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THE DEVELOPMENT OF MOBILE APPLICATION AND SYSTEM STRUCTURE FOR COMPATIBILITY MONITORING OF MEDICINES

Abstract. In this work, presented the analysis results of mobile applications and registration systems of medicines, where the main task is automating data entry, storing and maintaining monitoring for the storage and transportation of medicines, as well as an appointment for their use. By using this Android mobile application, it would be easy for people to take more information about medicines that they are going to take. With Application it will be clear for users what to use, when to use and how to use medicines before taking, it is not invalid and has big possibilities. Nearly all people have smartphones, so it is possible to get that information just by downloading the application instead of going to hospital or pharmacy. The project doing process consists of getting data about the medicines, analyzing statistics of illnesses in Kazakhstan, working with database, compatibility and checking medicines composition for allergic cases. As a result of the analysis, a framework of the mobile application has been developed that meets the requirements and basic purposes of the analyzed mobile applications and systems.

Keywords: Android, database, medicines compatibility, analyzing disease statistics.

Аннотация. В работе представлены результаты анализа мобильных приложений и систем регистрации лекарственных средств, где основной задачей является автоматизация ввода данных, хранение и поддержание контроля за хранением и транспортировкой лекарств, а также назначение их использования. Используя это мобильное приложение для Android, людям было бы легко получить информацию о лекарствах, которые они собираются принять. С Applicationit будет ясно, для пользователей, что использовать, когда использовать и как использовать лекарства перед приемом, это является реальной возможностью и предоставляет большие возможности. Почти у всех людей есть смартфоны, поэтому можно получить эту информацию, просто загрузив приложение, а не бежать сразу в больницу или аптеку. Проект, осуществляющий процесс, состоит в получении данных о лекарствах, анализе статистических данных о заболеваниях в Казахстане,

работе с базой данных, совместимости и контроле лекарственных препаратов для аллергических случаев. В результате анализа была разработана структура мобильного приложения, отвечающая требованиям и основным целям анализируемых мобильных приложений и систем.

Ключевые слова: Android, база данных, совместимость с лекарствами, анализ статистики заболеваний.

Андатпа. Бұл мақалада мобильді қосымшалар мен есірткі тіркеу жүйелерінің талдау нәтижелері келтірілген. Онда негізгі міндет - деректерді енгізуді автоматтандыру, есірткіні сақтау мен тасымалдауды бақылау және сақтау және оларды пайдалану мақсаты. Android үшін осы мобильді бағдарламаны пайдаланып, адамдарға олар қабылдауға болатын ақпарат туралы ақпарат алу жеңіл болар еді. Өтініммен тұтынушыларға не істеу керектігін, дәріні қалай қолдануға және оны қолданудан бұрын қалай қолдануға болатыны анық болады, бұл нақты мүмкіндік және үлкен мүмкіндіктер ұсынады. Барлығының дерлік смартфондары бар, сондықтан сіз бұл ақпаратты тек қана қолданбаны жүктеп, ауруханаға немесе дәріханаға жібере алмайсыз. Процесті жүзеге асыратын жоба - есірткі туралы мәліметтерді алу, Қазақстандағы аурулар туралы статистикалық деректерді талдау, деректер қорымен жұмыс істеу, аллергиялық жағдайларға қарсы дәрі-дәрмектердің үйлесімділігі мен бақылау. Талдау нәтижесінде мобильдік қосымшалар мен жүйелердің талаптарына және негізгі мақсаттарына жауап беретін мобильді қосымшалар құрылымы әзірленді.

Түйін сөздер: Android, дерекқор, есірткіге үйлесімділік, ауру статистикасын талдау.

Introduction

This article is about the mobile application in Android that would be used in Medical System. There are a lot of people in our country who tries to take medicine when they are ill. But most of them do not know the usage of these medicines that they bought. Most of them do not read the instruction, how and when to use it or most people takes it by themselves without advice of doctor. Because all of us think that it is simple to use it. Just taking medicine when you are ill and getting better. But this simple thing can make big problems that we can even not represent. Mortality of the people due to using Medicine in Kazakhstan is growing up year by year.

