

Smart Services in Health Industry

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Abstract— An overview of the function of smart services in the healthcare sector is given in this research paper. It talks about how these services, which use AI, IoT, and data analytics, are changing the way healthcare is delivered. The study looks at how smart services are currently being used, highlights their advantages—like better patient outcomes and lower costs— and highlights their drawbacks—like interoperability and data privacy. The study shows how smart services can improve healthcare delivery while offering suggestions for removing adoption barriers through an analysis of previous research and case studies. In general, utilising smart services can spur innovation and result in a healthcare system that is more effective. With this smart services not only to the patient but also for hospital management gets benefitted with respect of time and efficiency.

Index Terms— Smart Health care, Chatbots, Machine Learning, Deep Learning.

I. INTRODUCTION

Health Sector is one of the key aspect in daily life. New disease are being diagnosed every day. The count of patient are increasing day by day. To treat them effectively and diagnose that particular disease they need smart services like AI assistance etc. Smart services have many advantages, including increased efficiency and accessibility, but their successful deployment requires addressing issues with interoperability, privacy, and security. All things considered, smart services have enormous potential to transform healthcare, but in order to reach their full potential, these obstacles must be carefully taken into account. These smart services can change the whole health sector to empower everyone to live healthier lives. And also smart services can provide high security to the data of both patient and hospital.

Some services of smart health services are like appointment booking, giving doctor suggestion based the problem of patient, creating a unique login for every patient, storing medical reports, medicine booking, disease prediction, online payment, AI based chatbots for patient clarification etc. And also creating a sin-gle platform in which integrating all above mentioned services. This is for patient logins, for hospital there are some other add-ons to that like smart hospitals, fully equipped with AI based technologies.

II. LITERATURE SURVEY

In Paper [1] the major topic is the potential applications and difficulties of cloud computing in the medical field. Outlines the growing applications of this new paradigm and the significance of cloud computing in the healthcare

industry. And also outline and suggest cloud computing in the medical field. They also assess their system based on the actual lifestyles of certain patients. They finally concluded that they found many challenges and benefits in cloudbased pervasive healthcare that researches need to be ad-dressed.

In paper[2] inspired by the issues that individuals with disabilities face on a daily basis, issues that the majority of people are unaware of. And also they mentioned that at present there are smart homes but these smart homes are not for disabled people. So they suggested a wireless sensor network to build smart services.

In paper[3] they discusses in-depth how cloud and IoT integration with deep learning and machine learning approaches can be used in the healthcare industry. In order to identify the methods and research gaps, they carefully examined the literature, favouring notable and recent studies. Cloud services, benefits in the field of healthcare, IoT architecture, different communication protocols, sensors, machine learning, deep learning, and challenges are all covered in this study. A comprehensive examination of their benefits and drawbacks is also covered, along with difficulties. Researchers can choose an application or domain from the available methods discussed in this study, which provides them with insight and the opportunity to start their research. When security and privacy protocols are followed appropriately, cloudbased IoT and ML healthcare systems are precise and completely helpful to patients, carers, and hospitals.

In paper[4] they have discussed several challenges that are facing by the present health industry. And also some solutions for that particular challenges. Using anonymous health data, pseudonymizationbased solutions can offer a tonne of opportunities for medical research on a specific disease. Also mentioned other important aspect i.e., security for patient data using block chain technology and IOT.

III. SMART SERVICES

Using latest technologies in health industry can make good services. So by adopting the smart services in health sector will be very helpful for both doctor, patient and as well as hospital managements. By creating a common platform for having all medical information. Some of the smart services are:

A. Login Credentials

Every patient should have login details like name, mobile number, mail-id, DOB etc and should create an account. And for every patient there should be a unique id which will be used for monitoring of that particular person.

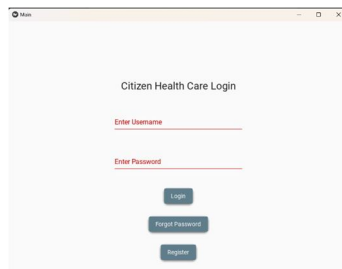


Figure 1. Login page

B. Appointment Booking

Generally it takes more time to wait for doctor appointment and also in some cases it is not possible get the doctor appointment. So as a part of smart service all doctors should give appointments to patient in online. So that it can be very useful in case of emergency situations. Due to this online appointment booking the patients wait will be decreased and they will come to hospital in their allotted time so that the managing will be easier in hospitals also.

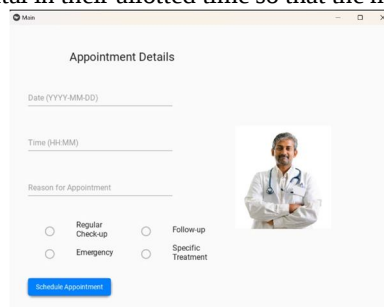


Figure 2. Appointment booking portal

C. Storing Medical Reports

When a person went to hospital with some problem the doctor tries to diagnose the disease by the test reports. For that the patient need to wait for more time until the report are given. Instead of waiting for more time, when the reports are ready it should be directly enter to the patient login using unique id. And it can be downloaded can access at any time. The doctor will see the reports and keeps the medicine in the login itself. So that the waiting time can be reduced and also the reports will be secured for future use in login.

