Cloud based Generic Medicine System

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Abstract— **The Cloud Based Generic Medicine System is a web based system specially designed for government hospitals which will help them connect to government authorized suppliers regarding purchasing of generic medicines. All transactions between the government hospital and authorized suppliers will be done under government surveillance. Apart from this, the system will act as a portal for the common citizens wherein they will be able to find whether a particular medicine or any room is available in a particular hospital or not. The system ensures transparency and proves to be a better and efficient alternate for eradicating inefficiencies and drawbacks in the government procedures.**

I. INTRODUCTION

The introduction of various technologies has resulted to various tremendous changes in all aspects of human life. One such field which has been developing the most is the healthcare sector. Not only the private, but also the government has started taking measures in improving their heath care services and provide them at free or low cost to the people. But, the entire development process is being hindered by various obstacles.

Consider the example of the COVID pandemic which literally created a strain on the healthcare sector, where many people had to lose their lives just because of the lack of medicines or shortage of oxygen beds in the hospitals. One such reason behind this entire scenario was the absence of an efficient system for managing services by the government. Also, this resulted to rise in various malpractices like medicine hoarding and black marketing.

Medicine hoarding is the practice wherein a particular medicine is stocked which results to hyping up in price. Although generic medicines cost much lower than the branded medicines, the malpractice resulted to rise in demand and shortage of medicines in the market. Taking advantage of the increasing demand, medicine black marketing rose up wherein common people paid up to 10 times higher the original price of medicines. These events not only resulted to financial loss but also to loss of innocent human lives.

The usage of Cloud Computing technology can prove to be helpful in ensuring that such events could be avoided. As the name says, the Cloud Based Generic Medicine System uses the mentioned technology for handling medicine supply to government hospitals by the government registered suppliers and can also be used for handling various healthcare related services and ensure no interruptions or hindrance occur in the public healthcare sector.

The paper explains about the how the system can help eradicate related malpractices and provide efficient and organized results to the users.

This section II gives a brief idea about the existing systems being in use, section III discusses about the working of the system, section IV and V talks about the methodologies being used and about the implementation of the system respectively and finally the obtained result and conclusion drawn from the above mentioned points.

II. RELATED WORK

To understand about the existing systems being in used, various site surveys and literature surveys were conducted which gave a brief idea about the methods used to manage the public health care sector. Depending on various factors, variations in techniques was highly observed in the existing technologies around the world.

The first case study discusses about the methodology used by Sarvajanic Aspatal, a government hospital situated in rural Karnataka. The village is located miles away from the main city and has less density of population. The above government hospital uses the traditional method of storing details about patients and medicines in registers or files. The data is mostly handwritten and is stored in special rooms or cupboards. A person is appointed by the hospital whose responsibility is to manage the data and also retrieve the files or registers from the room.

But, the above traditional method is suitable only for regions which have very less population density. Also, cases of files missing were observed and risks of vandalism in data cannot be avoided.

Second case study is about the Micropro Software used by medicine suppliers or local agency in Maharashtra, India. The software is quite useful for storing purchase related data and also retrieving it at the same time. It is mostly used by the suppliers who have a turn-over of around 3 to 4 lakh Rupees. Also, the stored data can be used during tax returns, GST, preparation of balance sheets and finding out average sales or turn over.

The system, however deals only in storing data and is not at all involved in medicine supply management. For medicines, a salesperson is involved whose absence can hinder the entire transaction process; resulting to incurring in financial loss.

Third case is the research study of ePharmacare system built using Design Science Research by Luís Velez Lapão, Miguel Mira da Silva and João Gregório of University of Lisbon, Portugal. The system was used for chronic disease management, which was common back then. The system found out that the pharmacists spent their 50% of the time interacting with the patients and the system somehow succeeded in reducing costs and also helped in disease control.

However, developing and implementing such online services requires trained and motivated professionals and more research and rethinking is required in improving the efficiency of the system.

The fourth case study is about the e-Aushadhi system used by Government of Rajasthan which is a complete web based application used for managing distribution of drugs, surgicals and sutures to various district drug warehouses, medical colleges, hospitals where the drugs are issued to respective patient. Under the initiative of "National Health Mission – Free Drug Service", it has reached around 15 states and is still going on.

Although, the system may have been successful in managing medicine supply, it lacks transparency in the entire process and is restricted to certain users only. Also, common people cannot know about medicine availability in a particular hospital which makes the system a bit suspicious.

III. PROPOSED SYSTEM

As mentioned in Section II, the above existing systems or methodologies were being in use, although they lacked in some way or the other. The proposed Cloud Based Generic Medicine System manages to eliminate all the drawbacks of the existing systems. Data security with the help of cloud is achieved which eliminates the drawback of traditional method of storing data in rural areas. The system also makes it easy for government hospitals to purchase generic medicines and check stock details. The system is quite easy to use and shows higher efficiency with the help of Cloud Computing Technology as compared to other approach. Also, the common person will be able to search available rooms or any generic medicine in a particular hospital which is way faster than rather applying under Right To Information Act; which might take weeks or even months.

The Cloud Based Generic Medicine System consists of 4 modules namely the Government Panel, the Supplier Panel, the Hospital Panel and the User Panel. Each panel except the User Panel has a specific username and password access only

after which the concerned official will be able to access the system.