The project is Android mobile application that works with data about medicines. Application gives users more information about medicines and gives possibilities with its useful functionality.

The Application consists of such parts where users are able to do:

1) Registration/Login part. User must be registered if he uses the Application for first time. If he has an account yet, he can use it to login to the system. This part is important, because by this way he can save information about himself and actions that his did will be saved in his account and will be visible only for him;

2) Medicines List part - the main part of the Application. Data about medicines parsed from database will be shown here like a list with medicines title. User can search needed medicine or read more by clicking on list items;

3) Compatibility part - necessary and useful part of the Application. This function gives possibility to check compatibility of two medicines. By choosing two medicines from the list user can read and compare their interactions with other medicines at the same time;

4) Adding to Favorites List - by clicking on star icon on items of the medicines list, user can add medicine to Favorites List;

5) Checking composition of medicines for allergic cases. This part shows is medicine valid or invalid to use if the user has an allergy to some elements of medicines. On registration time, the user will be asked has he allergy or not. With this information, the system divides medicines into two groups. If medicine is valid for user, on item will be shown special correct sign, else other sign.

Problem statement and its solution

One of the most important causes of the disease and death of the people is improper intake of food and medicines. These factors increase the number of diseases in the country's statistics. According to the information of The Ministry of Health of the Republic of Kazakhstan, the last statistics of disease in country shown in below tables.

Table 1

Statistics of mortality in the Republic of Kazakhstan in 2016 [1]

Disease type	Total number	Diseases of the blood system	Diseases of respiratory organs	Diseases of the digestive tract	Infectious and parasitic diseases	Accident, poisoning and injury	Others
Number of people	11967,39	2908,09	1622,52	1138,66	121,42	1217,04	1498,95

Table 2

Statistics of disease tuberculosis by age groups of 2016 [2]

Age	0-14	15-17	18-34	35-54	55-64	65 and older

Percentage,%	3%	4%	43%	33%	10%	7%
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Table 3

Structure of population morbidity in 2016 [3]

Disease type	Percentage, %
Infectious and parasitic diseases	2,37 %
Nervous system diseases	3,33 %
Eye illnesses	4,34 %
Ear illnesses	2,83 %
Diseases of the circulatory system	4,56 %
Diseases of respiratory organs	43,51 %
Diseases of digestive organs	7,44 %
Skin diseases	4,81 %
Bone and Muscular Diseases	3,31 %
Diseases of genital tract	7,45 %
Pregnancy, labor and postpartum complications	1,54 %
Trauma and poisoning	5,86 %
Others	8,57 %

The last statistics shows that the number of disease and mortality in country is not low. The lack of care for such things like usage and compatibility of medicines with other things increases the mortality and disease number.

One of the best solutions of such problems is - mobile application that is usable and useful among the people, application should have more advantages and possibilities.