D. Doctor Suggestion

Many people don't know to which doctor they should consult for their problem. So in this platform suggesting doctors for their problem by using suggestive algorithm. The suggestion will be done by taking the symptoms of the patient like heart related problems should consult cardiologist, for digestive problem should consult gastroenterologist etc. With this suggestions the patients can know which doctor they should meet. Doctor suggestion is not for any particular hospital, it was among doctors. In these suggestion window they can find the clinic address and contact number and other necessary information.

E. Disease Prediction

As mentioned above the patient will have unique id and with that id the reports will be stored in their login. When the reports are entered in the login The disease predictor will predict the patient disease and inform the patient. Disease prediction should be integrated to the platform for some disease like cancer prediction, heart attack prediction etc for which the datasets are pre-available. Machine learning and deep learning algorithms for training the model from the dataset available in Kaggle website. The algorithms that can used for some disease predictions are:

logistic regression - heart disease prediction

malaria prediction – customized cnn

pneumonia detection - vgg net

cataract prediction - resnet 50

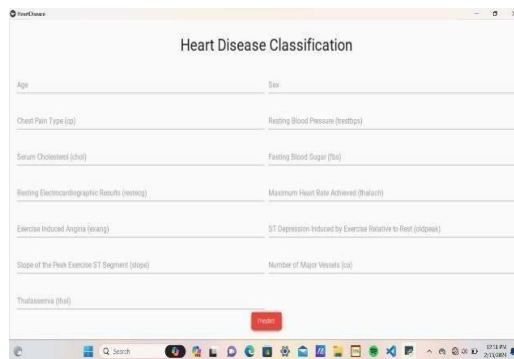


Figure 3. Sample of heart disease prediction

F. Medicine Booking

For some disease like bp, diabetics etc the patient should take the medicine for lifetime. Every time they should go to medical store to purchase the medicines. Instead they can by buy the medicine from online on this platform with proper doctor prescription. When doctor see the reports in the patient portal he can prescribe the medicine there itself and also the patient can order the medicine from the same platform. And without doctor prescription the medicine cannot be booked in the portal.

G. AI Based Chatbot

These AI based chatbot was installed in the platform to help the people who cannot access the platform or having any issues to understand they can contact the backend team with this chatbot. This chatbot can understand the human language and immediate response according to the query. It was designed using NLP terminologies for example root words etc. This chatbot can also address payment related queries and make the things understand easily.

H. Payment Gateway

All payment related activities in health sector can be done in this platform. Some of them are doctor consultation fee, Medical test fee, medicine fee and all other types of charges can be paid from this portal. In future, receipts will also be generated in the portal itself so that the patient can know how much he paid and these can be used for insurance purpose.



Figure 4. Payment Scanner

IV. CHALLENGES

A. Health related data is a precious data because it can be misused. For that securing data is very important. This is one of the major challenge to create a strong platform which cannot be misused. The patient and also payment related data should not vulnerable to all. For that block chain technology can be more suitable to overcome data vulnerability.

B. In case of disease prediction i.e., [3.5] machine learning and deep learning algorithms can be more helpful. So to train the models more data is essential for more efficient models. For building models both text and image formatted data is required.

C. In case of Storing medical reports i.e., [3.3] more amount of cloud storage to store all the medical information in lifetime. Its not that easy to provide that high storage multi-media data for everyone in the country.

V. FUTURE WORK

A. Hospital Management

This service is purely for hospital. In this portal the hospital management can monitor all its patient details, equipment required for hospital like oxygen cylinders films etc, and they can check their revenue related information. And also this portal contains all details of its staff and doctors pupil, salary details and also from this can directly contact the dealers near them for equipment and they can use this portal all the transactional operations like staff salary, dealers amount etc.

B. Easy Usage Of Platform

As a part of future work developing the platform as user friendly to be understand by all the users and use the platform effectively.

VI. CONCLUSION

Health is one of the basic fundamental sector in daily life. So it should adopt latest technologies to serve better for people. Taking this as an idea tried to bring all the health and hospital related services under one roof and develop a platform. A major development in the healthcare industry is the adoption of smart services like ordering medications, scheduling doctor appointments, and creating patient login accounts with unique identifiers, storing medical reports and prescriptions, predicting disease with these medical reports using machine learning and deep learning, Adopting AI based chatbot for contacting for any information etc . By simplifying administrative procedures and enabling patients to take charge of their own health care, these technologies provide patients with convenience, accessibility, and individualised treatment. Although promising, issues with interoperability, security, and privacy must be resolved for successful deployment. If these obstacles are sufficiently addressed, smart services have the potential to significantly enhance patient outcomes, access, and efficiency in the healthcare

industry. As a part of future work will try to improve security, add hospital management etc. Finally concluding that health sector is one of the very important nowadays to live. So updating this sector by adopting latest technologies will be much more helpful. Health sector is not only a business sector but also a service sector, by adopting these technologies the service can be improved and also it can be more efficient.

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