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Unused Medicine Donation System for NGOs

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Abstract: *Medications are a fundamental component in lightening enduring, and gifts of clinical supplies with incredibly profit worldwide helpful aid projects. This medication gift application is about the assortment of medication that is unused by the patient who recuperates totally and remaining prescriptions becomes squander, those medication can be gathered and utilized further. This excess medication can be utilized by NGOs, Hospitals who are to be sure for those prescriptions. By the utilization of this entry, there will be less wastage of drugs. The aim and object of this project are to prepare an Online Portal for the collection of unused medicines so that they can be given to the people who are in need. What this project will do is, collect the unused medicines from the people who have completely recovered from the illness and do not require the medicines anymore. After the collection of these medicines, they would be handed over to the NGO's which would check the medicines and then if approved will be given to the people directly or to the hospitals who will be giving out these medicines for free. This system can contribute to reduce the cost for national health services by making proper use of unused medicines; and to help people to get better health services who can't afford these medications.*

Keywords: Online Portal, Collection, Unused Medicine, NGOs and Donation.

I. INTRODUCTION

India is developing at a fast pace and has made quick walks in many fields since its autonomy. But, according to many researches and National Family Health Survey (NFHS), it is clear that the admittance to medical care is still a rising issue in many slums and rural areas. Tough India is classified as a developing country, poverty is still a major challenge. The Per Capita GDP in India is still around $1900, by which it is clear that many people in India still lack expensive medical care and are deprived of healthcare facilities. There are many reasons for the above statements and poor availability of medical care to many people in India:

1. India's current population is estimated at 1.3 billion. Nearly 17.7 per cent of the world's population lives in India.
2. In a country where 50 million people live on less than USD 2 a day and nearly 200 million people are undernourished, the growing population will only make the food security situation worse.
3. There is one doctor for every 1,445 Indians as per the country's current population estimate of 135 crore, which is lower than the WHO's prescribed norm of one doctor for 1,000 people.
4. India's literacy rate is about 74% - leaving a quarter of the population without basic reading and writing skills. Poverty and illiteracy are closely linked - and with the second largest population in the world, India is home to one-third of all world poverty.
5. Poverty erodes good health status of a populace and further deepens individual and national poverty while creating a public health concern for the society.

Due to the poverty and illiteracy, the people below poverty line cannot/do not want to pay for the expensive medical care because the cost of many medicines is so high that they prefer to buy food over medicines. Due to this issue, they suffer many diseases that turn into life-threatening issues if not taken care in time.

Whereas, people whose per capita income is more and stable can afford these medical products and also preserve them for future need. But according to various researches and surveys it is found that the prevalence of unused medications in

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homes has dramatically increased in recent decades, which has resulted in medication wastage.[1]

In the rest if the paper, we have compiled and shortlisted all our research that we conducted on this issue and as well as a detailed walkthrough of how we are going to implement this software. The following section II consists of the background of the related works performed before and our review and study of it. Section III consist the conceptual design, the architecture diagrams, DFD's and other related structural works. The resulting evaluation is mentioned in the section IV, following it is the conclusion section V.

II. Related Works

We conducted a survey of various applications related to our project and tested various systems that follow the same principle. We also conducted a walkthrough of various guidelines related to Drug Donation and what policies and programs are followed throughout the world in this area. We researched the Guidelines released by WHO to implement such Medicine Donation Programs and found out about various new factors and precautions should be taken while this donation process takes place. The following is the gathered data that we collected by reading and shortlisting the references we followed. We also studied the various drug donation campaigns that take place in India and prepared a detailed analysis on the topic.

2.1 Existing Systems

The existing systems proposed asked the donor to check the expiry date of the medicines and asked them to avoid the medicines if they are near to their expiry after checking. What the proposed system by us does is, it takes care of checking the medicines expiry date, all you have to do is donate and the proposed system, i.e. the portal, automatically assigns the Collection Center following the required Procedure. Unlike some medicine donation app, that are android app, this can run on any system without the need for you to download the application. The existing systems lacked many features like checking the user validity, inventory management, Donor-to- Receiver flow of the donation, Doctor Consultation Modules, Drug Information and Education, Forums, which are for the donors to help them to work easier.

