



BEDS IN-HAND: Increasing the accessibility of finding resources

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Abstract: This system handles the patients that are victims of mass casualties, during this time, it is important to utilize the limited medical resources available in the hospital. Following this, the system prioritizes the patients pertaining to the categories and fields inherited from Glasgow Coma Scale Study and assigns the patients dynamically to the appropriate medical services. This System asks the hospital initially to set up the number of beds and then they can add patients dynamically by choosing the Glasgow coma scale values which will automatically allocate the bed and can be checked too and dynamically assign the highest priority patients to the next empty bed available. [1]

Keywords: Localhost Server, Ventilator, Discharge, Web Application, Admin.

I. INTRODUCTION

In our day-to-day life, there are certain occurrences of mass casualties like natural calamities, disasters, injuries during a sports match, bus, or train accidents. This disrupts the health of many people who need to operate in parallel. As a result, there is a need to modify the traditional approach of handling the patients in such a manner that the resources available are not overwhelmed due to the sporadic arrival of victims. [2]

The application is implemented in PHP and MYSQL. The user needs to log in to the system with the username and password. In this system, the admin can add the new patients with their name, gender, age, blood group, and phone number.

Admin can view all the patients that have booked the bed for them. To get the bed, an employee needs to assign it. They can even see all the available beds. Eventually, they can add a new bed too.

A. Objective

As the resources are limited in such an environment, it becomes vital to allocate the available limited resources to the patients in the best possible way.

The initial goal is to provide normal, oxygen, ventilator beds to the patients according to the severity of the patient calculated via GCS Scale. We made this project so that people in need can get the required bed in a nearby hospital in less time to get medical treatment. They can easily analyse which bed is empty so the new patient can use it. [3]

B. Technology Used

The technologies used in this project are:

1. **HTML:** For Page layout and design.
2. **CSS:** Designing and styling the webpages.
3. **JavaScript:** Frontend (Client-Side Scripting).
4. **PHP:** Frontend (Server-Side Scripting).
5. **MySQL:** For storing all the tables and data used in the project.
6. **Localhost Server:** For setting up the server to run the project.

II. LITERATURE REVIEW

1. Shailendra Kumar (Kumar S., 2016), in his work report, clarified why public health services have failed to provide health for all, and the private sector was promoted and even facilitated to provide health care services to people but failed due based on profitability, hence created merely inequality and misallocation in spreading of infrastructure facilities in all areas. [4]

2. Kumar and Gupta (2012) discussed current scenarios for healthcare facilities and staff. They proposed a modern health plan centred on preparing a long-term strategy for the qualitative and quantitative improvement of India's healthcare infrastructure with a focus on workforce capabilities, information, data systems, and organizational capabilities. They propose an integrated approach in which the government is integrated into a decentralized structure at the local level with the help of residents and local level agencies such as Panchayat. [4]
3. The Centre for Disease Dynamics, Economics, and Policy (June 18, 2020) said some of the worst-hit and richest nations are frustrated by the growing demand for hospital beds, ventilators, and other critical care items. The World Health Organization has no international recommendation on the number of hospital beds per 1000 population, leaving policymakers to make informed guesses based on known data on the disease. According to the index, the USA has 2.77 beds per 1000 people and 29.4 ICU beds per 100,000, with 18.8 ventilators per 100,000 people. Italy which is a strong member of the EU has 12.5 ICU beds per 100,000 with 8.3 ventilators per 100,000 people and 3.17 beds per 1000. China has 4.05 beds per 1000 people and 3.6 ICU / 100,000 beds and an unknown number of ventilators. [5]
4. Isabelle Joumard and Ankit Kumar (Kumar I. J., 2015) found in their study that India is a mix of private and public healthcare system providers and there is a tremendous shortage of healthcare staff in urban and rural states of the north. They suggest that the longest gains in health status will come from preventive measures. Improving living conditions and lifestyle habits would have the greatest impact as a total sanitation campaign (Swachh Bharat Mission) has a high effect on reducing young deaths and development disorders in the later stage of life. Likewise, better use of drugs would improve the quality of health care and reduce out-of-pocket expenditure. [4]
5. Chandrakant Lahariya (Lahariya, 2018) discussed health service infrastructure, health education infrastructure, and human resources available for health in India and the challenges in this area. It concludes that India's vast rural health infrastructure has the capacity and potential to deliver more services than currently it is providing. The need is to strengthen them and enable with input mix of facilities, supplies, and human resources based upon a real-time information system. [4]
6. The CDDEP (2020) estimated that India has approximately 1.9 million hospital beds, 95,000 ICU beds, and 48,000 ventilators. Nationally, hospital beds are concentrated in the private sector (hospital beds: 1,185,242 private vs 713,986 public). ICU beds and ventilators follow a similar trend (ICU beds: 59,262 private vs 35,699 public; ventilators: 29,631 private vs 17,850 public). [5]
7. Pradeep Kr. Chaudhary (Choudhury, 2018) in his paper raises questions on the issue of private sector involvement in medical education, the regional variations in the health care services, and the availability of doctors. It analyses the role of the private sector in medical education, the unequal distribution of medical schools, and the quality of medical graduates from private institutions and proposes that government regulate geographic imbalance by establishing poorly served health facilities. [4]

