

# USE CASE STUDY REPORT



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**Submitted to:** Prof. Xuemin Jin

**Topic:** Blood Bank Database

**Executive Summary:** The Primal objective of this project is to design a database that can easily store the availability of the blood bank across the hospitals, efficiently using the internet.

To do that we chose the most popular DB in the world “MySQL” , using that also enables us to segregate the data in proper form, visualizing the data , and extracting the meaningful information from the Database.

The database can visualize, and extract information in such a way that if the person who needs blood searches for the hospitals where blood is available. If he found a hospital (donor) then he can submit request for blood. The hospital will get all the information of the receiver, and they will accept the request of the receiver if blood is available. This site helps the persons who are in very need of blood, even for other country people. The site contains 2 types of users: Hospitals and Receivers. The inspiration of this project is to develop a blood bank information system, which focuses on making an online system that is accessible for both hospitals and receivers. The proposed of Blood Bank is helping the people who need a blood by giving them all details of blood group availability. They don't need to go anywhere to search the blood when they need. They just need to use this software then all the result will appear in just a second. Our life is so busy so we don't have time to spend going here and there, we can use technical way to search the

blood by using the Blood Bank we can find thousands of people who are donating the blood and what is the Blood group of that person ? So, this is the most useful site ever.

## I. Introduction

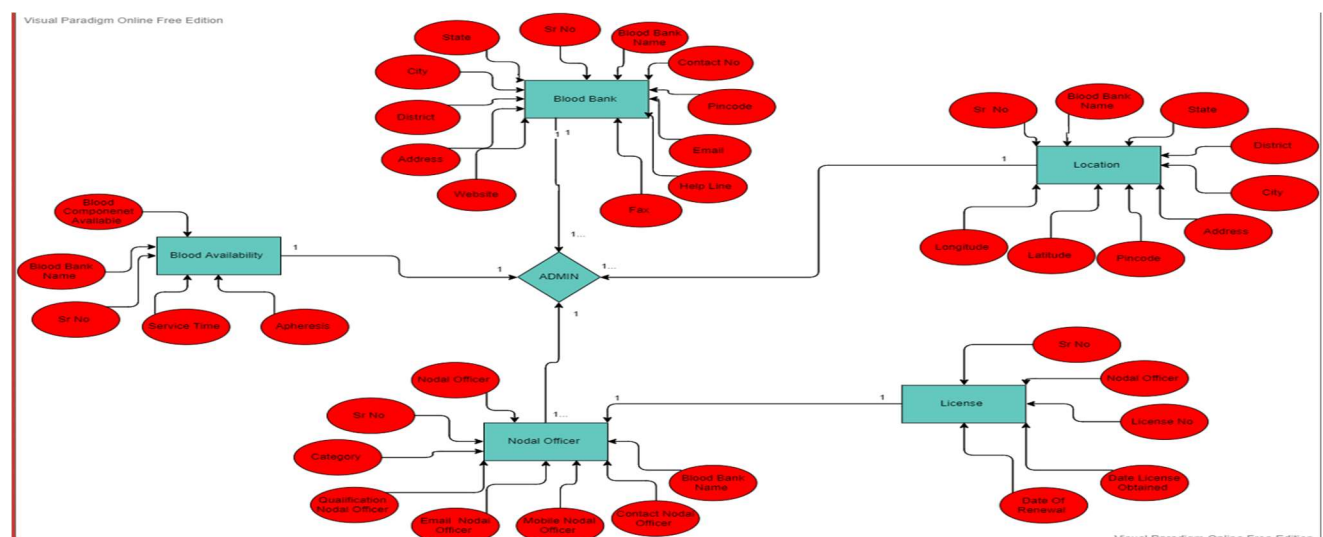
The people in need of blood can search for the hospitals. It saves time as he can search donors online without going anywhere. Using this system user can get blood in time and can save his relative or friend life. Our website work 24x7 so user can get information any time. Hospitals can also get registered and save life of another person. The main benefit of this system is the information of available blood group. When blood is need in the operation then people have very less time to get the blood available so if he gets the information like who can give him blood in time in his city is lifesaving. And here our system work, whenever a person needs blood, he gets information of the person who has the same blood group he needs.

