

Drug Content Extractor

(An Application For Reselling Unused Medicine And Extracting Salt Content From Medicine Wrapper)

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Abstract

Considering the different phases of the of the patients in medical field, we come across the people having plenty of pharmaceutical pills that remain with the consumer even after the patient got treated or due to change in prescription. Resulting in wastage of money and a large number of resources. On the other hand there are a large number of people that are left uncured due to lack of money. Paper puts forward the right utilization of these unused medicines that remain unconsumed out of the prescribed medication available with the patients. Collecting those medicines such as tablets, capsules, sealed syrups and providing them to the needy people (on prescription) via an android platform, making it easy to use and firebase as a real time database.

Keywords– World Health Organization, Android application, electronic health service, ICT, medicine distribution.

1.Introduction

Health is considered as the fundamental right of the humans also it is globally a social goal. But in times poverty becomes a barrier in achieving this goal not only in developing countries but also in some of the developed countries.

According to WHO there are 3 physicians and 1 nurse per 10000 population, the ratio of the doctor to patients in urban is 1:1500 and in rural it is more worst 1:15000[8]

[India itself utilize just 1.4 % of its GDP on health which is less than the countries like Nepal and Sri Lanka.]¹ Sometimes it could be a case where in people do fight for their food and fodder in such scenario affording medical care becomes a challenge. This results in increase in death rate of the countries. At the same moment some other person is throwing out the required assets lack of which is the cause of death of the person. Medicine is one of those asset, medicine are wasted in huge amount (by quantity and by monetary value) these medicines can be reused (if not expired) by a person suffering from the similar disease to get cure, it could be a life saviour for one and at same moment it could give relief to the person throwing them.

This paper is in accordance with the abstract stated above that would help the people to reduce the medicinal waste and side by side curing the people suffering from various disease while giving monetary relief to other person. Medicines now a days are so expensive that out of [The total household expenditure 70% is of medicine expense]¹.

1.1 Literature Review

The work previously done in the same field related to this paper is being presented in this section this is not all there might be some other important work that might have been done, but might have left.

Muhammad Nazrul Islam[2] have tried and developed a web portal for the donation of medicine that are left over after a medical treatment, the web portal was developed for the country specific poor people of Bangladesh. Leisinger[3] tried depicting a scenario of the poor the poor people that are incapable of getting the good treatment to their health due to the lack of sufficient amount of money to purchase the medicines. He put forward his idea of collaboration of the NGO's and individuals to donate and receive the medicines. Islam et al.[4] conducted a study that concluded that the factors that influenced the health services in rural areas and the equipment that are used for the diagnosis of the patient in rural areas are not of fine grade. Health management Information System [5] in their study discussed the opportunities and challenges of the developing countries in the medical field, they highlighted some opportunities such as internet, application development and adoption of telemedicine, whereas the challenges are the reachability of the people to the services. Ruxwana et a.[6] founded that the perceived, necessity and ease of use affects people's interest towards the e-health supports in government based clinics in the Eastern Cape Province of South Africa.

Android Studio for the development of the android application for the smartphones. Android is the open source platform for development of the application and [7] also it covers the 2 billion active devices as of 2017. That makes it the largest active operating system in mobile.

1.2.1 Java- It is an object oriented programming language developed by James Gosling, this is used in the project for the implementation of the business logic and developing different modules of the system

1.2.2 Xml- it is used for the development of the UI of the application within the android studio

1.2.3 Firebase- it is the database system that provides the real time databases for the android application, our proposed system requires a real time database to depict the changes in the same moment they are made. Also it is based on the nosql so there are no need of preparing the tables for storing the data

2.Proposed Work Plan

Above illustrated situations can be managed by developing a common system that allows both the parties to interact and get benefitted mutually.

This common system .involves a platform that allow the users to sell their left over unused medicines by enlisting them on the platform. The medicines are prone to expiry date by considering this important factor the system provides the seller to list the medicine that are due to expire and have at least a week or more to expire. If the medicine gets expired even after getting listed prior to getting sold. The system would remove advertising that pill by itself, which would make the system convenient for the user to find only those pills that are not yet expired.

The users are engaged in the system to get the monetary benefit from the pills that would yield nothing else than getting useless and been thrown. On the other hand the people that are incapable of purchasing the medicines due to lack or the insufficient money with them would be able to buy the medicines at cheaper prices resulting in cheaper cure would ultimately result in saving more lives at lower cost.

