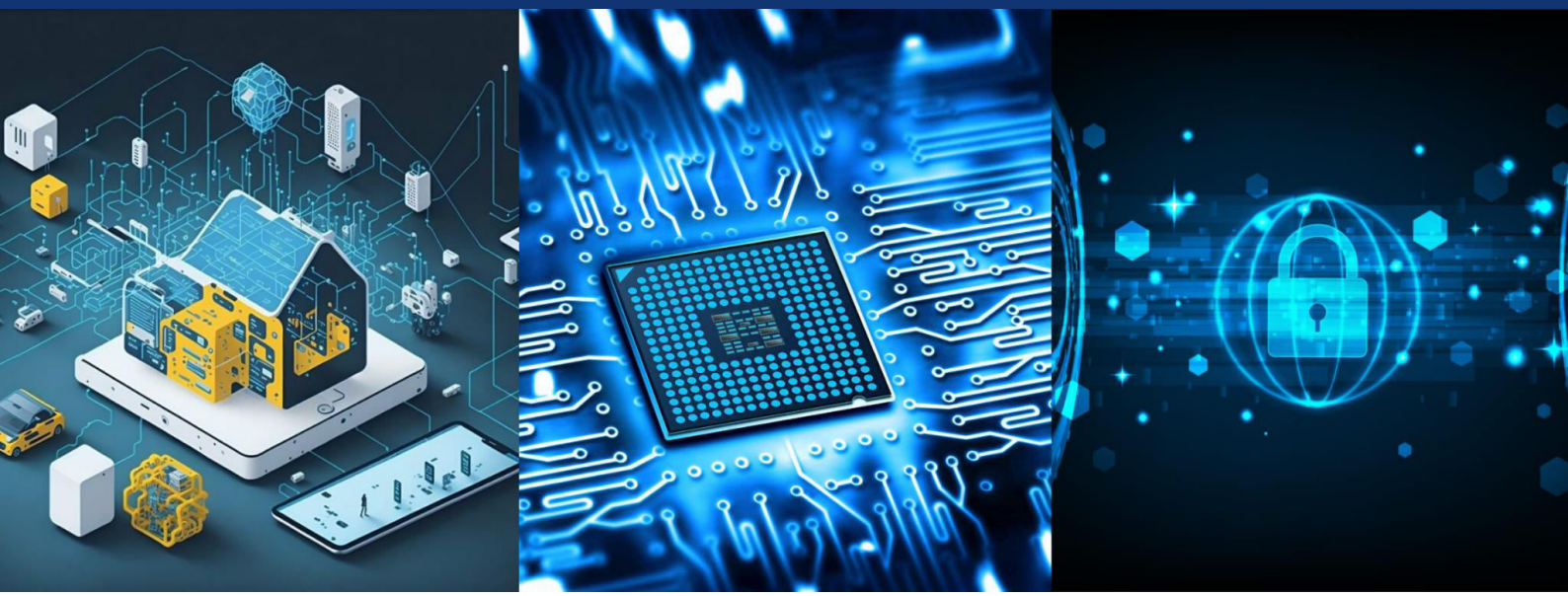
IJIRCCE

ISSN(O): 2320-9801

ISSN(P): 2320-9798



International Journal of Innovative Research in Computer and Communication Engineering

