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Kan ve Organ Bağışı Mobil Yönetim Sistemi

Mobile Blood and Organ Donation Management System

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ÖZET

Akıllı telefonların artan kullanımı nedeniyle mobil, insanlar arasında çok önemli bir iletişim aracı haline geldi ve insanlar bu akıllı telefonları kullanarak birçok etkinliği ve görevi tamamlama olanağına sahip oldular. Akıllı telefonun belki de en önemli özelliklerinden biri, GPS özelliği sayesinde konumun doğru bir şekilde belirlenebilmesidir. Bu çalışmada akıllı telefonların bu özellikleri kullanılarak sağlık ve tıbbi alanda kan ve organ bağışı yönetiminin yanı sıra acil durumlarda gerekli hastane ve doktor bilgilerini de sağlayan bir uygulama geliştirilmiştir. Önerilen sistem kısa sürede hastanelerin kentte bulunup bulunmadığını, her hastanenin uzmanlaşma alanını, telefon veya e-posta yoluyla hastaneye erişim imkanını veya ambulansı nereye göndereceklerini belirleme özelliklerini sunmaktadır. Uygulama ayrıca, hastanede bulunan doktorların adlarını, uzmanlık alanlarını ve işbaşında olup olmadığını belirleme imkânına da sahiptir. Uygulama herhangi bir kişinin kolaylıkla kayıt olmasına imkân sağlıyor. Sistem sadece kan bağışını desteklemiyor, bunun yanında böbrekler gibi başka organların da bağışını destekliyor ve bağış yapacak kişi bilgilerini sağlıyor. Sistem, hastanelere özel bir tıbbi ekip gelişi gibi olaylar ve tıbbi faaliyetler için reklam ve duyuru imkânı da sağlamaktadır. Başka bir deyişle, sistem entegre bir sağlık hizmeti sunmaktadır.

Anahtar Kelimeler: Mobil uygulama, kan bağışı, sağlık hizmeti, organ bağışı.

ABSTRACT

Because of the increasing use of smart phones, mobile has become a very important means of communication between people, and made people have the ability to complete a lot of events and tasks through the use of these smart phones. Perhaps one of the most important features of a smart phone is the ability to determine the location accurately through the use GPS feature. In this study, using these features of smartphones a mobile application has been developed to manage blood and organ donations as well as to provide hospital and medical doctor information in emergency situations. The proposed system helps to locate the presence of hospitals in the city, the specialization of each hospital, contact the hospital through phone or e-mail and determine where to send the ambulance. The application also has the possibility of determining the names of doctors who are in the hospital, the specialization of each doctor, and whether doctor is on duty or not. The application is open for registration from any user without difficulties. The idea of the system does not rely only on blood donation it also includes other parts of the human body such as kidneys and it provides donor information. The system provides the possibility of advertising for events and medical activities in hospitals such as the arrival of a specialized medical team in particular competence. In other words, the system provides an integrated medical service.

Keywords: Mobile Applications, blood donor, healthcare, organ donation.

1. INTRODUCTION

With the growing interest in the quality of life, healthcare has become one of the fields that have received increasing attention. Especially with the increase of population, the burdens of healthcare are continuously increasing. This means that the need for communication between family, friends and community members to share in healthcare activities [Kardasand E.,2006].

In the last decade, mobile, computer, and communications technologies have been evolving rapidly. Using mobile for search or access to information through internet network becomes one of a necessary part of every daily life. There are many networks that are connected to each other and many mobile application used by people to implement various types of work. In addition, smartphones contain many services which include an internal database, voice recognition, GPS and ability to connect to local wireless networks and the Internet that can be used to develop applications that can be used in healthcare [Kardasand E.,2006].

Blood supply process at a specific time is an important factor in medicine and treatment and often considered as a very important element in determining life or death of the patient. Therefore the need emerged here to provide an effective way to overcome this problem which. The technological development happened in the process of making smart phones in terms of their size and diversity of services offered and their widespread application among people and provide Internet service even in remote locations with the ability to locate people through these cell phones in order to find a solution to the problem of providing blood for patients who need them within a short time which helped greatly in saving the lives of many patients [S. Muftic,2011].

The process of providing blood to patients can be summed up in the following points:

- Donors: A person who wants to donate blood.
- Seekers: he is the one who needs a certain type of blood.
- Blood Donor system: A system is used to provide blood.