The Best Advantage of this database is :-

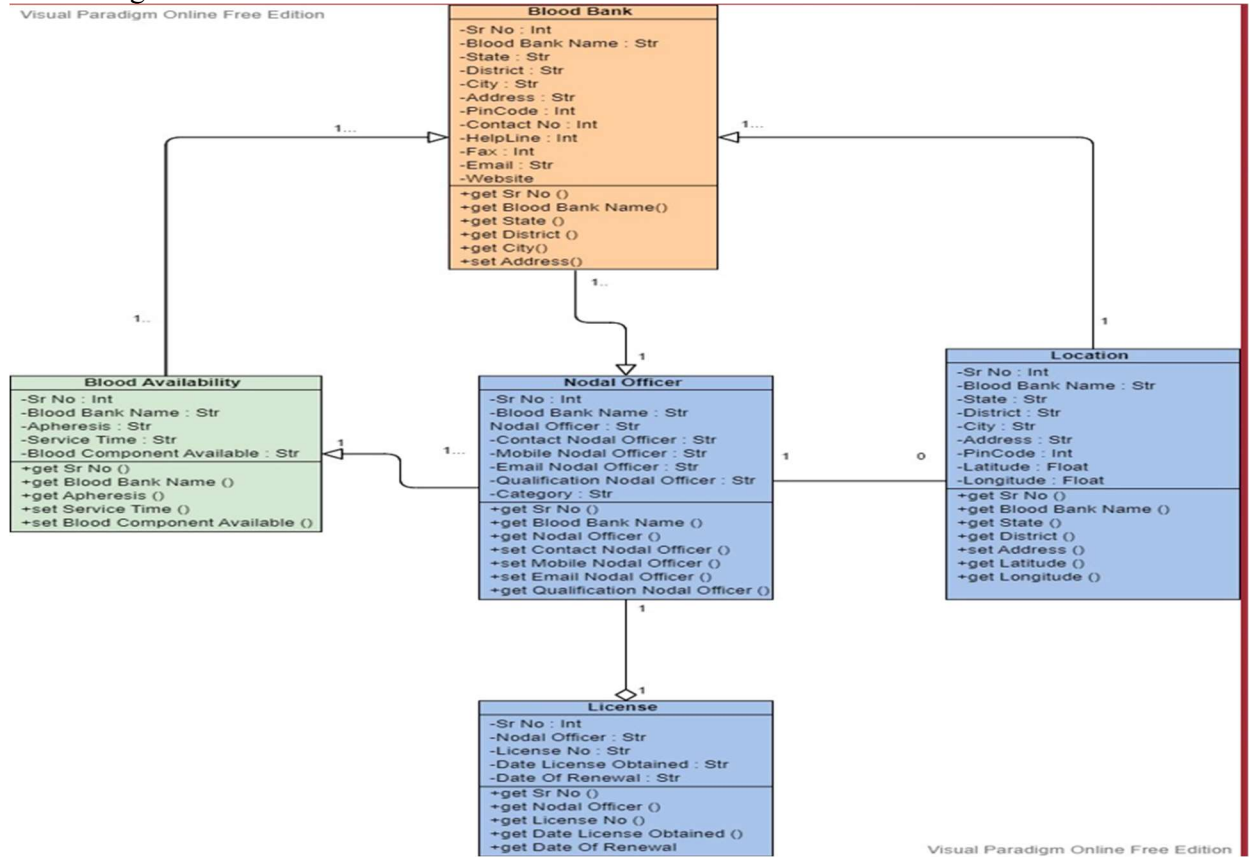
- I. An easy way to search the nearest blood available to the accident site with the help of internet.
- II. An effective way to find out the availability of the required blood groups in the hospitals.
- III. A proficient way to search the volunteer blood donors.
- IV. To provide a means for the blood bank to publicize and advertise blood donation programs.
- V. To allow the probable receivers to make search and make request for the blood.
- VI. To provide an efficient donor and blood stock management functions to the blood bank by recording the donor and blood details.
- VII. To provide synchronized and centralized blood stock database.

## II. Conceptual Data Modelling:-

This EER model is designed to provide immediate access to Emergency Blood Availability Requests, by directly assigning nodal officer to the case.



### UML Diagram:-



### III. Mapping Conceptual Model to Relational Model.

Primary Key is in Yellow, and Foreign Key is in Red.

Blood Bank	<b>Blood Bank Name</b>	Contact Number	Mobile Number	Helpline	Fax	Email	website
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Nodal officer	<b>Blood Bank Name</b>	<b>Nodal Officer Name</b>	Contact Number	Mobile Number	Email	Qualification	Category
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Blood Availability	<b>Blood Bank Name</b>	Apheresis	Service time	Component Available
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License	Nodal officer Name	License Number	Date Obtained	Date of renewal
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Location	Blood Bank Name	State	District	City	Address	Pin Code
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#### IV. Implementation of Relational Model via MySQL and NoSQL.