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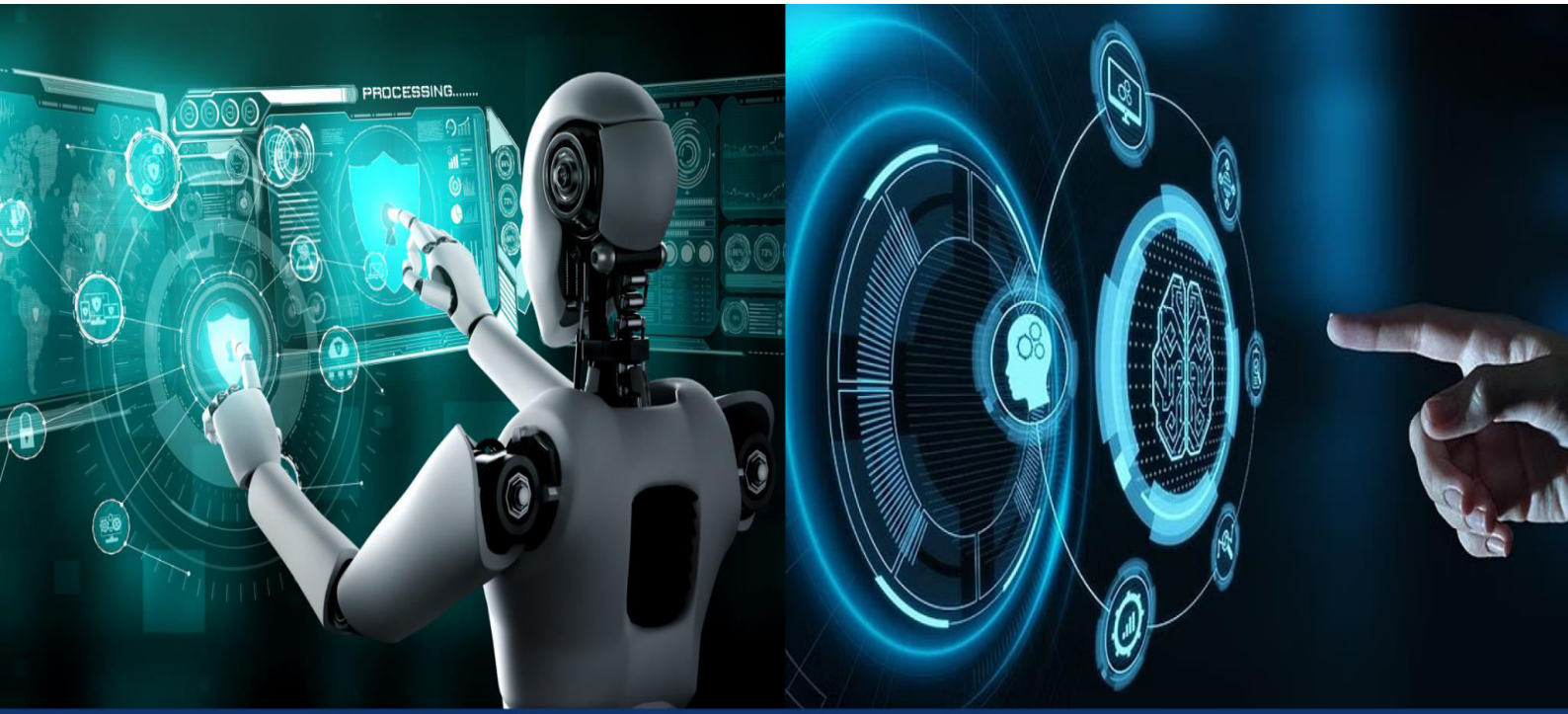

Impact Factor: 8.625

Volume 13, Issue 1, January 2025

© 2025 IJIRCCE | Volume 13, Issue 1, January 2025| DOI: 10.15680/IJIRCCE.2025.1301092

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Hospital Finder

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ABSTRACT: The lack of hospital beds and a lack of trained medical professionals, such as doctors and nurses, are the main causes of tertiary hospitals' frequent problems with overcrowding and understaffing. These restrictions make it more difficult for them to handle an increasing number of patients, especially in times of medical emergency. These problems have been brought to light by the global COVID-19 epidemic, since countries are finding it difficult to supply the growing demand for medical resources. The issue is made worse by emergency situations, since patients require prompt medical care and effective transportation to appropriate medical facilities. Although the demand for ambulances has increased due to the growth in patient numbers, people still have a difficult time finding the closest hospital or ambulance. In order to assess the effects of hospital bed shortages during emergency epidemics, this study suggests a piecewise smooth model. The system uses Google Maps APIs to map the best routes from the user's current position and uses GPS technologies to find the closest hospitals. The app also offers up-to-date information on hospital infrastructure, such as the availability of beds, specialists, and other vital resources. For smooth service delivery, the system uses PHP and SQL databases and was constructed with a client-server architecture. By integrating this system with ambulance services, operational efficiency can be improved and patients can obtain emergency medical care in a timely manner.