The process of donating blood can only occur through people that are alive and that the patient's life depends on quickly and easily finding and locating blood donor. This study works on creating an integrated and easy to use system in determining the where about of blood donors through mobile phones [Mita Meshram,2013].

2. LITERATURE SURVEY

[P Priya,2014] Introduced an extended web application to timely update the information regarding the donors, acceptor and patients where the administrator accesses the whole information about blood bank management system. Also, the work has a Push technology with security, to protect the contact details of the donors in a web application where it can be misused by third parties. It also maintains the amount of each available blood group, if the stock of a particular blood group is lower than the required amount then the proposed method notifies the donor to donate blood. In addition to the web application, an android mobile application is proposed to search the donors who are available nearby during the emergency cases such as accidents.

[R.Vanitha, 2013]., presented BCloud Blood Donor Contact Manager Web Services that allows you to maintain a free, easy-to- organize database of contacts and their blood groups. With this convenient—and potentially lifesaving--app, you can quickly check your Android device for someone with a certain blood type and contact them immediately.

[Sultan Turhan,2013] presented a smart phone's application for the volunteer blood donor to increase the willingness and accessibility with the purpose of providing a continuous blood supply. This application helps healthcare centers to provide the blood as quick as possible when their stocks are insufficient. The application sends periodically.

[Lisa Maria Garnweidner-Holme, 2015] Introduced designing and developing a smartphone application (the Pregnant+ app) that automatically transfers blood sugar levels from the glucometer and has information about healthy eating and physical activity. This formative research included expert group discussions among health professionals, researchers, and experts in data privacy and security. User-involvement studies were conducted to discuss prototypes of the app. Results indicated that the content of the application should be easy to understand given the varying degree of patients' literacy and in line with the information they receive at clinics. The final version of the app incorporated behavior change techniques such as self-monitoring and cues to action. Results from the first round of interactions show the importance of involving expert groups and patients when developing a mobile health-care device.

[M. V. M. Figueredo, 2004] described the implementation of a telemedicine system for patient monitoring using mobile telephony. The major aspect of this application is its generality, which allows the use of any patient monitor with a RS-232 interface. The system proved to be quick and reliable. Therefore, it represents an applicable solution to tele-home care.

[Rajapraveen.K.N,2012], presented a topic called "Health Care Application in mobile device" mobile itself a plenty of applications as a repository, on adding the new health care application in mobile, it provides the user knowledge of disaster management of health problems.

[Javed Akhtar Khan, 2015] introduced the new working concept of a blood bank management system for the rural area. Information and computer technology are very famous in blood banks for its potentials in working efficiency as well as service quality we just provide new facilities for all blood bank management as well as for seeker. It plays a vital role in this new concept. the main objective behind in this concept is more of places blood bank does not have a good facilities for storing a blood unit in bank for large time period, but with the help of this new concept blood bank have to provide a blood to any time and any situation to seeker apart from that seeker is also able a call the donor for blood in a very serious condition of patient.

3. FACILITIES OF THE PROPOSED SYSTEM

When in the process of designing the proposed system, it has been taken into account that the system should be able to achieve the goal with ease and high flexibility, and that exceeds all the negatives in previous systems and therefore the proposed system has the following specifications:

1. The proposed system provides a database on all blood donors.
2. System can locate donating blood with high accuracy by using the GPS feature.
3. System can locate nearby blood donation centers.
4. System can locate nearby hospitals.
5. System can determine the presence of doctors in a certain hospital.
6. The system provides an easy and efficient access to knowledge of the donor.

As regards users of the system, there are several types of them:

- a. Administrator:
Has the ability to reach all parts of the system.
- b. Blood banks, Hospital, clinics, etc.
Centers can identify blood donors close by.
- c. Blood donor.
People who want to donate blood.
- d. Blood seekers.
People who deal with emergency and in need of blood.
- e. Organ donor.
People who want to donate Organ.

When designing the proposed system the following points have been taking into account:

1. A person who is looking for a blood donor could not obtain any personal information about the donor except the donor's name and proximity.
2. Not everyone can reach the donor's personal information with confidentiality.
3. The person as a donor has to record the following information:
 - i. donor's name
 - ii. blood type
 - iii. the donor's health history

The donation process is free and it is contained information about how to connect with the donor. The proposed system doesn't only assist the process of donating blood but also includes the process of donating human organs such as the kidney.

