for an in-field, portable-by-foot, critical telemedicine workstation, previously feasibility assessed, specified and demonstrated at the Proof-of Concept level. The work reported in the paper was designed to support the ongoing and future endeavor of the Institute of Space Science, in cooperation with the European Space Agency, to promote space assets and technology oriented applications in the industry and for societal beneficiary services.

[10] The paper discusses the application of machinelearning in medical diagnosis and its contribution to the improvement in the classification and recognition systems used in disease diagnosis. The researchers applied different classification algorithms, each with its advantage, on three separate databases of disease (Heart, Breast cancer, Diabetes) available in UCI

repository for disease prediction. They accomplished the feature selection for each dataset by backward modeling using the p-value test. The study's results strengthen the idea of the application of machine learning in early detection of diseases.

III. EXISTING SYSTEM

The current healthcare systems are not efficient enough to provide timely and accurate medical care. Existing apps and websites with their own audio and video calling system can crash due to the traffic, causing inconvenience to patients. Therefore, we have developed a solution that uses the zoom API for audio and video calling purposes. As Zoom's system can handle large data transactions and traffic, it is a more reliable option.

Furthermore, many of the existing systems lack an accurate disease prediction system, while some may have this feature but lack accuracy. Our system addresses this issue by implementing an accurate disease prediction system that provides timely and accurate medical care to patients.

Another issue with existing systems is that the admin must manually verify whether the details of a registered doctor are genuine or fake. This requires human interaction and 24/7 support, which can be a complex task if more doctors join the portal in the future. Our system addresses this issue by automating the verification process and making it more efficient.

Additionally, some of the existing systems lack the feature of creating medical reports. Our system addresses this issue by enabling doctors to create medical reports by filling out a simple form. This makes it easier for doctors to provide medical reports to patients at their doorsteps. By addressing these issues, our system aims to provide a more efficient and reliable healthcare system at a lower cost.

Disadvantages:

- Very complex UI.
- Check manually whether doctor information is fake or genuine.

IV. PROPOSED SYSTEM

This system is designed to facilitate the interaction between patients and doctors. Upon registration, patients can log in to the system and book appointments with doctors. During the booking process, patients have the option to upload past physical reports in PDF format and images related to their health concerns. Once the patient submits the appointment form, the details are displayed to the doctor, who can decide to accept or reject the request.

If the doctor accepts the appointment request, a meeting link is automatically created, which is reflected in both the doctor's dashboard and the patient's appointment list. If the appointment is rejected, the status is displayed as "rejected." After the consultation, the doctor can create a report by filling out a simple form, which generates a PDF report. These reports are available to doctors, even if the patient consults with another doctor in the future.

Doctors can join the portal by registering and uploading their profile photo, qualification certificate, and license. The system includes a feature that verifies the authenticity of a doctor's qualification certificate through OpenCV brute force matching techniques. If the certificate is valid, the doctor can enter the system; otherwise, an error message is displayed, requesting a valid certificate.

Finally, the system includes a disease prediction section that utilizes the Naïve Bayes algorithm. This feature is available only to doctors and offers information on recognizing or cross-verifying diseases by selecting appropriate symptoms. This feature is for informational purposes only and is not intended to replace professional medical advice.

Advantages:

- Simple and responsive UI.
- Safe and secure because it uses SHA-256 hashing technique to encrypt password.
- Cheaper than existing system.