The data is cleaned and organized in such a way that each column can be accessible using the MySQL and NoSQL queries.

Here are some scenarios to get the information from Our database:-

MySQL:-

**Scenario 1:** To get the Information about all the Hospitals with having the blood component available.

```
SELECT L.State, b.`Blood Bank Name`, b.`Blood Component Available`
from location as L, `blood-availability` as b
where L.`Blood Bank Name` = b.`Blood Bank Name`
AND b.`Blood Component Available` = 'YES' ;
```

State	Blood Bank Name	Blood Component Available
Andaman And Nicobar Islands	G.B. Pant Hospital Blood bank	YES
Andhra Pradesh	Indian Red Cross Society Blood Bank, District Br...	YES
Andhra Pradesh	Government General Hospital Blood Bank	YES
Andhra Pradesh	Government General Hospital Blood Bank	YES
Kerala	Government General Hospital Blood Bank	YES
Rajasthan	Government General Hospital Blood Bank	YES
Sikkim	Government General Hospital Blood Bank	YES
Andhra Pradesh	Indian Red Cross Society	YES
Andhra Pradesh	Indian Red Cross Society	YES
Andhra Pradesh	Indian Red Cross Society	YES
Karnataka	Indian Red Cross Society	YES
Telangana	Indian Red Cross Society	YES
Telangana	Indian Red Cross Society	YES
Telangana	Indian Red Cross Society	YES

**Scenario 2:** Making a View to get the data for the nodal officers, with their designated Hospitals names.

```
DROP VIEW IF EXISTS Nodal_with_Hospitals;
CREATE VIEW Nodal_with_Hospitals AS
SELECT N.`Nodal Officer`, B.`Blood Bank Name`, L.State
FROM `nodal officer` as N, `blood-banks` as B, location as L;
Select * from Nodal_with_Hospitals
```

Nodal Officer	Blood Bank Name	State
Dr.G. Parvathi & Dr....	MMC Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Metro International Cardiac Centre Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Mar Gregorious Diocese Memorial Mulhooth Hosp...	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Kozhikode District Co-operative Hospital Blood B...	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Government Woman and Child Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Government General Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Medical College Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Baby Memorial Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	Fathima Hospital Blood Bank	Andaman And Nicobar Islands
Dr.G. Parvathi & Dr....	K M C T Hospital Blood Bank	Andaman And Nicobar Islands
Dr.Ganesh Samaddar	G.B. Pant Hospital Blood bank	Andhra Pradesh
Dr.Ganesh Samaddar	I.N.H.S. Dhanvantri	Andhra Pradesh
Dr.Ganesh Samaddar	Pillar Health Centre Blood Bank	Andhra Pradesh
Dr.Ganesh Samaddar	Indian Red Cross Society Blood Bank, District Br...	Andhra Pradesh
Dr.Ganesh Samaddar	Government General Hospital Blood Bank	Andhra Pradesh
Dr.Ganesh Samaddar	Indian Red Cross Society	Andhra Pradesh

**Scenario 3:** To find the number of blood banks available in specific city.

```
SELECT sum(State = 'Delhi' ) as DelCount FROM `location`
```

	DelCount
▶	68

**Scenario 4:** To find the Number of Blood Hospitals in Each State.

```
SELECT distinct(L.State), count(*) FROM `blood-availability` as B, location as L
WHERE B.`Blood Component Available` = 'YES' AND
L.`Blood Bank Name` = B.`Blood Bank Name`
GROUP BY L.State
ORDER BY count(*) desc
```

State	count(
▶ Uttar Pradesh	386
Madhya Pradesh	316
Maharashtra	316
Andhra Pradesh	176
Telangana	157
Kerala	151
Tamil Nadu	144
Karnataka	130
Gujarat	114
Delhi	82
Rajasthan	61
Punjab	55
Chhattisgarh	50
Nagaland	49
Haryana	49
West Bengal	42

**Scenario 5:** To get the License Number and contact details of Government Nodal officer in Delhi.

```
SELECT N.`Nodal Officer`,K.`License #`,N.`Contact Nodal Officer`,N.Category
FROM `nodal officer` as N, Location L, License K
WHERE L.State = 'Delhi' AND N.Category = 'Government'
```