Here is some literature form those systems:

They only had the necessary modules like Login, Donation and Collection. It missed many important guidance modules that are necessary to help user get familiar to the application. There are many drawbacks as mentioned above that we have covered and fixed in the proposed application. Proposed application will be full fetched and will repair all the errors and correction that we have mentioned and sorted from the existing systems.

Existing systems are based on outdated guidelines form WHO, which are related to donations related to drugs and medicine. These guidelines are updated after a particular period of time and need to be updated as per the current requirements. They also are not standardized and are not affiliated with NGO's. Many application have the option to select the NGO as an option from Multiple choices. This leads to many complex difficulties that the application cannot manage. It can also lead to false expectations from the system to the NGO's and can cause internal conflicts. To prevent this, we have selected a particular NGO that we are affiliated with and who will manage all the received donations. This already solved the major issue mentioned above.

2.2 Proposed System

The proposed medicine donator project will be to prepare a portal for the collection of unused medicine for further utilization by a needy person. The website will be made so that the user can donate the unused medicine to NGO. That NGO can help needy people. The user can donate the medicine. Many poor people who could not afford to buy their own medicines, will get help from this website, where people can get the treatment and medicines to cure the respective diseases, and also the unused medicine will be utilized. The proposed system will also ask the user for the images of the medicines that he/she wants to donate so that there will be no further confusion on NGO side. An additional feature that will add will be AI Image Search where the postal will search for the medicine on the Internet and provide the condition of the medicine that is to be donated. This will help to determine the condition in which the medicine is and also prove beneficial for the segregation of the medicines at NGO and Collection Center Level. This feature is completely new in our portal and is revolutionary in many ways. When the user is asked to click a picture of the medication, let's consider a Syrup

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Bottle, the portal will take that image and compare it with a new packed bottle image on the Web. Collection Center will accept it only if the condition of the bottle is as per the requirements.

Currently, we will be providing the services of login and registration to users and NGOs and the donation of medicines carried out in the moderation of admin. But, in the future, it can be expanded to provide treatment to the user via video consultancy with doctors providing prescription upload feature. It can very beneficial to the user because as per the current situation of COVID-19 it is very important to follow governments rule and regulations.

The aim of the suggested system is to enable using of information and communication technologies in order to unite and offer a more effective way for arranging common activities of the NGOs. The modules included in the proposed system that are lacking in the previous systems are: Donations Tracking and Status of the medicines, Doctors Consultation, Drug Information and Education, Guidance on Medicines and Proper Donation Methods Education to the users, Proper Inventory Management System, Medicine Sorting, User Validation using authentic details, Forums and Emergency Notifications to the registered users, etc .

2.3 Functional Requirements

1. The system must be able to register a new user and if the user is not a new user, he must be able to login in the system using the login function.
2. The system must accept the name, quantity and contents of the medicines that the user wants to donate.
3. The system must also request the images of the medicines that the donor wants to donate.
4. The system must also display the status of the donated medicine to the donor for their satisfaction.
5. The system must send a proper notification to the donator when the representative from the NGO will arrive to collect the medicine.
6. The system must store all the data of the collected medicines in a Database and must sort the data according to the prescriptions for different diseases.
7. The system must include a Guidance and Education module for the users to educate about proper methods to donate the medicines and information on various drugs.
8. The system must send notification to all the users in case of emergency medicine requirements.
9. The system must include a Forums Page for users to discuss their queries and so experts and other experienced users can guide them.
10. The system must be able to identify valid users by asking them for verified documents like Aadhar Card, E-mail or valid Phone Number.

2.4 Non-Functional Requirements

1. The system must be user friendly and the GUI must be easy to understand.
2. The system portfolio must load within 4 seconds from request.
3. The system must meet Web Content Accessibility Guidelines.
4. All the contents and components must be displayed properly and on their specified place on the portal.
5. Database security must meet Health Insurance Portability and Accountability Act (HIPPA) requirements.
6. The software must be able to handle the specified loads and must perform as per specified in the specifications.
7. The system must be portable and compatible with the specified systems.
8. The software must be easily maintainable, available for maximum time and must be reliable.
9. The software must follow ease of usability and learnability.
10. The system must follow all the latest security standards and must not be vulnerable to external malware and attacks.