III. METHODOLOGY

1. Use Case Diagram:

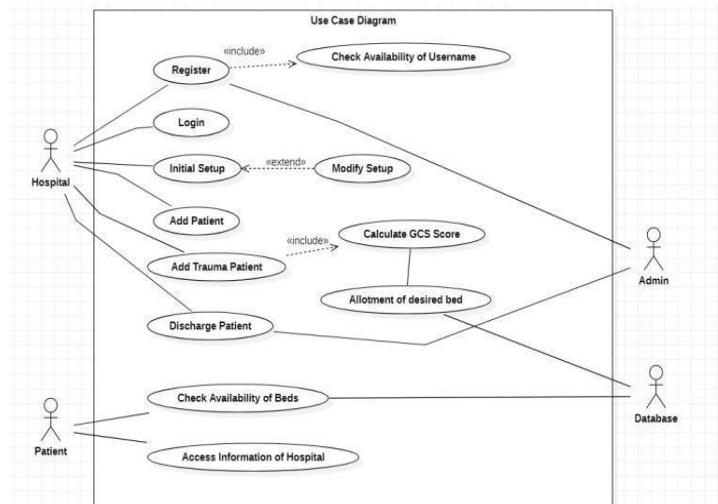


Figure 1. Use Case Diagram



IV. SYSTEM DESIGN

The Glasgow Coma Scale is different for both children and adults. This is because the verbal and motor response of a child is not as well developed as an adult. [3]

According to this scale, patients are assessed based on movement, speech, and eye-opening. After the examination, the values given corresponding to the patient's actions to the 3 responses are summed up.

They are classified as-

- Severe - (GCS <=8) -> Ventilator Bed
- Moderate - (GCS 9-12) -> Oxygen Bed
- Mild - (GCS >=13) -> Normal Bed