The buyer needs to scroll through the listings of the pills on the homepage of the designed system and would find the appropriate medicine that has been prescribed by the doctor.

After finding the required pills on the page the user would request the admin for making the medicine available to them at the specified price or he could ask out for more details on the item. Once getting cleared about the cost and quantity and knowing all the required salts the user can make a request to purchase the medicine by making the payment.

The buyer also needs to provide the prescription of the requested medicine or if the buyer is the licensed pharmaceutical entity then they are required to provide their license to avail the medicine. Since some medicines are not to be sold without prior prescription. On receiving the payment the admin initiates the process of taking the medicine from the seller and making his payment and providing it to the appropriate user.

The end user is not interested in entering the details of the salt composition of the medicine and also it is a tedious task so the system can be provided with capability to scan the back cover of the medicine and parsing the salt details from the back of the medicine. These details would automatically be uploaded to the database and would be visible to the buyer.

Data flow diagram of the proposed system is depicted below.

Scanning and storing of the details of the salt / drug composition of the medicines constitutes the major component of the system it involves the fetching of the salt details from the raw text that is printed on the medicine cover or sachet. This module is developed by extending the capabilities of the Optical Character Reader followed by parser containing the salt / drug dataset.

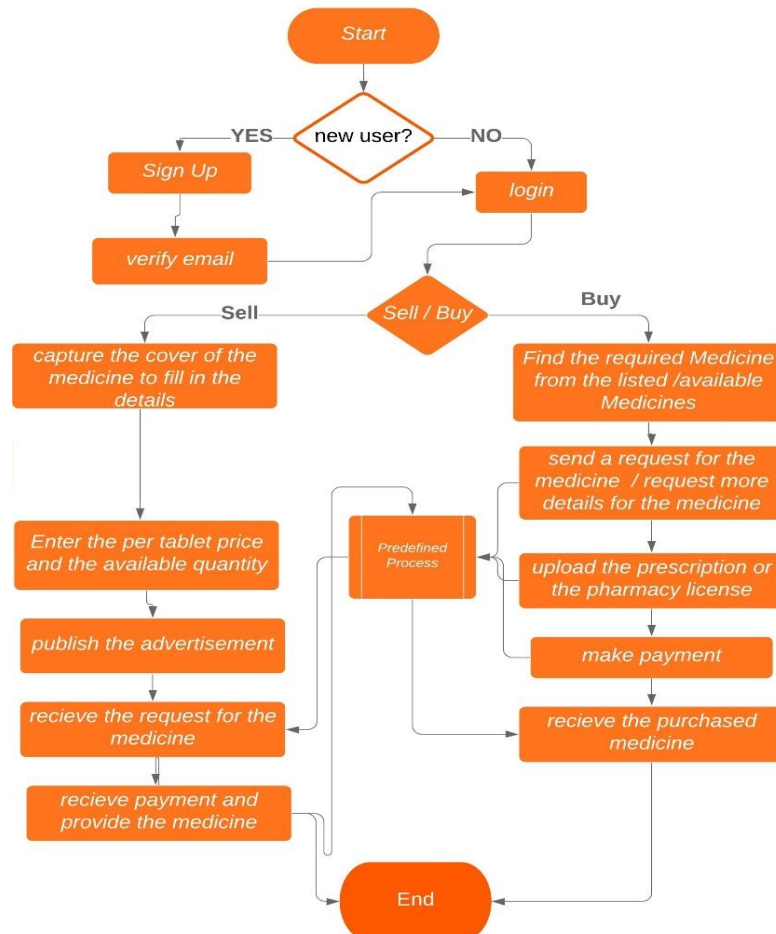


Figure 1 Data Flow Diagram

2.1 Algorithm

The procedure of the development of the module can be described as follows

1. The user is required to capture the image of the portion of the back cover of the image containing the composition of the drug present in the medicine or the entire back cover , the composition content must be entirely and clearly visible in order to fetch the details appropriately.
2. These images are then provided to the system as input for the detection and recognition of the text in the image.
3. The system tries to identify the region of the image containing the characters and marks these block for detecting the text.
4. The detected blocks are then matched with a large no, of available images within the dataset to recognise the detected characters. These characters are then combined to form words and in the same manner entire image is translated to block of codes.
5. These blocks of codes are the raw data that needs to be parsed that it only contains the composed drug details.
6. This is carried out by fetching the individual word from the block of the text and matching with available values in the dataset.
7. The matched values are stored and remaining text is discarded.
8. The following methodology can also be used for fetching expiry date of the medicine. This procedure can be achieved by utilising the available API for the OCR and also provided by Google, and then adding a parsing layer to the output of the OCR that would provide the drug content only.

