AN ANDROID APPLICATION FOR ORGAN DONATION MANAGEMENT BY USING IOT AND CLOUD SERVERS

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ABSTRACT

We are developing the application aims at bridging the sensors can be stored in cloud-based servers. These servers eventually can coordination and communication gap between patients and donors, we be used to analyze the data using various matching techniques. Ambulance know that lot of patients die without access to a proper donor, be it organ or system that are fitted with GPS capabilities alongside various other sensors blood. A mobile application that would bridge the gap is the need of the can relay data about the vehicle's location and current progress which can hour, Our application is no different and it is a bit different from the be used for the transportation of the organs without any delay. existing system, our application makes use of a mobile app at both the ends, anyone can register and turn out to be a user, the hospital when in need raises a request for blood/organ of a specific type with all the details, and this request will notify all the users and the nearest medical bank centres of it, the request will have an authorized e-signature of the handling doctor with their contact details, and the application will let the recipient choose the most feasible and nearby donor for help. Internet of Things driven systems can help in well-timed transplantation particularly for organs like kidney and liver which has only few hours of preservation time.An IoT based organ procurement and distribution system which can bring remarkable improvement in timely procurement, accurate serotyping, and resolving ethical, legal and clinical issues

Keyword : - *Android, SQLite, Cloud-servers, Internet of Things, Organ Procurement, Organ Transplantation, Blood And Organ Donation.*

Introduction:

Organ Transplantations are one of the most miraculous achievements of modern medicine whereas transplantation is one of the most challenging and complex areas of modern medicine. Organ transplantation is the process of surgically transferring a donated organ into a patient with endstage organ failure. The number of patients waiting for organ transplantation in United States alone has surpassed 123,175.Every hour adds at least six patients in to the organ waiting list. At present, out of the 1, 50,000 patients requiring kidney transplants across India, only 200 get kidneys by way of donations from the deceased. In order to achieve a successful transplantation and improve the unitization of the available organ, it is important to reduce the time taken from the retrieval of the organ and transplantation of the same. The organ which is donated will be viable for transplantation only for few hours. This time vary from 4 to 24 hours based on the organ type. This is especially true for organs like kidney, heart and liver, which has only few hours of preservation time.

The main idea of this proposition is to have a mobile application that gives people the choice to be a donor when a hospital near them is in need of blood or an organ. The application is set out to start as an Android based one, but eventually aimed at reaching out to devices of all kinds, the application allows any normal civilian user to register, but only the authorized admin from the other end can validate the credentials and user information before they can tend to the need of a patient, in case of a blood donation, the hospital sends request for the particular blood type and waits for a potential donor to respond. The emergence of Internet of Things equipped with sensors can transmit concurrent data related with this towards a single repository in the cloud server.

LITERATURE SURVEY:

SR. NO	PAPER TITLE	AUTHORS	CONFERENCE	INFERENCE
1.	Design And Implementation of Short Message Service (SMS) Based Blood Bank	G. Muddu Krishna, S. Nagaraju	2016 International Conference on Inventive Computation Technologies (ICICT)	Data processing module: Raspberry pi, GSM module, database Packet Count module: Blood is available at blood bank then the receptor will get contact details of the blood bank
2.	The Development of Web-Based System for Blood Requisition within Blood Supply Chain	Wijai Boonyanusith; Phongchai Jittamai	2010 Seventh International Conference on Information Technology : New Generations	It consists Website, which having information of blood stock in all blood banks in terms of MySQL database
3.	In-Hospital experiences of families of potential organ donors: A systematic review and qualitative synthesis	Sean Glenton Dicks , Kristen Ranse, Douglas P Boer	Health Psychol Open 2018	Information assist families of potential organ donord to make informed decisions. Data collection and Evaluation of Organ Donors and Users