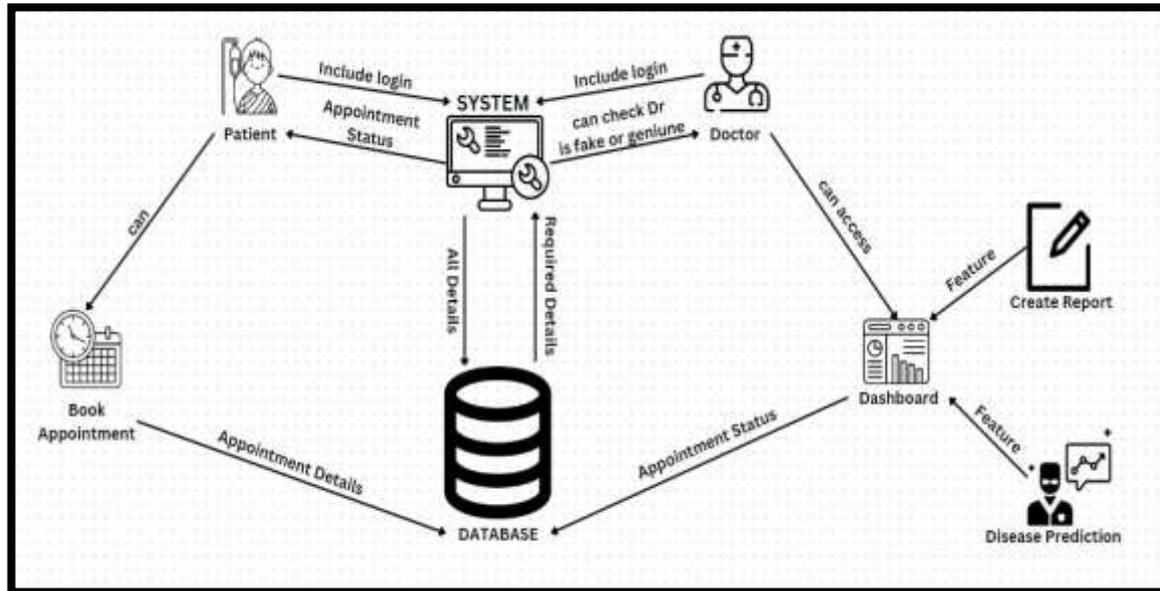


Fig1.(SystemArchitecture)

V. SYSTEM ARCHITECTURE

The system architecture described above is designed to facilitate communication and information sharing between patients and doctors. The registration and login process ensures that only authorized users have access to the system.

Once logged in, patients can easily book appointments with doctors and provide relevant information by uploading physical reports and images related to their condition. Doctors can review and accept or reject these appointments through their dashboard, and if accepted, a zoom meet link is generated to facilitate the appointment.

Doctors can also use the system to create reports on patient visits and use the disease prediction feature to obtain information on potential diagnoses. The disease prediction feature is implemented using the Naïve Bayes algorithm, which is known for its high accuracy based on the dataset compared to other algorithms.

Overall, the system architecture is designed to streamline the patient-doctor relationship, reduce wait times, and facilitate access to quality care. By leveraging technology to automate and enhance certain aspects of the healthcare process, patients can enjoy a more convenient and efficient experience while doctors can more easily manage their workload and provide accurate diagnoses and treatment plans.

VI. PROJECT MODULES

➤ Signup/Login

In this module, there is a registration process for both patients and doctors. They are

required to fill in their mandatory details such as name, email address, phone number, and other necessary information. After completing the registration process, the user or doctor will have their own account to access the portal.

Overall, this module provides a convenient and efficient way for patients and doctors to communicate and manage medical information. It streamlines the process of medical consultations and ensures that patients receive the best possible care.

➤ Book appointment

Yes, once the patient logs into the system, they will have access to a list of doctors with their respective specializations and details. This list will help patients find doctors who can best address their medical needs.

Additionally, the portal may have a search function that enables patients to search for doctors by name, location, or specialization. This can make it easier for patients to find a doctor who meets their specific requirements.

After selecting a doctor, the patient can book an appointment through the portal. The appointment scheduling feature may allow patients to select a preferred date and time for their appointment. Once the appointment is confirmed, the patient may receive an email or text message with appointment details and reminders.

Overall, this feature provides patients with a convenient way to find and book appointments with doctors that suit their needs. It saves time and effort by eliminating the need to physically visit the

doctor's clinic or make phone calls to schedule appointments.

➤ **Doctors Dashboard**

When a patient books an appointment with a doctor, the details of the appointment will be displayed on the doctor's dashboard. The doctor will have the option to either accept or reject the appointment based on their availability and other factors. Once the appointment is accepted, the doctor can prepare for the consultation by reviewing the patient's medical history and other relevant information.

During the consultation, the doctor can ask questions, perform examinations, and provide recommendations to the patient. After the consultation, the doctor can create a report summarizing the findings of the examination and outlining any necessary treatments or next steps. This report can be shared with the patient and other healthcare providers involved in the patient's care, if necessary.

Overall, the process of booking an appointment, accepting or rejecting the appointment, and creating a report is an important aspect of effective healthcare management that can improve patient outcomes and satisfaction.

➤ **Appointment lists**

When a doctor receives an appointment request, they have the option to either accept or reject it based on their availability and other factors. If the doctor accepts the appointment, the status of the appointment will be updated to reflect this on the appointment list. This will let the patient know that their appointment has been confirmed and that they should plan to attend the consultation.