2.2 Design & Implementation of Application

Implementing the feature that are necessary for an application to function as a shopping application.

2.2.1 UI

User interface of the application is made as simple as possible by considering the people that are not so advanced in technology so that they could find it easy to use and get benefitted to the fullest

The UI in android application is developed in XML and was made by drag and drop feature provided in the design view of the xml file.

2.2.2 Business logic implementation

For implementing the business logic for listing the items from the database and storing the data in the database managing the client requests were all maintained in the java file. The translation of the process from the one activity to other is also implemented in the java.

Android require the user to add dependencies prior to using their libraries in the class files.

2.2.3 Communication

For communication purpose the email service is considered whenever a user request a product (medicine). The request is made in for of mail to the admin, similarly for requesting the product from seller admin can also communicate via email id provided.

Further this service can be implemented in form of a chat box within the application itself.

3.Experimental Result Analysis

The data set used in the parsing was developed for the experimental purpose and was consisting of the 100 different drugs, the application was provided with the salts data set and the different medicines were analysed for the accuracy of the system in different conditions.

The performance of the system can be calculated as the ratio of the total number of the correctly recognised drugs to the total number of the drugs enlisted on the back cover of the medicine.

Mathematically –

$$\text{Efficiency} = \frac{\text{Number of words correctly recognised}}{\text{Total number of words in image}}$$

For different type of coverings the model was tested some of the are depicted below-

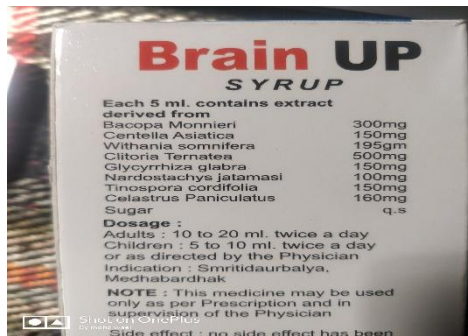


Figure 2 cropped image

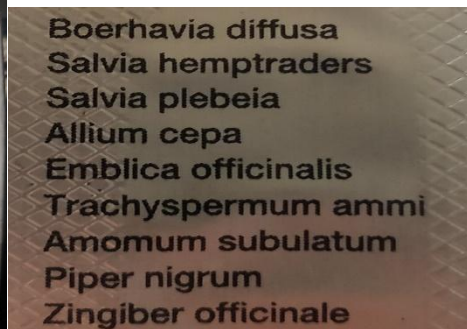


Figure 3 wrapper of the medicine

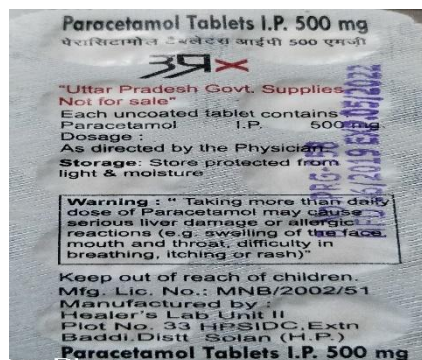


Figure 4 wrapper type 2

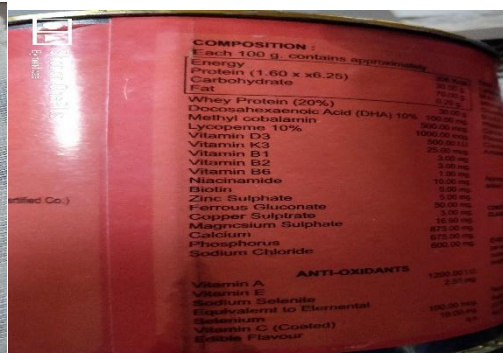


Figure 5 Tin container



Figure 6 Wrapper type 1

Figures 1 to 5 shows the different types of the medicine covering from which the user would be able to fetch the salt content of the medicine.

The graph below depicts the efficiency of the system-

1. Type 1 are the back wrapper which have some have silver wrapper with specifications on it. Its difficult to capture highly detailed images of these type of wrappers so the efficiency of the system is always lower than the others.
2. Type 2 are the wrappers that are made of plastic paper these wrappers provide higher details on the same amount of effort than the Type 1 wrapper
3. Type 3 are the hard covering of the medicine, basically it is the box of the medicine that also contain the drug content information of the medicine. These provide highly improved details but are not available for all kind of medicines.
4. Type 4 are the bottle or tin containers containing the powdered drugs or the syrup, these have a paper sticker or directly printed details of the drug content on their body.