KEYWORDS*:* Real-time resource management, ambulance services, Google Maps APIs, emergency healthcare, and hospital bed availability.

I. INTRODUCTION

1.1 Study Background

Capacity planning, another name for hospital bed occupancy predictions and optimization, has emerged as a crucial area of concentration in the healthcare industry. In order to meet the rising demand for medical services, the objective is to increase production and operational efficiency. Lack of beds is a major problem for many urban hospitals, especially in cities with high population densities. To anticipate bed availability and maximize patient placement, these problems call for a proactive strategy. Accurate bed occupancy forecasting, particularly for the next 72 hours, offers useful information to expedite the provision of healthcare in emergency situations.

1.2 Problem Description

Patients frequently find it difficult to obtain vital information regarding hospital bed availability and necessary medical supplies in emergency situations. Patients and healthcare professionals have difficulties when there is no efficient system in place for receiving real-time updates about hospital infrastructure. To close this gap, a client-server application is necessary, which makes it possible to quickly identify resources that are available and give people in need help.

1.3 The purpose and goal of the research

The development of a web-based system for hospital location and bed availability detection in emergency scenarios is the main goal of this project. The following goals are accomplished by the system in order to deliver the best possible services:

a) Create a user-friendly application that gives users access to thorough information on hospital facilities and medical specialists' availability.

b) Use Google Maps APIs to find and plot the best routes to local hospitals.

c) Lower emergency death rates by using the program to guarantee prompt access to hospitals with beds and specialists available.

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1.4 Study Scope

The goal of this project is to provide a novel, user-friendly method for locating hospitals in emergency and pandemic situations. In order to efficiently filter and show results, the system gives priority to infrastructure, healthcare requirements, and short travel distances. It determines the distance from the user's position and finds hospitals in the area by utilizing Google Maps APIs. Additionally, the app offers thorough hospital profiles with specialized contact details, allowing users to effectively schedule same-day consultations. Future improvements might include enabling online appointment scheduling and building a real-time network of on-call specialists, which would save patients a significant amount of time. The system's usefulness would also be increased by linking it with ambulance services, which would enable quick reactions to mishaps and other crises.

1.5 Study Limitations

For the suggested system to work as best it can, a steady internet connection is essential. The system provides navigation routes and uses GPS to find the nearest hospitals using Google Maps APIs. However, the application's functionality can be severely hampered by inadequate internet connectivity, leading to erroneous or delayed findings..

II. RELATED WORKS

Accurate planning for hospital bed occupancy has been essential to efficiently managing healthcare resources during epidemics like the COVID-19 pandemic. For instance, the Ghent University Hospital COVID-19 taskforce created a planning tool that tracked patient moves between wards, discharge, or death using a multistate model and daily admissions using a Poisson model. This tool simulated the best- and worst-case scenarios for different ward types, including intensive care units, and gave ten-day estimates for bed requirements. By depending on consistent data patterns, the models showed excellent accuracy in short-term forecasts, facilitating effective resource allocation and planning. Furthermore, because code snippets and setup instructions were supplied to apply the tool to various datasets, the methodology demonstrated adaptability for other hospitals. The difficulties of predicting hospital bed availability have been addressed outside of the COVID-19 environment using simulation models and artificial neural networks. These models replicate different patient demographics, non-stationary patient arrivals, and variable periods of stay. For instance, to replicate actual hospital dynamics, two different arrival timetables were included: one for elective patients and another for emergency cases. In order to ensure that the models appropriately reflected normal hospital settings, expert discussions were used to inform the arrival patterns as actual hourly arrival data were not available. Predicting bed availability within a 72-hour timeframe has been the main objective of these forecasting technologies, which provide useful information to enhance healthcare operations, particularly in emergency situations. These developments highlight how predictive modeling can improve hospital responsiveness and efficiency in emergency situations.