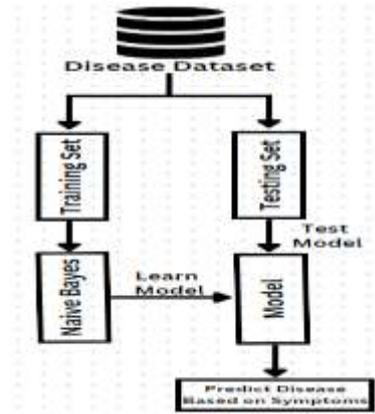
On the other hand, if the doctor rejects the appointment, the status of the appointment will also be updated on the appointment list to reflect this. This will let the patient know that their appointment request has been declined and that they should look for other available options.

In some cases, the doctor may provide a reason for rejecting the appointment, such as being unavailable at the requested time or not having the necessary expertise to address the patient's concerns. Overall, keeping track of the status of appointments is an important aspect of managing healthcare workflows efficiently and ensuring that patients receive the care they need in a timely manner.

➤ **Disease Prediction**

This project module is designed specifically for doctors, allowing them to predict a patient's disease based on their symptoms. The

module utilizes the Naïve Bayes algorithm, which has been found to provide the highest accuracy for this task.



The dataset used in the module contains information on various symptoms and associated diseases. After pre-processing the data, it is split into a training dataset (80%) and a testing dataset (20%). This ensures that the algorithm is trained on a sufficient amount of data and is able to accurately predict diseases based on symptoms.

While other algorithms have been used in similar systems, the Naïve Bayes algorithm stands out for its accuracy and efficiency. By utilizing this algorithm, doctors can make more informed diagnoses and provide appropriate treatments to their patients in a timely manner.

➤ **Doctoris fake orgenuine**

The system includes a feature that automatically verifies whether a doctor's certificate is genuine or fake. When a doctor uploads their certificate, the system extracts the features and compares them to the original certificate. The system uses the brute force matcher algorithm, which matches the features one by one in a sequential manner.

The brute force matcher algorithm calculates the score based on the total number of features matched out of the total number of features to be matched. Based on this score, the system determines whether the certificate is genuine or not. If the score indicates that the features match, the system will confirm that the certificate is genuine. However, if the score indicates that the features do not match, the system will return an exception and prompt the doctor to upload a valid certificate.

The system uses OpenCV for verifying certificates and provides a reliable way for doctors to confirm their credentials. This feature ensures that only qualified and authorized doctors are able to use

the system, promoting patient safety and improving the overall quality of healthcare.

VII. RESULTS AND CONCLUSION

Telemedicine is an innovative web portal that aims to help people who reside in rural areas by providing online medical consultation services. With this portal, both rural and urban residents can easily access medical consultation from the comfort of their homes. Patients can book appointments online and upload their medical reports and other necessary details.

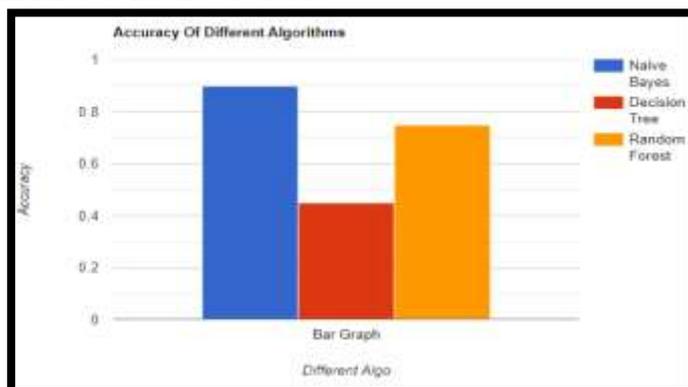
Doctors can access the appointment schedule and provide consultations through the online medium. After the consultation, they can create patient reports through a simple user interface form. To ensure data security, this system stores user details like passwords in encrypted format using the SHA-256 hashing algorithm.

The system includes a feature to detect

whether a doctor is genuine or fake. The doctors have to register on the system and upload their certificates and license. The system uses OpenCV and the brute force matcher algorithm to verify the authenticity of the uploaded certificates and licenses.

Furthermore, the system can help doctors in diagnosis. Doctors can input the symptoms of the patients, and the system can detect the disease based on those symptoms. The Naïve Bayes algorithm is used in this system, which has been found to provide the highest accuracy compared to other algorithms.

Overall, Telemedicine offers an effective solution to the problem of limited access to medical services in rural areas. By leveraging technology, this system enables patients to access medical consultations and doctors to provide their services more efficiently.



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