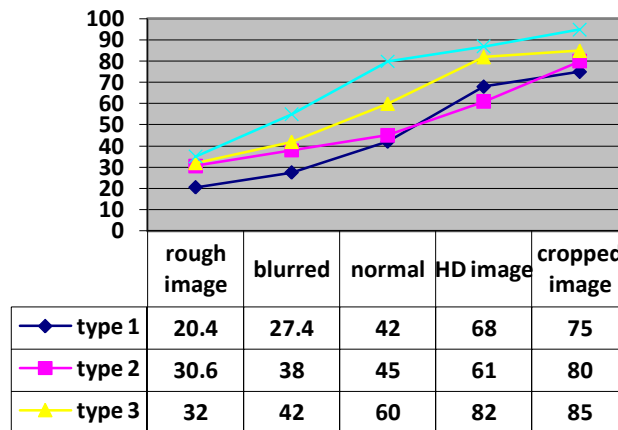


Figure 7 under appropriate lightning condition

It can be concluded from the above graph that the accuracy of the system can be obtained by using a camera of minimum 8 mega pixels and providing user a feature of cropping the image for the specific area where the drug content is mentioned.

4. Conclusion

Now the perception of the individuals is dynamical and are getting additional sensitive towards their health. No matter be the standing of the individuals either privileged or unprivileged, what thus ever be the acquirement rate, they're currently acutely aware towards their health standing. The matter of concern remains is that, despite of worrying, economically challenged individual's square measure unable to pay spare care to their health care because of their stripped-down financial gain and high expenses. Although Government take spare initiatives by availing the individuals with low expenses with medical facilities at zero expenses. However many times, they solely get the prescription of the costly medicines and not the medicines. In such cases they are doing not hassle to shop for those medicines and skip them which ends in improper cure of the illness. Following that the favourable initiative became priceless to them. This paper recommend a system that would facilitate them in utilising the technological advancement to scale back the value of these costly medicines by means that of AN mechanical man application, which might lead to a good approach of obtaining health care and can be a part of the providing services for those with less financial gain or economically challenged individuals. [An analysis of the implementation of the paper conjointly depicts as helpful, effective, efficient, and innovative mean of maintaining and natural action health]2. The paper additional needs the analysis and therefore the improvement in terms of the options and therefore the additional necessities of the paper by some real and enthusiastic users.

The involved limitations of the project involves the developing and creating individuals alert to the applying and therefore the alternative is that the it needs funding for the hiring of the delivery person and varied alternative resources.

References:

1. Oxfam Asian country workers,” fifteen aid schemes in Asian country that you simply should understand about”<https://www.oxfamindia.org/blog/15-healthcare-schemes-india-you-must-know-about>.
2. Muhammad Nazrul Islam, “GiveMed: A Webportal for medication Distribution among poor People”: 2017 IEEE Region ten Humanitarian Technology Conference (R10-HTC) twenty one - twenty three Dec 2017, Dhaka, Bangladesh.
3. K. M. Leisinger, “Poverty, disease, and medicines in low-and middleincome countries: The roles and responsibilities of pharmaceutical companies,” Business and skilled Ethics Journal, vol. 31, no. 1, pp. 135–185, 2012.
4. M. S. Islam, M. W. Ullah et al., People’s participation in health services: A study of Bangladesh’s rural health advanced. East Pakistan development center (BDRRC), 2009.
5. S. M, Application of ICT in strengthening health data systems in developing countries within the wake of globalization. PubMed - NCBI, 2005 (accessed June twenty two, 2017). [Online]. Available: <https://www.ncbi.nlm.nih.gov/pubmed/15687075>.
6. N. L. Ruxwana, M. E. Herselman, and D. P. Conradie, “Ict applications as e-health solutions in rural aid within the jap Cape Province of Republic of South Africa,” Health data management journal, vol. 39, no. 1, pp. 17–29, 2010.
7. Market share,” mechanical man (operating system)[https://en.wikipedia.org/wiki/Android_\(operating_system\)](https://en.wikipedia.org/wiki/Android_(operating_system)).
8. Who.int, WHO—Bangladesh, 2017 (accessed June twenty two, 2017). [Online]. Available: <http://www.who.int/workforc>.

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