4. BLOCK DIAGRAM OF THE PROPOSED SYSTEM

In this section, we will explain the general outline of the proposed system. It can be seen from the general outline that the proposed system provides a central database to store all data of donors in addition to provide the ability to determine the position of the donor in addition to the hospital. There are two types of users for this application: blood donor and blood seeker. Blood donor can register to donate blood. Blood seekers can search for the type of blood in the database of application and can determine the position of the donors and the hospitals. The blood donor mobile system diagram is shown in Figure 1. Figure 2 explains the procedure of how the seeker is looking for a certain blood type using the proposed system.

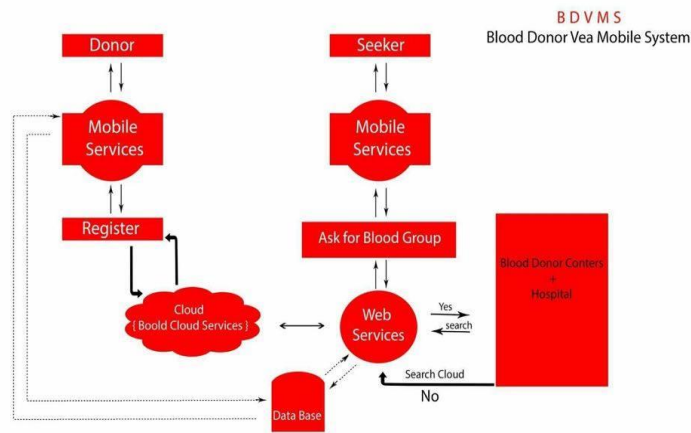


Figure 1. Blood donor mobile system [Prathamesh Raut,2016]

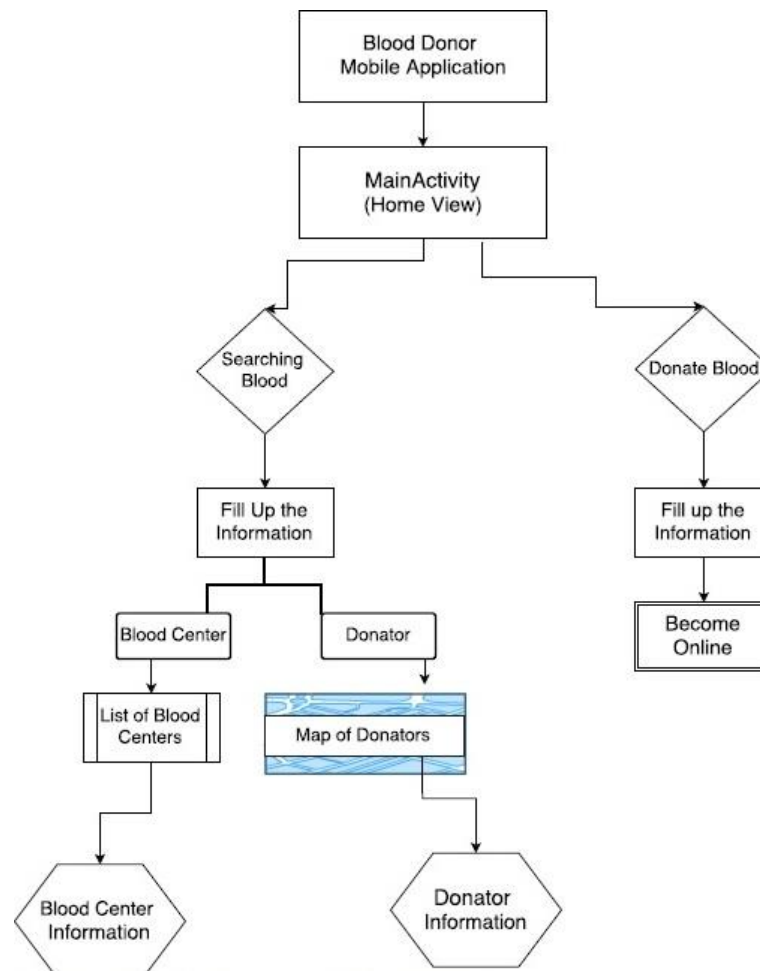


Figure 2. The step to look for certain blood type [Prathamesh Raut,2016]

When using the proposed system must note the following points:

- a) The proposed system can be used to donate blood or organs such as kidneys.
- b) The proposed system provides the ability to view the medical record of the donor to help the patient to make the right decision.
- c) The proposed system can identify the nearest hospital.
- d) The proposed system can determine the presence or absence of a certain doctor
- e) The proposed system can help to know the specialization of doctors currently in the hospital.