III. Design and Development

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. This is the system architecture model that we will be focusing on.[2]

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Area of Project: Data Mining.

Some Interesting Facts:

1) The government spending on healthcare has increased to 1.4 % of GDP in 2018. It is planning to further enhance this to 2.5% of GDP by 2025.[3]
2) A staggering 70% of the population still lives in rural areas and has no or limited access to hospitals and clinics. [4]

3.1 System Context/Level Diagram

As you can see in the block diagram above (see Fig. 1), there are four external entities, namely: the Admin, Member Users (Donors and Receivers), the Collection Centers and the Doctors. The task and functionalities of each user is listed alongside them and the data flow between them is also specified. As listed, the functionalities of Admin are: Login and Management of all the users (donors and receivers), appointment approvals from receivers and management of the database with the total medicine distribution; the functionalities of the Donor are: Login and Donate Medicines, see the medicines donated by other users, check the status of the donated medicines; the functionalities of the Receiver are: Register, Login, Add prescription, and receive medications; the functionalities of Collection Center are: Login and Accept the medicines from donors, collect and segregate the medicines, and updating of the database; while the functionalities of the Doctors are: to view Patient Prescriptions, Consult them and Specify the proper treatment.

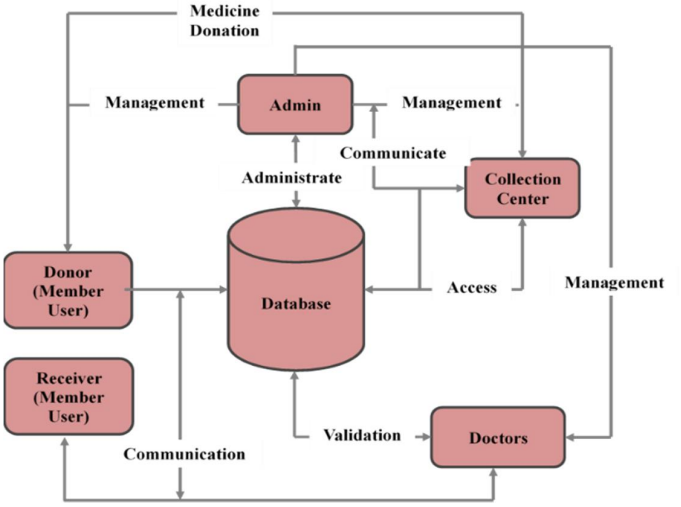

Figure 1: Block/Structural Diagram

3.2 Component Design

This section is focused on the conceptual design of our system which is the representation of the system composing the key concepts which can be used for knowing, understanding and simulating our system. The web based system will be the interface between the users (donors, doctors) and the trusted sources (government organizations/ NGOs) which will distribute medicines to the poor. The donors can donate their medicines through this web-portal and registered doctors can prescribe medicines for their patients who are unable to buy the costly medicines. The conceptual model for the system is depicted in Fig 1.

The medicine provider or donor as well as the doctor needs to create an account in our software system through which the system would be able to verify the account as well as all the information given by the donor or the doctor. For this process, registration name, address, sign up as (whether doctor or general), registration ID (for doctors only), email and password would be mandatory. During registration, the provided information is crosschecked to verify as this system is used for very delicate purpose and therefore, we handled the authentication system (specially for doctors) very cautiously.

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Doctor and donor both can access his/her account after this registration process and would be able to see the medicine list, from which the registered doctor can prescribe medicine and a PDF report would be generated and also the donor can donate medicine after providing necessary information.

3.3 Module Analysis and Design

In this system the administrator is the super user of this system. Only admin has access to this admin page. The administrator has all the information about all the users, Volunteers, and Available Medicines. This module is divided into different sub modules. Admin approves volunteer requests because without approval volunteers cannot log in. Admin selects volunteers and assign respective medicines.

