**2.0 Preliminary Investigation Phase**

**2.1 Summary of Problems, Opportunities, and Directives**

Hospitals have altered because of the use of digital healthcare apps. They've implemented technology to manage all the hospital's operations, and the results have been favorable and beneficial to both hospitals and patients. The excessive demands of waiting at the hospital for hours to see a doctor has been lifted thanks to the digital healthcare apps, which allow patients to schedule appointments using the apps.

We have a plethora of apps for booking appointments and consulting doctors online, but only a limited tools for hospital bed management. As a result, Hospital Bed Management System is assisting hospitals in building a Hospital Bed Management System to ensure a smooth flow of patient’s input and outflow.

The Hospital Bed Management System is a method that keeps track of all available beds as well as those that are occupied in real time to prepare for the most efficient utilization of beds. It saves time for workers and management by counting and recording the number of beds available.

This application aid in reduce the amount of time patients must wait during an emergency. Many times, patients face severe problem while obtaining the bed in an emergency case. By implementing this application hospital staff will acquaint with prior knowledge of total beds available in the hospital and how many are occupied by the patients. Thereby, with in a less amount of time, staff can allocate bed to the patient in an emergency case.

This application assists in reducing the time it takes for patients who need surgery right now. The most challenging task to the hospital staff is the make bed available promptly after the surgery. Through this application their work will ease. The application is helpful in eliminating the cost of medications traveling to vacant beds, thus it lowers the pharmaceutical costs. As staff already aware of vacant beds, patient will not require to travel from one bed to the other. With the hospital bed management system, staff will be able to better patient transfer and pre-planning which culminates in an increased coordination. In this manner hospitals will be capable to provide more refined services to the patients, eventually it will lead to the drastic increment in revenue generation.

With the advent of covid era, allocating the bed in an emergency is the most challenging task for the hospital staff as sudden rise in covid patients causes havoc in hospital while allocating bed due to the flurry of requests. The hospital bed management system can cope with this difficult situation and smooth the operation of allocating beds to the patients.

**2.2 Statement of Preliminary Scope**

**2.2.1 Description of Data in use by System Study**

Text, graphical output, and a knowledgebase are all part of the existing system.

The following information will be recorded, transcribed, monitored, progress evaluated, and archived.

• Patient information will contain the participant's full name, address, phone number, and date of birth.

• Medical history of major medical and pre-existing conditions is included in the patient's medical information. Surgical procedures, as well as diagnoses such as diabetes, obesity, cholesterol, and nicotine addiction, are examples.

• Total available beds in the hospital with following departments –

1. Total available beds in intensive care unit.
2. Total available beds in neonatal intensive care unit.
3. Total available beds in emergency ward.
4. Total available beds in regular ward.
5. Total available beds in deluxe ward.
6. Total available beds in premium deluxe wards.
7. Total available beds in covid ward.

• Total Allocation of beds in the hospital with following departments –

1. Total allocation of beds in intensive care unit.
2. Total allocation of beds in neonatal intensive care unit.
3. Total allocation of beds in emergency ward.
4. Total allocation of beds in regular ward.
5. Total allocation of beds in deluxe ward.
6. Total allocation of beds in premium deluxe wards.
7. Total allocation of beds in covid ward.

• Patient’s duration in the hospital which include day and time of entry and discharge date and time with total duration of stay in the hospital.

• Patient’s regular follow up by the doctor and assessment of the patient’s health is the mandatory part to determine duration of the patient’s stay in the hospital.

• Follow-up At intervals of one week, one month, three months, and six months, every active participant will be scheduled to return for evaluation. Per participant, a total of four follow-ups will be arranged.

• The name of the referring physician as well as the hospital affiliation will be included in the referral information.

**2.2.2 Business Processes**

At the most basic level of hospital management, the hospital bed management system is a fusion and integration of multiple systems that perform and complete distinct operations. EHR (electronic health records), ADT (admission, discharge, and transfer system), EDIS (emergency department information system), and BMS (building management system) are among the systems (bed management system).

The EHR (electronic health records) possess patient’s heart rate, electro diagram i.e., ECG report, surgery report, in the most recent cases covid rapid test report and RTPCR report.

The ADT (admission, discharge, and transfer system) is based on the electronic health records. Whatever data generated from the electronic health record is the determined factor for the prediction of patient’s duration of stay in the hospital. Through this data, hospital staff could manage the bed allocation and bed vacation for the patients.

The ADT portal is critical for hospital bed management since emergency and unintentional catastrophes account for 80% of the times when the hospital runs out of resources. During this situation, it is critical to predict and analyze real-time data as well as monitor hospital activities. The emergency data information system is linked to electronic patient records, providing clinical and hospital management with useful information in the event of an emergency. The information offered aids in patient care and operations, as well as efficient treatment for a better cure, inventory shortage notifications, and a focus on boosting hospital revenues.