5. THE PROPOSED SYSTEM LAYOUT

The aim of the application is to design and implement a blood donor mobile application which can provide the ability to search for the blood donor in application database and also give the ability to search for the donor through the internet to locate the nearest donor centers in case the blood seeker cannot find a donor in the database of application.

In addition, the application can identify the nearest hospital and also determine the presence or absence of a certain doctor at the hospital as you can specify the competence of doctors currently in the hospital. When the application is launched at the first time, the Home Screen Activity is started, which has all the tabs and menu item to access different activities. On home page of blood donor application, the user has three options: to donate blood or search about the donor either by application database or through the internet Figure 3 shows blood donor application homepage. The three options in homepage are as following:

- Donate
- Search by blood or kidney
- Search by specialization.

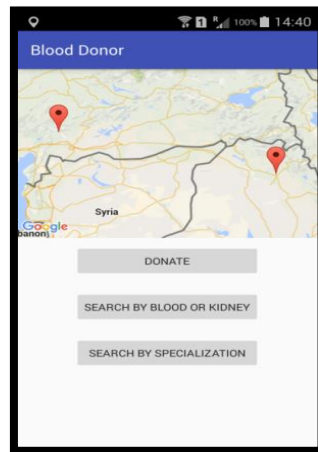


Figure 3. Blood donor application homepage

If the user wants to donate blood, user will go to donate option in the home page and this brings user to registration page where registration is managed. In this page donor will enter personal information and submit it to the application database. The required information includes name, age, phone, email, address, blood type and health history. Figure 4 displays the registration page.

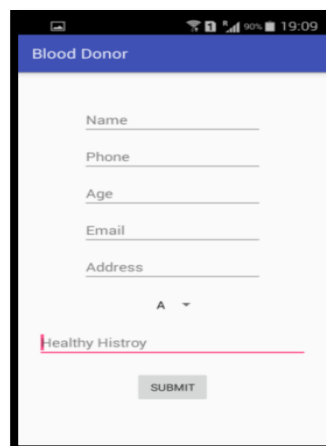
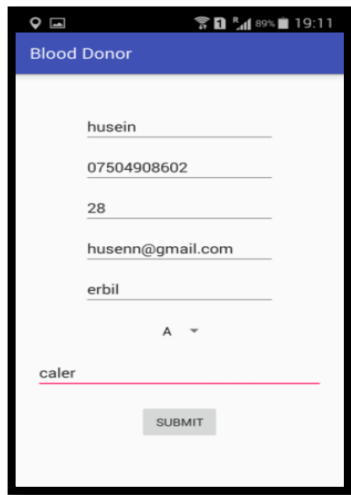
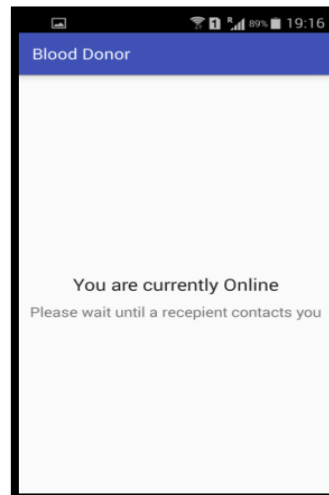


Figure 4. The registration page.

After the donor fills the required information and submits his registration request all information will be saved into the database and it will become available online and anyone searching about donor can find it. Figure 5a displays the registration page and Figure 5b displays how the donor will become online after registration is completed.



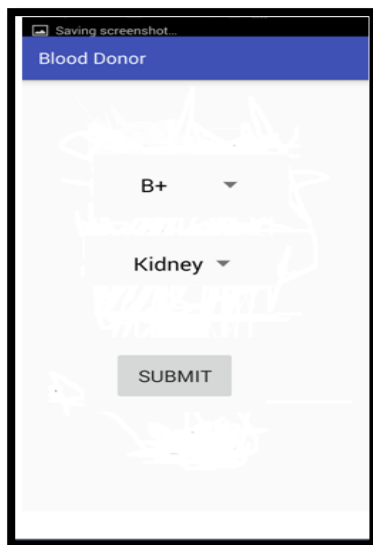
(a)



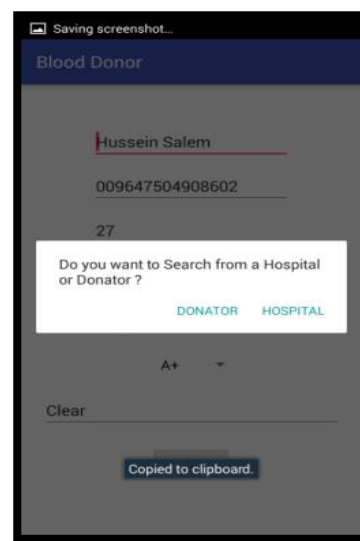
(b)

Figure 5. (a): The registration page and fills, (b): The donor becomes online after registration is completed

If the user wants to search for donor, he will go to search by blood or kidney option in the home page. In this page information about the type of blood that user wants to select. After that, the user will select one of the two options, blood from hospital or directly from the donor. Figure 6a. displays the search page and Figure 6b. displays the select page.