This system aims to provide the unused or left over stuffs or items to the poor and the need ones. This site have collaborated with various NGOs through this site the NGOs will come to know about the client's gift. The clients can have full records of the donations made by them. [5]

The Modules with their functionalities are as specified:

A. Admin

The Admin will have all the permissons with access controls of all the databases. He will also have full control over the users actions with the total control and admininstration of the Collection Centers. The NGO will go through all the requests from the receivers and will distribute the medications through the Collection Centers.

Functionalities of Admin

- **Login:** Admin can login using credentials.
- **Manage Members:** Admin analyses and deletes or blocks the member donating unwanted and drugs that pass their expiry dates.
- **Manage Approvals:** The appointments by NGO's are manage by approving appointment request.
- **Reporting:** The monthly report of the members who had donated medicine.

B. Member Users (Donors and Receivers)

The Donors can login to the portal and donate the medications as per the user convenience. For the donation, the criteria are: The Medications must be a minimum of two months away from their expiration date; If syrups and other bottled products, they must not be leaking and also must be in a proper condition and quantity; The value of the medications to be donated must be above Rs. 200 and above. The Receivers can login and specify the prescriptions and required medications as per the doctor's consultancy. The receivers must have a valid proof of their income with their ID (like Aadhar Card, etc.)

Functionalities of Member Users

- **Registration:** User can register to the portal as either Donor or Receiver using the set credentials.
- **Login:** User can login to the portal using the credentials.
- **Donate:** Donors can select the 'Donate' option and follow the required procedure to give the medicines to the nearest Collection Center.
- **Search & Request:** Receiver can search the required medications through the portal and request for it.

C. Non-Governmental Organization (NGO)

The user (donor) who accepts the request and donate the particular medicine will automatically send a request to NGO's volunteer for pickup. It will consist of medicine description sender address and delivery to (NGO's address) he will receive the notification and as soon as he accepts it, he will go for the pickup to users address and scan the medicine if it is right as per mentioned before he will accept the medicine and deliver it to the NGO's who had requested it.

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Functionalities of NGOs

- **Collection:** The entire collection of the donated medicines.
- **Distribution:** Distribution of the medicines to the deprived and needy.
- **Management:** The entire database management, user management as well as record and collection center data management.

D. Collection Centers

The request from the user will be received by the nearest Collection Center that is affiliated with the NGO and a representative of the Center will be dispatched to collect the medicines from the Donor's place. The representative will check the medicines and collect them only if they are as specified in the request. The representative will bring the medicines to the Center and then it will be segeregated as per the treatement they will be used for.

Functionalities of Collection Centers

- **Collection and Segregation:** The collection of the medicines from Donor and the division of the collected medicines as per the treatment.
- **Management:** The database management of the Collection Center Database which will include the date of collected medicines, the user details and total types of medicines collected.

Below are the Data Flow Diagrams (DFDs), Level-0 and Level-1. You can find the detailed communication between all the modules and entities.

