Developing A Web-Based Medicine Information System For Children

B. Chaitanya Krishna, K. Krishna Priya, P. Madhulika

Abstract— In today's world, consulting a doctor has become frequent due to illness. Also, we know that, due to lack of health consciousness and low immunity, especially children fall ill frequently. So we developed an information providing system especially for children aged up to 10 years. Since every parent cannot go to doctor for medicines due to various reasons like unavailability of medical treatment nearby or if the disease is a repeated one and commonly seen like fever, cold. So, people prefer to visit medical shops instead of consulting doctor in order to get medicines. There is a danger of giving the wrong medication or over dosage to their children. This Medicine Information System aims at providing medicine data like description and cost including its uses, precautions, long term effects and directions for usage for a particular disease. Only medicines that are approved by the Government of India are taken into consideration. This is a web-based application developed using SOA architecture. This is implemented as a real-time application, also in a regional language, so that users can get knowledge about children medicines easily.

Index Terms — Children, Database, Disease, Java, JDBC, Medicine Information System, Regional language

1 INTRODUCTION

Currently, the world population is rapidly increasing and especially we see a rapid growth of population in India which is close to 1.37 billion in 2019, according to UN data. India is the second largest populated country in the world. The total child ratio in India is 45.7 % who are aged from 1-14 years old. The growth is mostly seen in cities like Mumbai and Delhi due to the presence of densely populated areas like slums. Due to lack of sanitation facilities, the children frequently fall ill and the medical treatment becomes frequent and cost of treatment is also high. Due to lack of knowledge in English, or lack of education, there is also a possibility of giving wrong medication to their children like over dosage which is dangerous. Not only in urban areas, have people who could not afford to taken doctor treatment frequently due to unavailability of hospitals nearby and the cost of medications also increases when you go to hospital every time for the same type of disease. So this system provides all relevant information about medicine so that they can buy the medicine at an affordable price next time without going to a hospital. This reduces the amount of money spent on hospitals. Not only that, now a days, the technology is greatly improved and even people with no education qualification like farmers, workers, masons, etc. are able to use a built-in 4G technology phones and are able to access every website easily. This proposed system can be useful to each and every individual whether they are educated or not and acts as a real time information system and provides a facility to know medicine information for Government approved medicines even from home especially for children. Parents consider the doctors many times in order to get medicines since children are weak and the prescription is different in different hospitals which may result in side effects for children. They cannot know the appropriate cost of a medicine. There is a myth that branded drugs are more efficient than the generic drugs, but that is not always true. A generic drug is same as a branded drug in terms of safety, strength and quality. A generic drug gets at a low cost. This paper proposes an information system that helps in reducing the anomaly of giving wrong medication by providing the information in a regional language. The proposed system also provides specific medicine information like uses, long term effects, precautions and directions for usage for each medicine belonged to a particular disease so that even uneducated people can know medicine information and can also act as a first aid kit. The cost of branded medicines as well as some generic drugs that are approved by the Indian Government can be known through this information system. So, people can get government approved quality medicines at an affordable price. The system is also designed in such a way that the user knows the medicine data as well as an ability to store their medical data. The user can login into the system anytime and can view their medical details and previous used medicines so that they can know their medicines usage. They can also view the cost details of each medicine and can retrieve their medical data report. The further process of the paper has been categorized into the following sections. Section II describes the related work which shows the related research paper study and different methods related to the current work and online applications and websites related to the above proposed system. Section III describes the methods and various technologies used in the system briefly. Section IV describes the block diagram and the proposed system in a step by step manner. Section V shows the procedure and the results of the above proposed system by presenting the user interface and the application functionality along with its evaluation. At last, Section VI shows the conclusion work and also describes the future work along with acknowledgements and references.