(a)



(b)

Figure 6. (a):The search page, (b): the chosen page

When user clicks on the hospital option, the available hospital of the closest to the farthest will appear and when user clicks on one of the available hospitals, information about this hospital or center as well as the location of this hospital on the map will be displayed. Figure 7a displays the list of available hospitals and Figure 7b shows information about the selected hospital.

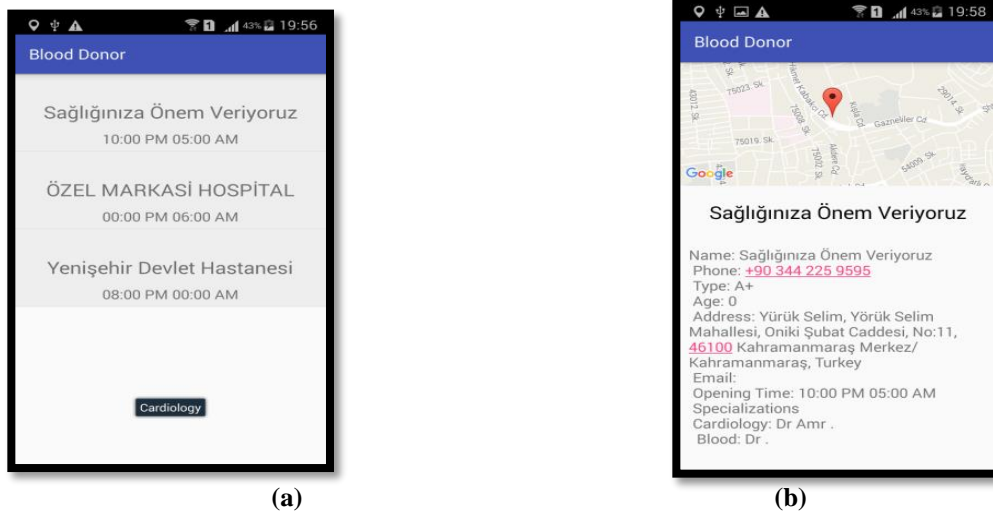


Figure 7. (a):The list of available hospital, (b):Information page of the selected hospital

If the user clicks on the Donor option, the available donor of the same type of blood will appear along with the information about if the donor is online or offline. When user clicks on one of the available donors, information about this donor such as name, age, mobile number, email address and the position of the available donor on the map will appear. Figure 8a. displays the list of available donor and Figure 8b. shows information about the selected donor.

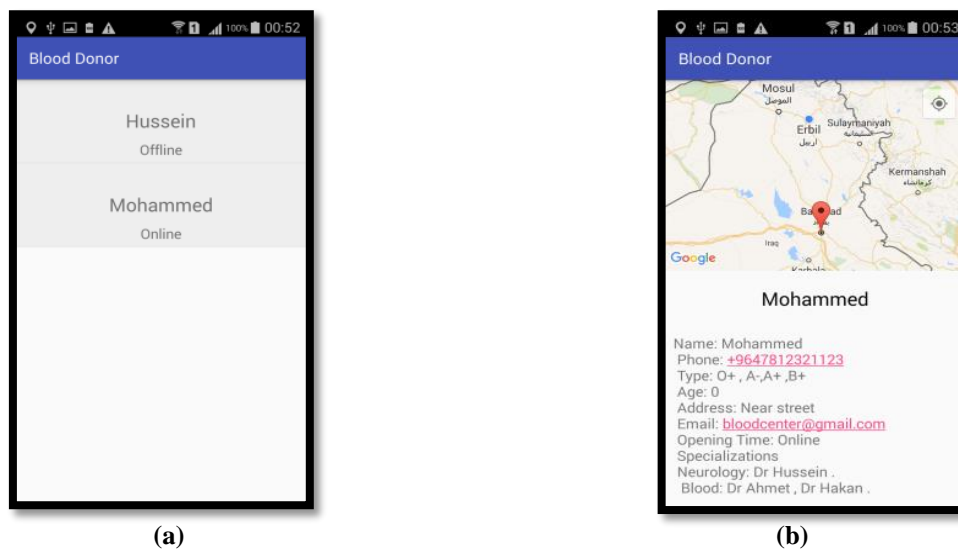


Figure 8. (a):The list of available donor, (b):Information page of the selected donor