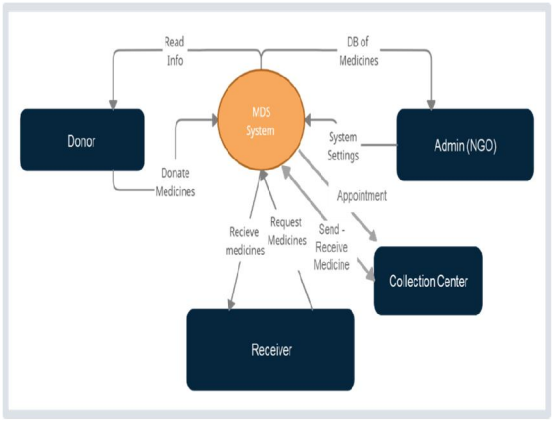

Figure 2: Data Flow Diagram Level-0

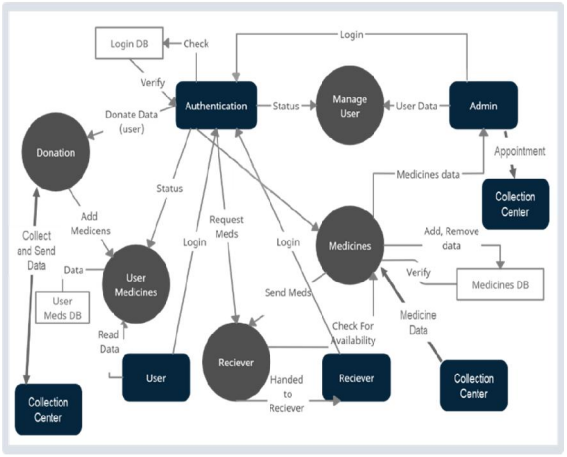

Figure 3: Data Flow Diagram Level-1

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IV. IMPLEMENTATION

The proposed 'Medicine Donation System' will be a portal through which a verified user will be able to donate the unused medicines they possess, to the NGO. The user will first register to the system with address and contact information and system will validate the user. Then, the verified user can enter the name of the medication (of any type), prescription for which it was given, its contents and expiry date and also click a picture of it through the portal.

The portal will then send the request to the nearest Collection Office affiliated with the NGO to collect the medicine from the donor. The representative of the Collection Center will then verify the condition of the medicine and accept them only if they are as per specified by the donor. The collected medications will then be stored at the Collection Center and will be sent to the main branch once the collection goal is fulfilled. The database will be automatically updated on the basis of the medicines received by the donor and then will be supplied to the needy by the responsible organization.
The Database, the Distribution and Management will be the NGO's responsibility.

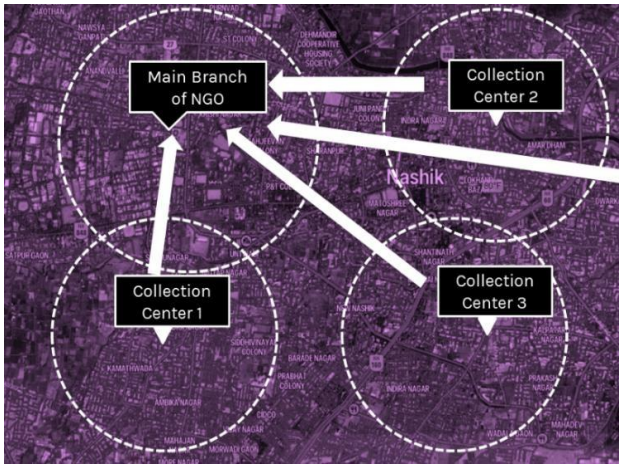

Figure 4: Implementation Demonstration

V. ACKNOWLEDGMENT

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VI. CONCLUSION

Modern era has started. Individuals both, privileged or unprivileged, proficient or ignorant are now conscious about their health. It is sad that even though needy individuals are in distress they can't give a lot of consideration to their medical services routine in light of the fact because of their low pay. NGOs show incredible drive by giving free treatment to the people who cannot afford expensive medicines. Yet, in most of the cases, they get the treatment but not the costly prescribed medicines. So in the bigger picture, this incredible act of giving free treatment to the people becomes useless as they would need to buy the costly prescribed medicines by themselves. This paper gives a brief outline of the plan and improvement of our proposed online portal, which will be extremely successful and will bear incredible commitment to get the wellbeing administrations for these needy people. Because of this portal we hope that even the wastage of medication will be diminished.

This project or this online medicine donation portal in the future has the ability to become a full fledge application wherein all the facilities will be provided on this portal. In future, it can be expanded to provide treatment to user via video consultancy with doctors providing prescription upload feature. It can very beneficial to user because as per the current situation of COVID-19, it is very important to follow governments rule and regulations. The feature of video

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consultancy with doctor is very best option of future scope for the portal. For better suggestions, we are merging all the medication facility like consultation, medicine donation, blood donation, etc. like facilities are part of the portal in future. So, in future, it can also become a commercial portal and app which will be unique in its nature and availability.

That said, we would like to conclude this presentation with the hope that our proposed system will be beneficial for the poor and needy and will help to create a better society where the benefits of modern and expensive medication can be received by all the masses. We would like to request each individual to help us and contribute to the society through such a simple and noble deed. We would also like to request to the people to help us spread awareness about the conditions that the deprived face and what a huge miracle it would be if each and every individual takes responsibility and donate as much leftover medicines as possible.

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