2 LITERATURE SURVEY

This Section describes the related work about medicines and their information by referring various websites. Also, a research study has been done on technologies and methodologies proposed in different reputed journals and research papers related to the above proposed system. The list of different drugs and other relevant information like side effects, directions for usage and pill identifier has been
addressed in [1]. Also different counter medicines available in USA have been posted here. The medicine information is displayed in alphabetical order and this is done as a website. The data addressed here relates to all ages and contains rating, but normal people find difficulty to understand since the information is huge and contains around 500 medicines related to a symptom. A web application belonging to USA, expressing different kinds of medicines and other drug related side effects, dosage, interactions and other information like health tips and drugs based upon disease conditions in [2]. Bruno M. Silva et al. [3] designed a mobile application for outpatients’ medication management named SapoMed. This application identifies the wrong medications that occur due to intake of out-dated medicines or over dosage. This is created for Android OS and captures the barcode to check whether the medical information is correct or not. Bureau of pharmaceuticals of India [4], a government based system approved by the department of pharmaceuticals in India, provides medicines at an affordable price. Daily aspirin therapy [5] is an online information providing site that presents the benefits and risks associated with commonly used Aspirin Drug. The best dosage of Aspirin to be taken and its side effects and different drugs data has been presents in alphabetical order. Danny Habamwabo et al. [6] presented a Drug accessibility and availability tool, a case related particularly to Rwanda which allows to access information about drug like price, location like a web application system. The drug inventories, cost and pharmacies in Rwanda are addressed. Department of pharmaceuticals provides a good quality pharmaceuticals resulting in mass consumption by Government of India. Different pharmaceutical report information has been gathered from [7]. NHP, A National Health Portal [8], has been studied to gather data about generic drugs as well as banned drugs information in India. Essential medicines and information regarding diseases and conditions is presented. The drug data has been gathered from [8]. Eongjun Kim et al. [9] present a Health care system for chronic patients and also life log information for prevention and management of diseases in chronic patients. This system can be used by a nurse or a care professional. It is a smartphone application that collects life log data and examines with patient’s bio data. It also checks whether there are any symptoms of disease. Essential Medicines and Health Products Information Portal, a World Health Organization contains 6112 medicines and health products from related WHO publications and other partners, countries. Different publication related to medicines is presented here in [10]. Fayezah Anjum et al. [11], discuss an Online Health Care, System which is a web application developed by considering Bangladesh public. It stores their medical data using database so that doctors can see patient’s data can give relevant prescriptions. A PHP framework, MySQL database and a XAMPP server is used in [11] to create the application. Guoling Liu [12] presents a medical information management system based on SOA that presents a new design method that discusses various scenarios related to medical retailers and about their legacy applications. Hathairat Ketmaneechairat et al. [13], proposes a search based system for smart phone usage like apps. This application gives medicine information to users and users can search types of medicines. The data presented in it is categorized as follows. Dangerous medicines and commonly used medicines. This shows warnings, property and usage. Health Direct [14], A Free Australian health related website that provide data about various drugs and a symptom checker that predicts disease based in the given symptoms. The visual appearance of a medicine is presented in words. Hibazeidan, Khalilkaram, Royablezeidaoou, Alihayek, JosefBoercosok [15] proposed an advanced and smart medicine box system that monitors and controls patient pills data. It also assures safety and best performance of the system by continuous observation while patients take pills. It gets connected to a mobile application and provides medicine intake data, alarms to alert patient to take medicine on time. This system has been tested on 50 patients on different mobile phones. Indian Government Approved medicines provided by Central Drugs Standard Control Organization [16] et al. it gives the list of approved new drugs by the Government of India. Also gives the information about the title of the drug and the release date we can search and know about them. Iuliana Chiuchisan [17] et al. proposed a secure approach that provides the security issues that occur during development of health information system. This paper mainly deals with patient data protection and monitors the patient’s disease to provide accurate medicine. J. Jara, A. F. Alcolea, M. A. Zamora, A. F. Gómez Skarmeta and Mona Alsaeby [18], designed a drugs interaction checker based on using IOT technology. Their system identifies and examines different drugs and detects allergic reactions and complications occurred when drugs are used. The bar code identification technology is used and data is integrated with IOT devices. There is no medicine information provided but addresses whether the drug is suitable. But drug reactions are taken from here. IOT is used to examine drugs in order to identify harmful side effects, liver/renal contradictions, allergies and effects during pregnancy. Jhih-Yuan Huang [19] et al. presents the usage of a machine learning based approaches to classify the drug side effects. This paper also uses the data analytics to collect huge data and predicts drug effects more effectively and achieves better performance. Juchen, Dianxing Yang, Yuecao, Yiji Ma, Chuanbing Wen, Xiweihuang, and Jinho Ngguo [20] proposes a disease diagnosing system. The system provides a treatment algorithm that generates drug data based on location, cause of the disease and conditions in traditional Chinese way. Based on the therapy generated by the algorithm, medicines and treatment is recommended. Kidshealth.org [21] is a website that provides information about different medicines for kids and teens and corresponding usage and precaution and guidance and health tips to the parents. Various kids’ medicines and other relevant data have been gathered through this website. Antonio J. Jara, Francisco J. Blaya, Miguel A. Zumora, Antonio F. G. Skarmeta in [22] proposes an intelligent knowledge based information system to predict myocardial diseases using ontology. It detects symptoms, heart details, electrocardiogram information and patient data using ontology and a jess rule and has been tested by research team. Mariaka Apostolova Trpkovska, Betim Cico and Lejla Abazi-Bexheti in [23] introduce a system that predicts children diseases using semantics. The main purpose of this system is to provide knowledge regarding symptoms of children diseases in an understandable manner. This mainly
focuses to help mothers who are in rural areas to know about their children illness. medicinesforchildren.org [24] is a UK website that has numerous amounts of drug data especially for children. Also other data like importance of drug and precautions is provided. Data has been collected and used for our system. Nai-Wen Kuo [25] provides a case study of a medical center in Taiwan that uses IT applications for developing a system that generates health information. This system improves the accuracy, provides proper care and safety to patient health. netmeds.com [26] is an Indian e-commerce pharmacy website that contains huge amount of medicines and relevant uses, treatments, health tips and more information and delivery. Medicine data is gathered and is helpful for our system. Medicines safety usage for children by World Health Organization [27] presents a case study that describes importance of the safe usage of medicines for children and also describes the possible ways to achieve it. The term medical error means all errors in the current system will be identified. Problems in medicine treatments are unlicensed medicines are using and wrong dosage of medicine causes treatment failure. This paper intends to promote awareness of medicine safety among people who have lack of knowledge on usage of medicines. stjude.org [28] provides medicine information for children and gives the list of all the medicines to learn about the use of medication. We can select any medicine and know the details about it. It can be very useful for giving more information about the medication. rch.org [29] is a website of royal children’s hospital Melbourne. Through this, doctor prescribes medicine to child to cure disease and describes instructions on how to give medicine to your child. Also medical safety means to be sure that a medicine works and is safe. If the children have a reaction for the dosage, it gets reported to the doctor. familydoctor.org [30] is a trusted medical advice website from the American Academy of family physicians gives the information about symptoms, causes, diagnosis, treatment for the disease and prevention to that disease. You can search by alphabet and it will give the information. It gives the brief information about the diseases.