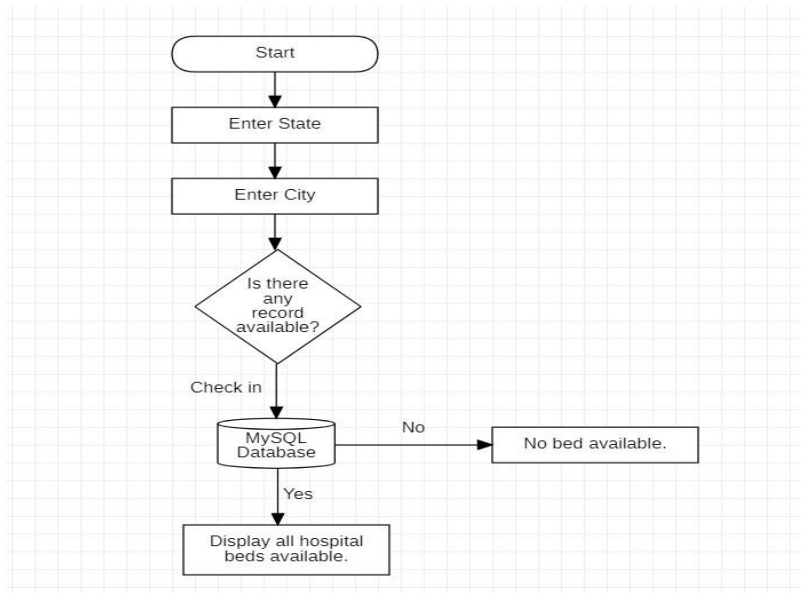


Figure 2. Flow Chart for Patient

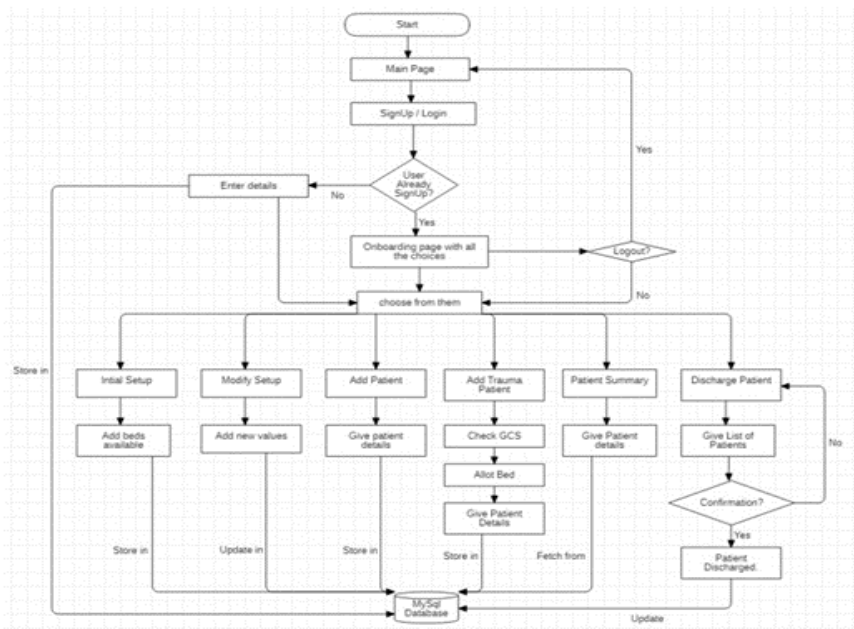


Figure 3. Flowchart for Hospital



FEATURE	RESPONSE	SCORE
BEST EYE RESPONSE	Open Spontaneously	4
	Open to Verbal Command	3
	Open to Pain	2
	No Eye Opening	1
BEST VERBAL RESPONSE	Oriented	5
	Confused	4
	Inappropriate Words	3
	Incomprehensible Sounds	2
BEST MOTOR RESPONSE	No Verbal Response	1
	Obeys Commands	6
	Localizing Pain	5
	Withdrawal from Pain	4
	Flexion to Pain	3
	Extension to Pain	2
	No Motor Response	1

Figure 4. Glasgow Coma Scale – For Adults

FEATURES	>1 YEAR		< 1 YEAR	SCORE
EYE OPENING	Spontaneously		Spontaneous	4
	To Verbal Command		To Shout	3
	To Pain		To Pain	2
	No Response		No Response	1
MOTOR RESPONSE	Obeys		Spontaneous	6
	Localizes Pain		Localizes Pain	5
	Flexion Withdrawal		Flexion Withdrawal	4
	Flexion Abnormal(decorticate rigidity)		Flexion Abnormal(decorticate rigidity)	3
	Extension (decelerate rigidity)		Extension (decelerate rigidity)	2
VERBAL RESPONSE	No Response		No Response	1
	>5 YEARS	2-5 YEARS	0-23 MONTHS	
	Oriented	Appropriate words/Phrases	Smiles/Coos Appropriately	5
	Disoriented/Confused	Inappropriate words	Cries and is Consolable	4
	Inappropriate words	Persistent Cries/Screams	Persistent Inappropriate Crying	3
	Incomprehensible sounds	Grunts	Grunts, Agitated and restless	2
	No Response	No Response	No Response	1