1. Existing System:

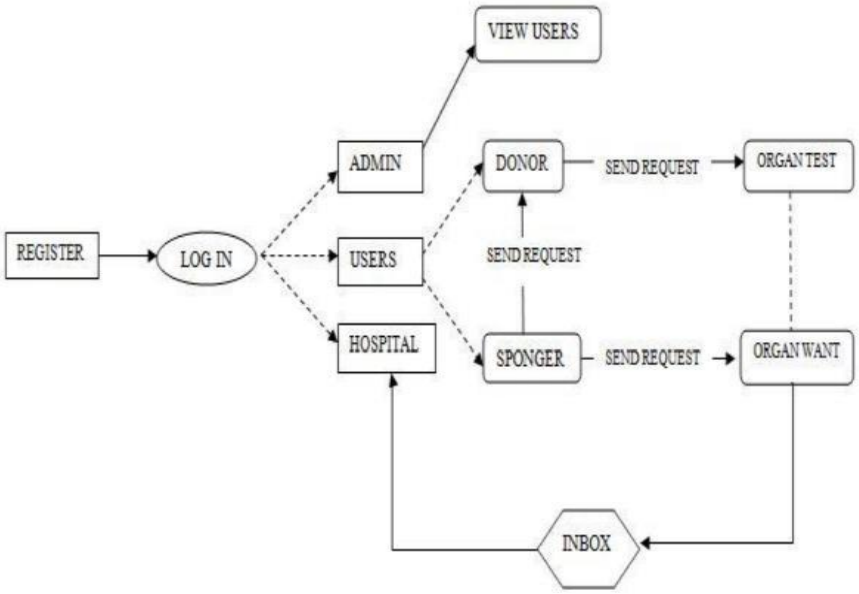
The blood bank system applications that are currently in existence require the user's involvement in most of the processes, A person needs to be connected to the web to if he wishes to know about the donor, the data about these people is provided by themselves from the other end , and access to information about their medical history is more than an addon or a feature, access to proper information is not adequate and available in most scenarios.

2. Proposed System:

The proposed system is a mobile application that is set to be initially developed on an Android centric environment using Android studio and the database is to be developed using SQLite. It also uses IOT for transportation facility of organs.The system's functionality would mainly include the following actors.

1. Hospital

2. Normal users
3. Donors
4. Blood banks and organ bank.
5. Intelligent Ambulance ***System Architecture:***



3. *System design:*

The application starts with an authentication check which is done with Firebase Authentication Mechanism. The authentication mechanism is classified into two categories, the first being the organisation authentication and the other is user authentication. On Authenticating successfully, they are allowed to access the application. The application maintains a database of all the hospitals and organ banks which are the major ones in each city ,we give a verified status to those hospitals and these hospitals can verify other small hospitals to join the service .When there is a need for any organ or blood the user can make a request through the application with a practicing doctor's Id (we collect doctors' id for authentication purpose). The request is first updated in Cloud Server and is broadcasted to all hospitals and organ banks who can respond to request through the Application and when more than one is ready to donate, we match the best ones. This application has a separately viewable screen where all the requests to you are specified and your response will be updated in the cloud database. We can later view the responses to our request once a response is received on the cloud database.

When we get the best match of donor, the transportation facility is available which is actually is a Intelligent Ambulance system that are fitted with GPS capabilities alongside various other sensors can relay data about the vehicle's location and current progress which can be used for the transportation of the organs without any delay.

4. Working:

A hospital uses the application to raise a request for an organ/blood donor, then the request is broadcasted in the app to all the nearby users and blood/organ bank facilities. The request also contains the details of the patient along with the location of the hospital. It also contains the authorizing signature of the doctor observing and handling the patient's case along with the contact details. The details will be revealed once the

request's organ/blood details match the donor's organ or blood details. It will show the distance of the donor or the bank facility from the hospital. It will show a list of probable candidates and allow the hospital to choose from it. In case of an organ transplant the application raises and lodges a request to the appropriate authority (AA) under the THO (Transplantation of human organs act) and gets the authorization to proceed forward with the transplantation. The database developed using SQLite stores the user details who could turn out to be potential donors, details such as their medical history records, blood type , physical stats and location distances from a particular hospital upon matching, another table is entitled to store the details of hospitals.
Once a hospital's request has been responded to, it also shows the shortest route to the hospital on a real time scenario. This could turn out to be beneficial during times of emergency too.