If the user selects specialization option from the home page, list of specialization will be displayed. These options include search, infection diseases, Neurology, cardiology, Anesthesiology, cardiothoracic surgery, kidney, liver, and blood. This option is provided to help the user to searches about a special thing. When the user clicks on cardiology option, the list of the hospital (closest to the farthest) that provide this specialization will be displayed.

By this way, the user can know about hospitals that provide this specialization and see which of those hospitals is closer. When user clicks on one of the available hospitals, information about this hospital or center, as well as the location of this hospital on the Google map will be displayed. Figure 9a. displays the list of available by specialization option;Figure9b. shows the name of available hospital.

As mentioned above, if the user wants to donate a kidney, he must register and then he will enter his information to the application database. The required information is as the following name, age, phone, email, address, blood type and health history. When seeker searches for a kidney, user will go to blood or kidney option in the home page and select kidney option. After that, he can find information about available donors.

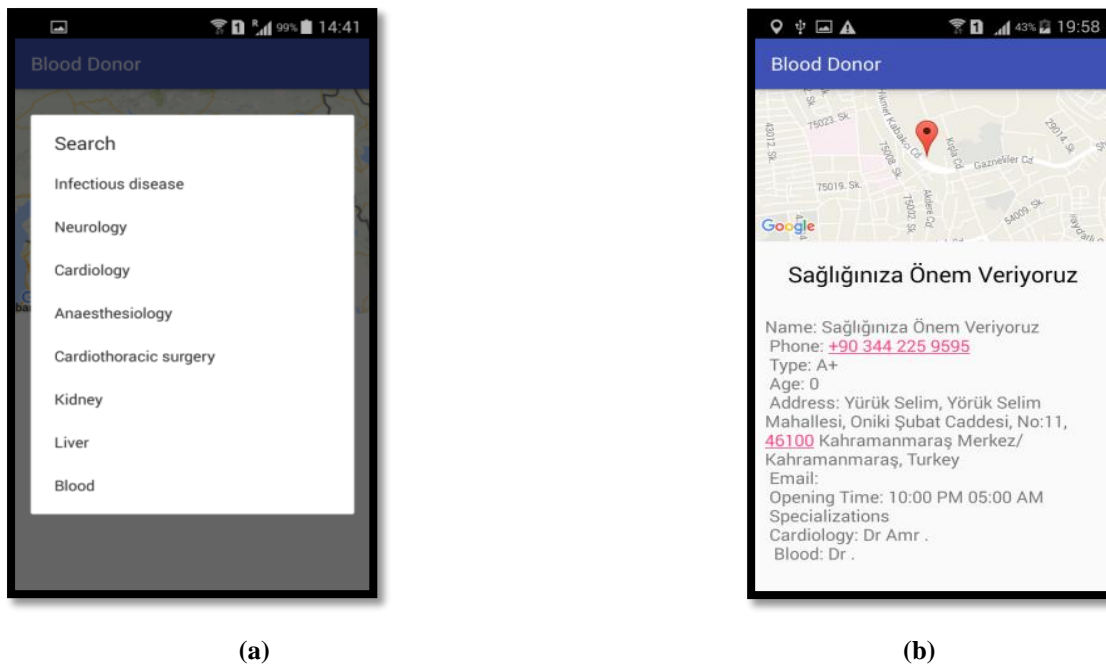


Figure 9. (a): The list of available by specialization option, (b): The name of available hospital

6. CONCLUSION

The proposed system contributes significantly to saving lives through easily and quickly locating the persons donating blood or human organs and locate the nearest hospital and doctor. All the goals can be achieved by building a vast network of people who want to donate blood as you can use this network to increase people's awareness about the importance of donating blood and organs to save lives. The proposed system provides an easy and flexible interface so that all persons at various levels can use the proposed system through the use of smart phones with Internet and GPS property. Proposed system can further be customized according to different needs of different health systems. This can be customized for the needs of blood donation authorities and also needs of organ donation authorities and rules and regulations in that specific area. That will increase the usability and effectiveness of this application.

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