Nodal Officer	License #	Contact Nodal Officer	Category
▶ Dr. Ganesh Samaddar	DL 1/CLAA/ANI	03192 230628	Government
Dr. Smiti Mathur	DL 1/CLAA/ANI	03192 248759	Government
Dr. Shiva kumar & Dr. Swapna	DL 1/CLAA/ANI	08554 275024	Government
NA	DL 1/CLAA/ANI	NA	Government
Dr. G. P. Subbrayudu	DL 1/CLAA/ANI	NA	Government
Dr. Sai Kiran	DL 1/CLAA/ANI	NA	Government
Dr. K. Babu Rajendra Prasad	DL 1/CLAA/ANI	NA	Government
Dr. P. Radhakrishna Reddy	DL 1/CLAA/ANI	NA	Government
Dr. L. Krishna	DL 1/CLAA/ANI	NA	Government
Dr. G. KARNAL RAJU	DL 1/CLAA/ANI	9989 105236	Government
Dr. G. Karnal Raju	DL 1/CLAA/ANI	NA	Government
Dr. C. Salmon raj	DL 1/CLAA/ANI	8854252333	Government
Dr. Anasuyamma, Dr. Marut...	DL 1/CLAA/ANI	NA	Government
Dr. Sujatha	DL 1/CLAA/ANI	8985100299	Government

## NoSQL (MongoDB):-

Here's the required queries for our MongoDB database:-

**Scenario 1:** To find hospital “ Indian Red Cross Society Blood bank RCH -II KADIRI” in Andhra Pradesh

```
db.Blood_banks.find(
{$and: [{State:"Andhra Pradesh"}, {"Blood Bank Name": "Indian Red Cross Society Blood bank RCH -II KADIRI"}]})
```

Blood Banks					
_id ObjectId	Sr No String	Blood Bank Name String	State String	District String	
1	ObjectId('626758446b0c363ebed...')	"10"	"Indian Red Cross Society Blo...	"Andhra Pradesh"	"ANANTAPUR"

**Scenario 2:** To find the Blood availability in all the hospitals, which operates 24 hours.

```
db.Blood_availability.find(
{$and:[{"Service Time":"24X7"}, {"Apheresis":"YES"}]})
```

Blood_Availability					
_id ObjectId	Sr No String	Blood Bank Name String	Apheresis String	Service Time String	
1	ObjectId('626758446b0c363ebed...')	"49"	"NRT Blood Bank"	"YES"	"24X7"
2	ObjectId('626758446b0c363ebed...')	"115"	"M/s. N.T.R. Memorial Trust B...	"YES"	"24X7"
3	ObjectId('626758446b0c363ebed...')	"131"	"Palakol Voluntary Blood Bank"	"YES"	"24X7"
4	ObjectId('626758446b0c363ebed...')	"134"	"Sri Buddala Narasimhamurty V...	"YES"	"24X7"
5	ObjectId('626758446b0c363ebed...')	"396"	"Pitampura Blood Bank"	"YES"	"24X7"
6	ObjectId('626758446b0c363ebed...')	"399"	"Holy Family Hospital Blood B...	"YES"	"24X7"
7	ObjectId('626758446b0c363ebed...')	"418"	"Mata Chanan Devi Hospital Bl...	"YES"	"24X7"
8	ObjectId('626758446b0c363ebed...')	"430"	"Jan Jagriti Blood Bank"	"YES"	"24X7"
9	ObjectId('626758446b0c363ebed...')	"438"	"L. G. Hospital Blood Bank"	"YES"	"24X7"
10	ObjectId('626758446b0c363ebed...')	"439"	"Civil Hospital Blood Bank"	"YES"	"24X7"
11	ObjectId('626758446b0c363ebed...')	"443"	"Institute of Kidney Disease ..."	"YES"	"24X7"
12	ObjectId('626758446b0c363ebed...')	"457"	"Sterling Hospital"	"YES"	"24X7"
13	ObjectId('626758446b0c363ebed...')	"465"	"A.D. Gorwala Karamsad Blood ..."	"YES"	"24X7"

**Scenario 3:** To find the Blood Banks located in Delhi and Andhra Pradesh

```
db.location.find(
{$or:[{"State":"Delhi"}, {"State":"Andhra Pradesh"}]})
```