3 RELATED WORK

A. Data extraction and Data analysis
Data was extracted based on the related information to the above proposed system. Characteristics include only medicines which are approved by the Government of India. A research study has been done and the content was taken according to the objective of the system. Study is focused on more than one aspect, and therefore, some of the studies were categorized under several main themes and sub themes like the main ideology is to provide information about medicines and sub theme is to mainly classify about children medication.
- Medicine Name
- Uses
- Side effects
- Precautions
- Dosage and age limit.

B. Platform development

A Platform www.MIC.COM is being developed especially for this research project and it provides a flexibility to collect information about children medicines. The Search was manually done by collecting data from Pediatric experts and researchers were consulted in order to identify relevant information and research lines and a review of different websites has been done to collect information about different medicines and information like medicine description, side effects, long term effects, costs, dosage and directions for usage and all this gathered information is stored in the database.

C. Database
The children information system provides an additional feature for user to store their medical data like prescription with date. So this data can be used for future reference to get medicines.

D. Online Converter
A multi lingual machine converter is used to translate text supporting over 100 languages serving many people daily. It is used here to provide a native language website interface. Our idea is to make this medicine information system to reach everyone despite of their educational background, a converter is used to make the information available in both English and regional language.

E. JDBC Usage
JDBC to Java data base connectivity is an API in java, used to access database. The JDBC technology is used for java to retrieve data like —Write Once Run Anywhere”. In this model as said MYSQL database is used to store data. To connect this database to the interface, JDBC driver is used. We can store and retrieve data from database to interface by using JDBC connectivity.

4 METHODOLOGY
The following block diagram shows an overall development of the system.
various medicines, especially the medicines used for children. This data is useful for everyone, that they can know information regarding the medicines used for their children. The overall system is designed as a web based application, consisting of a user friendly interface, so that, any person who uses phone or pc can know data easily. Basically, the application is in English, but here there is an opportunity to see the information in regional language used in a particular area.

The system is a SOA based architecture, which means a client and server based system that gives response for a user request.

The methodology for system is as follows:

1. The system is designed by using the front-end and back-end technologies. The front-end is a user-interface by which user sees information and requests data. The Back-end is a server-side which user cannot see and interact. This contains overall functioning of system, like a response to user request is given by server and a database which stores user data.

2. The front-end is developed using front-end languages like HTML, JavaScript and CSS. First, the user is able to see the UI of the application. The UI of the system contains the components like

   - Home
   - About Us
   - Join
   - Contact Us

3. The Home page contains a search bar in middle by which a user can search the data regarding a particular disease. If the user provides a disease name like cold, then the relevant medicines for cold and information about each medicine like description and cost including its uses, precautions, long term effects, side effects, directions for usage.

4. The About Us is a subpage in Home page that gives details about this application and why it is developed. The Contact Us page contains a contact form, by which user can contact us for any queries through phone or email.

5. The join takes user to a new page which consists of a registration form. The registration form allows user to register their identity in our database. Through registration, users get free medicine data storage facility. They can store their prescription data, date in our database.

6. Users can login into system with their credentials if they have already registered once. If the login credentials are valid, then user gets access into the system.

7. For now as a sample, the system provides medicine data for cold, fever and asthma diseases of children.

8. The Back-end is a server and database. The server user for developing this system is a Tomcat Server and the database used is MYSQL. JDBC and Servlet technologies are also used in this system to make it a real-time application.

9. The servlets is a server program that gives response to a user request by validating in the database. Finally JDBC is java program that helps to connect client side with database. This is the working methodology of the system.

5 RESULT ANALYSIS

For sample, here the disease cold is taken as input. The user searches for cold and it is taken as input. Now the system searches for the list of medicines that are present for cold. Here for sample, we provide 5 medicines for cold. The result is explained in a tabular format.

The below table provides information about medicine when user searches. The results are given in the form of attributes in the table above. The attributes include

- **Medicine name:**
  The name of medicine is given by the user.

- **Uses:**
  The uses of a particular medicine are displayed as above.

- **Side effects:**
  The side effects attribute lists all the reactions or problems that occur due to over usage of the drug.

- **Precautions:**
  The precautions give safety measures before using the medicine.
Dosage:
The dosage for each medicine is displayed according to pediatric consult.

Age:
The age limit of children is provided. So according to age, the dosage levels are provided.

6 CONCLUSION

Thus this paper proposes a medicine information system based on SOA which is a web based online application which can be accessed anywhere by anybody. This system is useful for everyone to get awareness on the usage of medicines. The users can also store their medical data in database. Mainly, it can be used as a real time application by providing medicine information to common people for their daily use, by providing data in a regional (native language) also.

7 FUTURE WORK

As our future work, we are going to provide more medicine information and the system will work dynamically by updating medicines frequently, whenever new medicines are released into the market. This system will have an improvement to provide user location and also the available medical shops near them. In future, by using Android software, we will make this information system be available as a mobile application.

REFERENCES

[1] A drug information website, information is available for both consumers and healthcare professionals on over 24,000 prescriptions and over the counter medicines available primarily in the USA. [Online]. Available: https://www.drugs.com/drug_information.html


[8] Drugs and pharmaceuticals, National Health Portal of India, Indian approved pharmaceuticals.