Figure 5. Glasgow Coma Scale – For Children

V. IMPLEMENTATION

- 1. Dashboard Module:** This module will be the homepage of our project. This enables a user to enter their state and city to find different beds (normal bed, oxygen bed, ventilator bed) available in the hospital.
- 2. Login Module:** This module will help hospitals to login with their credentials to access the functionalities and database used to create this project. New hospitals can also sign-up via this module by clicking on the NEW USER button.
- 3. New User Module:** In this module new hospitals will create their credentials by creating their username, and password and adding the hospital details which will help them to get registered and use the functionalities this website offers.
- 4. Onboarding Module:** This module consists of all the functionalities this website offers to hospitals. It enables hospitals to choose from those functionalities.
- 5. Initial Setup Module:** In this module, the hospital will enter the number of beds (normal, oxygen, and ventilator) available in the hospital.
- 6. Modify Setup Module:** In this module, they can increase or decrease the number of beds in their initial setup and can modify the total number of beds.
- 7. GCS Check Module:** In this module, the doctor will check the Glasgow Coma Scale responses and will help them to assign the bed to the patient according to the GCS sum.
- 8. Add Patient Module:** In this module, we can add patients by entering their details which will get stored in the database so that the database can be updated to show the updated number of beds to the users.
- 9. Patient Summary Module:** In this module, the hospital can check the summary of the patients of the respective hospital.
- 10. Discharge Patient Module:** In this module, the hospital can discharge patients at a click and can modify the database to show the updated number of beds to the user.



VI. RESULTS AND ANALYSIS

Using HTML, CSS, PHP, JavaScript, and SQL databases we have been able to achieve the desired output. A patient can quickly find the hospital beds available near their location. They will enter the state and city and find all the hospitals with the number of normal, oxygen, and ventilator beds available. We can achieve the desired results. [6]

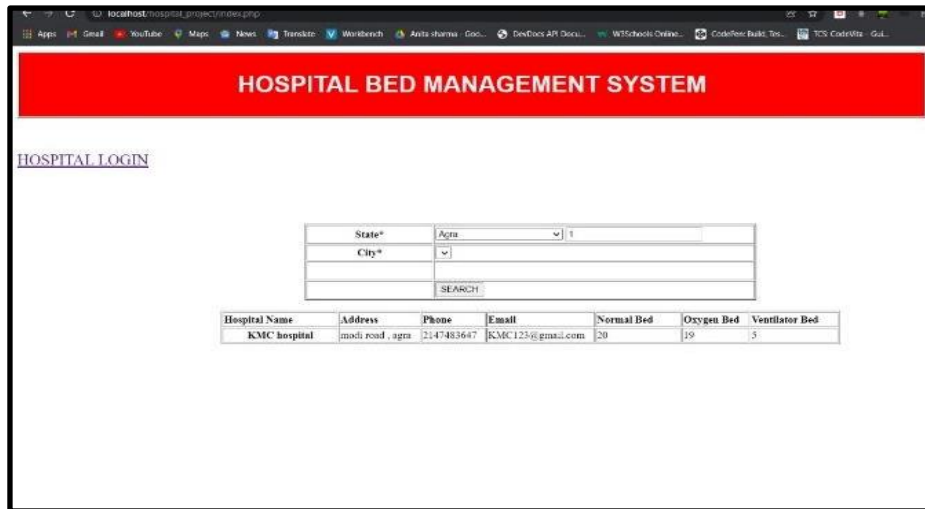


Figure 6. Result Screen

VII. CONCLUSION

It can be concluded that the web application gives essential highlights and capacities like hospital enrolment, login, and confirmation, and an updated contact data page, with full advantages. The execution of various stages is working true to form. Experiments were performed on various working frameworks, programs, and stages to guarantee that the application was working effectively on all the above-mentioned. In this manner, it tends to be inferred that the application is a web interface that can help clients find available beds and shows the updated hospital information in the application.

The application is implemented in PHP and MYSQL. Continuously, it consists of one main component Admin side. The hospital needs to log in to the system with the username and password. The hospital can add new patients with their name, gender, age, blood group, and phone number. Beds can be assigned to the patients with the help of the GCS scale and GCS sum. Admin can view all the patients and book the bed for them. They can even see all the available beds.

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