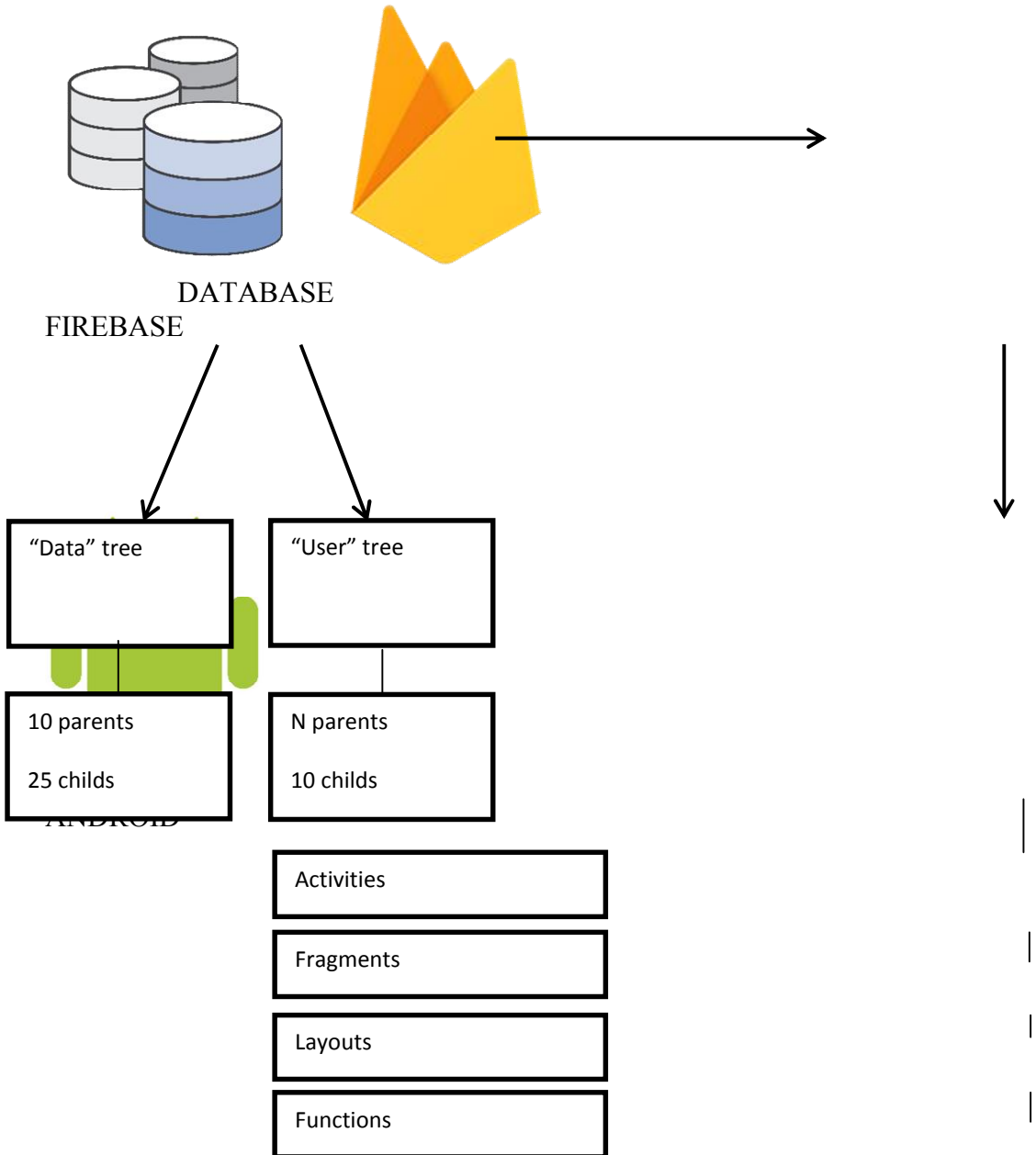
Application will help people to choose right medicine and will shorten the number of ills in country.

The aim of the work is decreasing the number of people who have problems on taking medicines. In this way, a mobile application has been developed to give people some sort of knowledge about medicines.

Structure of the Application

A structure is construction or framework of identifiable elements (components, entities, factors, parts) which gives form and stability, resists stresses and strains [4]. In Structure scheme of the Application shown a connection between Database and Android Project. Database table is saved on Firebase and by connecting Firebase to the project, system can get access to the data. Firebase has 2 databases (they are like tree with parent and child elements) - "Data" and "User". "Data" database is for medicines and their elements, "User" database is for registered users that saves all data about user

(name, age, country, etc.). Android project as usual consists of its own main elements like activity, fragment, layouts, action bars, bottom navigation and their functionality(Scheme 2.1.).