Using the technologies and their valuable insights, a flowchart of hospital operations may be created to improve the current bed management system. The improved hospital data aids in better operations while dealing with accidents and emergencies, medical evaluation cases, and patients transferred from other hospitals for better care.

**2.2.3 System Interface with Users, Locations, and Other Systems**

**Interface with Users**:

This program is a web-based intranet system that is deployed using a web browser. Medical Clinicians (Nurses) and hospital staff and Doctors are the main users of this system. They can do the following tasks:

1. Enroll Patients in Treatment Programs: Medical Clinicians will be able to enroll patients in the treatment programs for emergency situation, accidents, covid detection, and surgery.
2. Notification to staff and management: As soon as the bed becomes empty or occupied, an automated message should be issued to the personnel and management, allowing them to organize their operations accordingly.

Because the bed manager cannot always record the number of beds available and beds occupied due to the large number of beds in the hospital, the Hospital Bed Management System must be built, which automatically records all of the details and notifies the staff.

1. Offline mode: The adoption of Offline mode in the Healthcare system and HBMS has resulted from technological advancements in Hospital Bed Management software (HBMS). This can aid in the support and empowerment of healthcare facilities in remote places. When there is no internet connection, data on the patient will be captured and saved locally, and then updated in the database system when the network is available.
2. Separate Color Code: One of the most important components of a Hospital Bed Management System is the use of distinct colors to distinguish between occupied and vacant beds. With the use of these color codes, management will be able to quickly identify available beds and allocate those beds to future patients.
3. Tracking: It's critical to keep track of the patient's activities from the moment he's hospitalized. Not only must the Hospital Bed Management service allocate beds, but it must also keep track of the patient's medical information from the moment he arrives until he is discharged. The system must keep track of all of the patient's details for future reference.

**Interface with Locations**:

This application is web-based which can access using intranet system. It is accessible to PC and tablets. The use of bootstrap while designing the application is useful for making the web base application interactive. Through boot strap design, the application can access using PC or desktop as well as using tablets and mobile phones. The User interface will adjust the screen accordingly. To provide the security to the confidential data, system is needed to access from local server only.

**Interface with Other Systems**:

To deploy the program, the application will interact with the user's preferred web browser. Additionally, the system will connect to SQL Server to query data for the application. Personal, medical, follow-up, and referral information will be included in the data.

**2.3 Assess Project Worth in Terms of Cost vs. Value**

**2.4 Preliminary Project Plan**

**2.4.1 Master Schedule for Entire Project**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Task Name** | **Duration** | **Start** | **Finish** | **% Complete** |
| 1 | **Introduction** | **1 Day** |  |  |  |
| 2 | Cover or Title page | 1 day | 01/11/2023 | 01/12/2022 | 1.43% |
| 3 | **Preliminary Investigation Phase** | **4 Days** |  |  |  |
| 4 | Summary of problems, opportunities, and directives | 1 day | 02/06022 | 02/07/2022 | 2.86% |
| 5 | Statement of preliminary scope | 1 day | 02/22/2022 | 02/22/2022 | 4.29% |
| 6 | Assess project worth in terms of Cost vs. Value |  |  |  | 5.71% |
| 7 | Preliminary Project Plan | 1 day | 02/27/2022 | 04/27/2022 | 7.14% |
| 8 | **Problem Analysis Phase** |  |  |  |  |
| 9 | Study The problem domain |  |  |  |  |
| 10 | Analyze problems and opportunities |  |  |  |  |
| 11 | Establish System Improvement Objectives |  |  |  |  |
| 12 | Re-evaluate and update project scope |  |  |  |  |
| 13 | **Requirements Analysis Phase** |  |  |  |  |
| 14 | Identify Requirements |  |  |  |  |
| 15 | Analyze functional requirements using system modeling approach |  |  |  |  |
| 16 | Master list of all requirements |  |  |  |  |
| 17 | Re-evaluate and update project scope |  |  |  |  |
| 18 | **Decision Analysis Phase** |  |  |  |  |
| 19 | Identify candidate solutions |  |  |  |  |
| 20 | Analyze candidate solutions |  |  |  |  |
| 21 | Compare candidate solutions |  |  |  |  |
| 22 | Recommend a final "best" solution |  |  |  |  |
| 23 | **Design Phase** |  |  |  |  |
| 24 | Design the application architecture |  |  |  |  |
| 25 | Construct detailed models |  |  |  |  |
| 26 | Design the system database |  |  |  |  |
| 27 | Design the system interface for each model |  |  |  |  |
| 28 | Design the system database |  |  |  |  |
| 29 | Design the system interface for each model |  |  |  |  |