5. METHODS AND PROCEDURES:

A. Registration

Solid organ transplantation remains the only effective treatment for many patients with end-stage disease. But the availability of organs does not always match the need. Patients can register their details on national and international organizations who will be maintaining donor registries in their databases for adult unrelated donors or cord blood units.
The addition of a cloud-based server to analyze the data and automatically generate a list considering many factors and also most importantly the medical emergency condition derived from the real time physiological status would require further in the direction of the IOT .

B. Organ Allotment

Because of the organ shortage, the process of managing and distributing the organs that are available is complex and often surrounded by controversy. When an organ donor becomes available, each patient in the database is matched by the computer against the donor characteristics.

C. Organ Procurement

A medical practitioner should satisfy himself that the donor has given authorization; the donor is in a proper state of health and is fit to donate the organ. The registered medical practitioner should then sign a certificate. A registered medical practitioner shall, before removing a human organ from the body of a person after his death, has to confirm that the person lawfully in possession of the dead body has signed a certificate and in the event of brain-stem death should confirm that a certificate has been signed by all the members of the Board of Medical Experts. Digital signature certificate from authorized person and medical professionals has to be available which will make the process of procurement less time consuming.

D. Organ Transportation

Organs must get to their new recipient very quickly as they can remain healthy only for short periods of time after removal from the donor. Intelligent Ambulance with GPS can be used to track the position of ambulance, emergency vehicles which will help to direct the ambulance to reach the hospital as early as possible and also reach the vehicle to their destination.

D. Organ Transplant

Once transplant candidate has been selected, a proper evaluation will be carried out by a transplant team. The team includes a transplant surgeon, a social worker, a psychiatrist or psychologist, a dietician, and an anesthesiologist. After proper evaluation, doctors will explain the procedure to the candidate and will be asked to sign a consent form. The health parameters such as heart rate, body temperature, blood pressure and blood level are measured and these information are send wirelessly over the cloud, complex algorithms are applied to analyze the data and then share it
through wireless connectivity to medical professionals who can make appropriate suggestions.

The donor can be maintained on artificial support in the operating room awaiting the arrival of the lifesaving organ. The transplant operation takes place after the transport team arrives at the hospital with the new organ. After the transplantation the recipient candidate whose physiological status requires close attention can be constantly monitored using IOT-driven, noninvasive monitoring. Sensors can be used to collect comprehensive physiological information and uses gateways and the cloud to analyze and store the information and then send

the analyzed data wirelessly to medical professionals for further analysis and review. A proper coordination between the Transplant team and the qualifying patients for transplant can be achieved using the combined cloud-based servers and IOT services. With an IOT-driven transplant system, managing transplantation process becomes a less tedious procedure.

6. Salient Features:

- Provides links to register as an Organ Donor.
- Donor list: We display a complete list of people who are willing to donate their organs.
- Contact list: this is a list of all doctors, hospitals and NGO for instant contact.
- Donor registration: A facility for any person willing to donate body organ to register and appear in the donor list.
- Any user who wishes to register their last wish for donating their organs after death can register with our application.
- After death, the message serves as reference material and the last wish can be executed

7. CONCLUSION:

1. *This work deals with the fact that one can donate the organ or receive it using cloud computing.*
2. This system aims at saving a large amount of man-hours caused during registration, organ allotment, organ procurement, organ transportation and organ transplant which can save lives.
3. Duplication is avoided by using a unique id aadhar card number and fingerprint.
4. By updating this system with more ideas, it can be used to get information of a organ donor who is dead and whose organ donation details is unknown to the environment and hospital

8. FUTURE SCOPE:

In future, we will be updating the application with additional features like implementing a machine learning model which will automatically suggests for the compatible source of organs and donors thereby eliminating the risk of tissue rejection in organ transplantations. We will also include cloud computing architectures to minimize the load of the application in mobile devices.

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