_id ObjectId	Sr No String	Blood Bank Name String	State String	District String	
127	ObjectId('626758a16b0c363ebed...')	"130"	"Indian Red Cross Society Blo...	"Andhra Pradesh"	"WEST GODAVARI"
128	ObjectId('626758a16b0c363ebed...')	"131"	"Palakol Voluntary Blood Bank"	"Andhra Pradesh"	"WEST GODAVARI"
129	ObjectId('626758a16b0c363ebed...')	"132"	"Indian Red Cross Society Blo...	"Andhra Pradesh"	"WEST GODAVARI"
130	ObjectId('626758a16b0c363ebed...')	"133"	"Dr. Mulla Pudi Harischandra ..."	"Andhra Pradesh"	"WEST GODAVARI"
131	ObjectId('626758a16b0c363ebed...')	"134"	"Sri Buddala Narasimhamurty V...	"Andhra Pradesh"	"WEST GODAVARI"
132	ObjectId('626758a16b0c363ebed...')	"135"	"Rajiv Gandhi Institute of Me...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
133	ObjectId('626758a16b0c363ebed...')	"136"	"Indian Red Cross Society, Bl...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
134	ObjectId('626758a16b0c363ebed...')	"137"	"Boga Parvathamma Blood Bank "	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
135	ObjectId('626758a16b0c363ebed...')	"138"	"Rajiv Gandhi Institute of Me...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
136	ObjectId('626758a16b0c363ebed...')	"139"	"Fathima Institute of Medical...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
137	ObjectId('626758a16b0c363ebed...')	"140"	"District Hospital Blood Bank...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
138	ObjectId('626758a16b0c363ebed...')	"141"	"A.P Vaidyavidhanaparishad Ar...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
139	ObjectId('626758a16b0c363ebed...')	"142"	"A.P. Vaidyavidhanaparishad A...	"Andhra Pradesh"	"Y.S.R. (Kadapa)"
140	ObjectId('626758a16b0c363ebed...')	"363"	"Indian Red Cross Society (IR...	"Delhi"	"CENTRAL DELHI"



## V. Database access via R or Python.

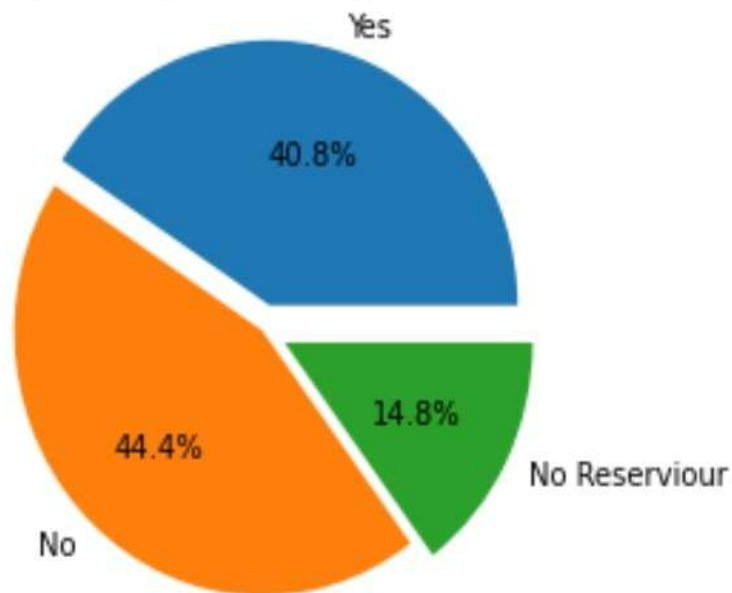
The database is cleaned and organized, data is also tested, and visualized using Python. To connect with the database we have used mysql.connector, and queries are executed using cursor.execute.

Data frame is created using Pandas and visualized using Matplotlib library.

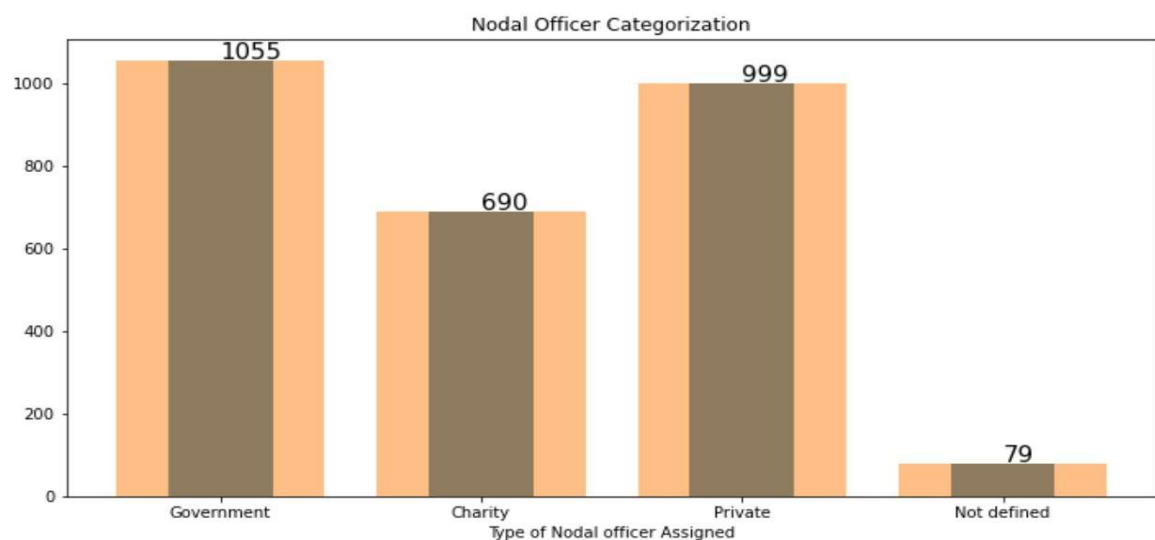
Some scenarios for visualization, are :-