Scheme 1. Structure Scheme of the Application

Results of Comparative analysis

The Applications that are compared with are downloaded from Google Play [5], and here is shown their characteristics like amount (Mb) of Mobile version, developer's name and country. Everything that other Applications have helps to compare with our Application and do right conclusions on good technique using way:

1. «Фармацевт в кармане», 42 Mb, by APPIT.company
2. «PharmaSafe»[6], 6.6 Mb, by Nur-Magomed Arsakhanov
3. «Справочник лекарств», 24 Mb, by LeХа
4. «Справочник моя аптечка», 29 Mb, by ShevolApp
5. «Здоровье: справочник лекарств и болезней», 4.5 Mb, by BIT Apps4u
6. «Лекарства, пищи и алкоголи», 34 Mb, by KORDAG
7. «IV Drug Compatibility», 35 Mb, by Mobi Systems
8. «Аптечка», 35 Mb, by VeOS
9. «Антибиотики», 4.8 Mb, by KM-lab
10. «Моя аптечка: справочник лекарств, аналоги и цены», 75 Mb, by K.Nelyubin

Table 4

Comparison Table

<i>Functions Applications</i>	Scalability	Response of the System	Input Data types	Variables of the System	Security of the System	Cloud of the System	Data base	UI	Desk top ver.	Cost
«Фармацевт в кармане»	+	4 sec.	+	+	-	+	SQL	+	+	free
«Pharma Safe»	+	1-2 sec.	+	+	-	+	SQL	-	+	free
«Справочник лекарств»	+	2 sec.	+	+	-	-	SQL	+	-	free
«Справочник моя аптечка»	-	1-2 sec.	+	+	-	-	SQL	-	-	free
«Здоровье»	+	1 sec.	+	+	-	+	SQL	+	+	free
«Лекарства, пищи и алкоголи»	+	2 sec.	+	+	+	+	SQL	+	-	free
«IV Drug»	+	4-5 sec.	+	+	-	+	SQL	-	-	free
«Аптечка»	+	1-2 sec.	+	-	-	-	SQL	+	-	free
«Антибиотики»	+	2 sec.	+	-	-	+	SQL	-	-	free
«Моя Аптечка»	+	1 sec.	+	-	-	-	SQL	+	-	free
My Application	+	2 sec.	+	+	+	+	No SQL	+	-	free

Conclusion

The project is Android mobile application about medicine usage in Republic of Kazakhstan. In the process of the thesis work all tasks are fulfilled: researched about disease and mortality statistics and analyzed, problem statement of the project has been solved, for project application used different types of methods and functions, was chosen suitable backend platform for creating database and saving data and the prepared the design model of the

Application

One of the main tasks of the project was doing analyze to other similar Applications. In this case, picked up 10 applications and downloaded from Play Market to make comparison with our application. By the result of solving task, we added all necessary functions to the project to do it better and usable among the users.

As the statistics show, among the all mortality a large place takes a mortality from disease. Almost many diseases appear due to the improper intake of medicines. A mobile application has been developed to give some sort of knowledge about medicines and to reduce the number of mortality in statistics, and we hope that the task has been accomplished perfectly and Application will be useful.

References:

1 Standardized mortality rate by disease types in the Republic of Kazakhstan in 2016. (Committee on statistics 2018).

Url: http://stat.gov.kz/faces/wcnav_externalId/home%20NumbersHealthCare/.

2 Disease of tuberculosis by age groups of 2016.(Committee on statistics 2018).

Url: http://stat.gov.kz/faces/wcnav_externalId/homeNumbersHealthCare/.

3 Structure of population morbidity in 2016. (Committee on statistics 2018).

Url: http://stat.gov.kz/faces/wcnav_externalId/homeNumbersHealthCare/.

4 Introduction to Structure: <http://www.businessdictionary.com/definition/structure.html>.

5 Official page of Google Play: <http://www.play.google.com>.

6 «PharmaSafe» applications official web page: <http://www.rlspro.ru/>.