III. PROPOSED APPROACH

The goal of the proposed system is to give patients a location-based, automated way to locate hospitals in their area in case of an emergency. In order to estimate hospital bed occupancy and necessary supplies, this system will incorporate computer forecasting simulations and the Google Maps API for location services. It is intended to guarantee that, in accordance with their immediate needs, patients can obtain the most pertinent hospital information.

Integration of the Google Maps API

First, based on the patient's present location, the system will use the Google Maps API to find hospitals in the area when the patient searches for one. In order to guarantee that patients can get to the closest medical institution as soon as feasible, the system will also utilize the Distance Matrix API to determine the lowest travel distance to hospitals. The system will

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offer substitute possibilities that satisfy the patient's requirements, such as available beds, departments, and necessary supplies, in the event that the nearest hospital is fully booked.

To make it simple for people to locate the hospital that provides the care they require, the hospital listings will be arranged according to departments, medical services, and accessible resources. Additionally, the device will employ GPS navigation to lead the user to the hospital, giving them turn-by-turn directions and real-time traffic updates.

In order for customers to use additional services like saving their favorite hospitals, tracking their search history, and getting alerts about hospital availability in their area, they will need to register for an account. Both patients and administrators will have access to the program, which allows administrators to enter and manage hospital data such as departments, services, bed occupancy, and medical supply availability.

Hospital Bed Availability Forecasting Using Computer Simulation

The proposed system will employ computer modeling for forecasting in addition to location-based services. Based on past data, emergency admissions, and other variables, the simulation model will monitor hospital bed utilization and forecast occupancy trends. The system can give consumers the most recent information on bed availability within the next 72 hours by utilizing this predictive model. This would lessen the stress and uncertainty that individuals experience while attempting to locate accessible medical options in an emergency.

The simulation will forecast hospital bed availability by analyzing the effects of emergency admissions and occupancy rates. Patients will have access to more precise information thanks to this predictive feature, which will help them choose a hospital quickly.

Combining Forecasting with Location-Based Services

A complete solution for emergency hospital searches will be provided by combining real-time position monitoring via Google Maps with computer simulation to predict hospital bed availability. In addition to providing timely and accurate hospital information based on proximity, the system will guarantee that patients have access to the most up-to-date and dependable information on available resources and bed occupancy.

The goal of the suggested approach is to make it easier for patients to locate hospitals in their area and guarantee that they may obtain the most pertinent information in a timely and effective manner. These cutting-edge technologies working together will enhance the hospital search experience and help with prompt decision-making in medical situations.

IV. CONCLUSION

The suggested application aims to give people a dependable and effective way to find hospitals with beds and necessary supplies, especially in times of emergency. The purpose of this software is to improve the responsiveness and accessibility of healthcare services by integrating cutting-edge location-based technology, such as GPS tracking. The program enables real-time tracking of ambulance positions by equipping them with GPS trackers, guaranteeing that the patient receives fast medical attention from the closest ambulance. This feature is essential for increasing the overall effectiveness of emergency medical services and saving crucial time during crises.

Through its user-friendly layout, the app assists users in finding hospitals in their area that meet their unique needs, including departments, facilities, and resources. To ensure people make well-informed judgments, users can examine comprehensive hospital profiles that include departmental capacity, specialist medical services, and bed availability. In order to help patients get to the chosen hospital as soon as possible, the app integrates GPS and Google Maps APIs to provide optimized routes, estimated trip times, and real-time traffic updates.

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