### Scenario 1: Blood availability, from database.

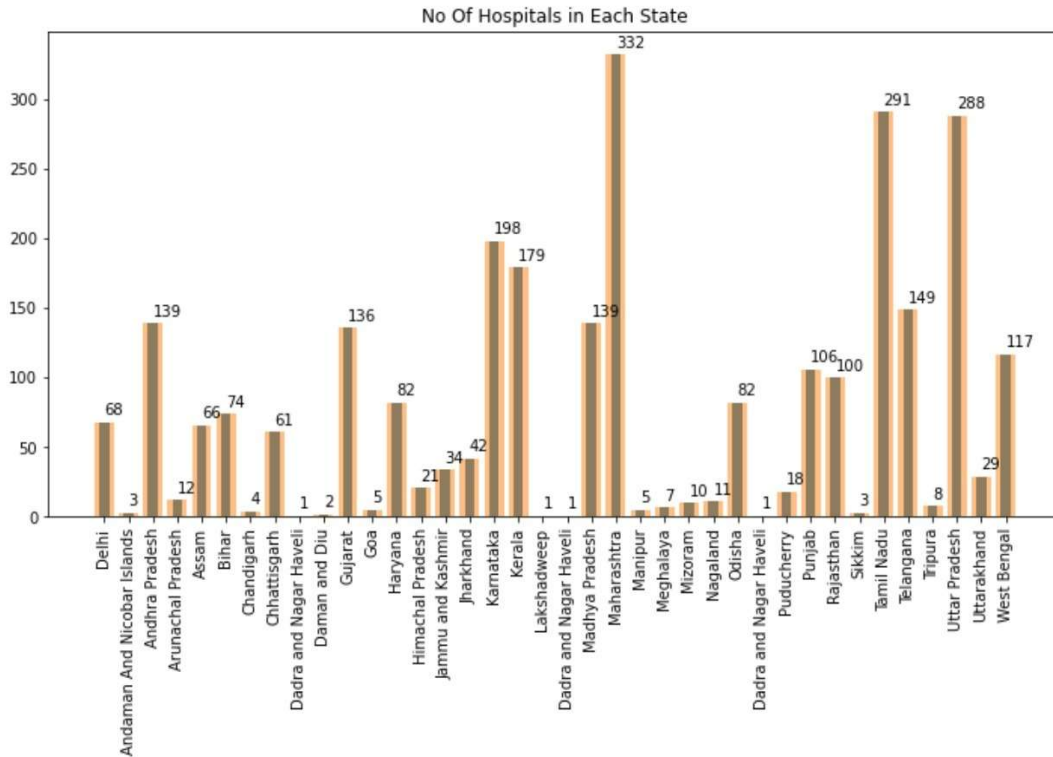
Blood Availability Among 2823 Hospitals Present in Our DB



### Scenario 2: Number of Nodal officer by each category.



### Scenario 3: Number of hospitals in each state.



## VI. Summary and Recommendations.

The blood bank database is created in such a way that it helps a lot of people from different states, finding the nearest city for blood availability. Also depending on the request i.e. emergency or normal. We can provide the required information to the patient, making the blood bank accessible to the patient, using the organized database. So that searching process will be fast and reliable.

The recommended steps for implementation of this project, is to make a website. Where users can create their account and know about the availability of blood in various state, also they can request the blood online. By contacting the assigned nodal officer, using the website or contact details available to the patient. This will surely make a huge difference, and save lives.