Once the user logs in to the Government Panel, the government user will have access to features like tracking users who accessed the system, the transactions taking place between the government hospitals and suppliers, list of registered government hospitals, authorized suppliers and government officials using the system. This data will be generated in form of reports which would help government in decision-making process. Also, the government will be able to read feedbacks and resolve issues regarding the health care sector. Not only government will be able to view data but also will be able to register new hospitals and suppliers.

The authorized supplier logs in with the credentials, the supplier will be able to add new medicine into their inventory which will further go for sale. The supplier will be able to check transaction history done with the hospital and manage stock details by updating stock details or deleting one. The authorized supplier thereby has a major task in the system to ensure that no hospital is deprived of generic medicines and hence regulate the availability of generic medicines.

The system proves to be quite useful for government hospitals as the system succeeds in establishing contact with the authorized suppliers; wherein direct purchase of required generic medicines will be done. The hospital will have payment options of paying online or offline and bill will be generated respectively. The bill hence will remain saved in the local device which will be easy to retrieve. Not only purchase of medicines, hospitals will be able to add rooms and also register new patients and allocate vacant rooms to the patients.

The user section is one such unique which makes the system effective than other existing systems. Here, user will be able to get details regarding availability of rooms in a particular government hospital or whether a particular essential generic medicine is available or not. The user will also be able to complain to government directly in case if they face any bad experience or observe poor quality in the services provided by the government hospital. With this, the cloud computing based system aims to reduce burden by proving to be an efficient solution.

IV.METHODOLOGY

The following architecture helps in easy understanding of the working of the system. As shown, the icons represent the actors who will have access to system namely the Hospital, supplier, the government administrator and the common person i.e. the user. The Hospital will be able to purchase generic medicine from suppliers which will be stored by them in the form of "inventory" or available stock. The Inventory block is the general representation of transactions taking place between suppliers and Hospital. All the transaction related details will be examined by government administrator; also hospitals and suppliers will be able to access their past transactions done. The user will be able to search and know about available medicines and room details of a particular government hospital; all this huge amount of

data will be stored and handled by the database; which plays a very crucial role in data management and provide efficient and quick results to the specified actor.
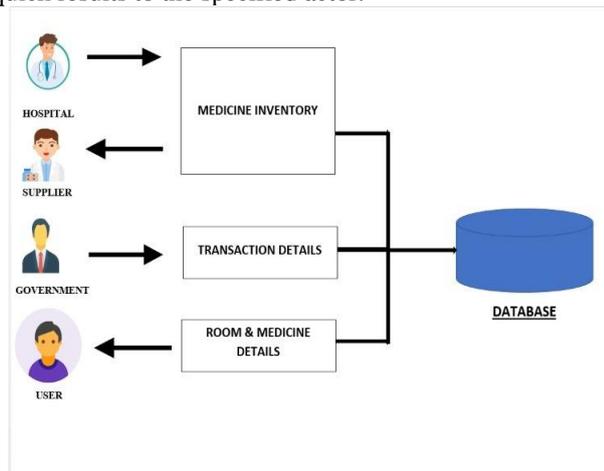
V. IMPLEMENTATION

For successful implementation of the system, certain prequisites are required to be fulfilled. To design interactive and user-friendly interfaces, a suitable text editor and knowledge of web technologies like HTML, CSS, JavaScript and basic understanding of AJAX is required; whereas for backend, knowledge of database languages like MySQL is required and in order to establish connectivity of webpages with the database, one can use frameworks or any language like PHP, Java etc.

The system has been implemented using following steps:

1. Designing of webpages

This is the first step wherein webpages are designed as per the features which will be provided to all users by the system. The design should be user-friendly in a way such that common people without any specific training would also be able to use the system and hence save their time of travelling to the concerned hospital or office and enquire for details which they need the most.

2. Designing and Connection of Database

Once the webpages and database designing is done, with the help of frameworks or any suitable language, connection of webpages with the database can be established.

3. Collection and Storage of Data

For any user, be it government, hospital, supplier or any common person, certain information is needed to be collected which will help them allow access the system and also the data can be used for analytical or security purposes.

4. Providing Credentials for Accessing the System

As the system will consist of large and confidential data, there may be risk of misuse of data. So, in order to ensure that data does not get stolen, certain users will be provided credentials so that not only the concerned user's data gets secured but also the system remains intact.

5. Designing of Use Cases

To ensure that the system achieves the desired goals, certain use cases can be designed which can explain relationship between the user and system and depict the high-level overview of relationships between use cases.

6. Testing and fixing errors:

Once the system is built, it is essential to find out whether the system satisfies all the expected output as per the designed use case and in case of any errors or bugs found during the process, proper debugging is required to be done in order to avoid any inconvenience during the usage of system.

VI. RESULT

Using cloud computing technology and other related technologies which will be used for implementation, output would be generated as per request made by any to system. For government, results will be generated in form of tabular reports which can be used for decision-making process or to find out areas where health care services can be improved. The hospital section will be able to purchase generic medicines from authorized, registered suppliers and bills will also be generated which will be the proof of transaction being completed. Registered suppliers will be able to update stock and add new medicines in their inventory and for common users, details will be available which will help achieve the system's aim of transparency.

VII. CONCLUSION

The Cloud Based Generic Medicine System comes to be an efficient alternative to the currently existing systems being in use. The system aims to eradicate illegal hoarding of medicines and black marketing by ensuring transparency in the entire system processes. The main intention of the system is to ensure that no person would be ever deprived of medicine or any other services provided by the public healthcare sector and contribute to development of the public sector and the nation.

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