

Using Data Mining to Predict Hospital Admissions from the Emergency Department

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ABSTRACT

To help healthcare managers, data holders, and data analyzers by making hospital admission management more effective and data-driven, a web-based system called "Using Data Mining to Predict Hospital Admissions from the Emergency Department" was created. It ensures that only authorized and authenticated users can access system functionalities by offering secure login and registration options. Data Analyzers can access datasets to do analysis and produce admission predictions, while Data Holders can enter, update, and manage patient emergency information using an easy-to-use interface. Healthcare servers are capable of monitoring hospital data, reviewing prediction results, and

assisting with operational decision-making.

The solution incorporates a centralized database using MySQL to guarantee the safe and scalable storage of private medical data. The Data Analyzer dashboard allows

for the visualization and study of prediction results, while the Data Holder dashboard makes patient data maintenance easier. Administrators have the option to create reports, keep an eye on system activities generally, and guarantee the prediction process's dependability and openness.

Keywords: *safe login, user authentication, data mining, web-based application, and hospital admission prediction.*

INTRODUCTION

In contemporary healthcare facilities, particularly big hospitals and emergency rooms, the management of patient flow and hospital admissions directly affects patient safety, quality of service, reputation, and operational effectiveness. When patients come to the emergency room for care, it is critical that admission choices are precise, prompt, and data-driven. Nonetheless, a lot of hospitals continue to use antiquated techniques such fragmented data sources, simple record systems, and manual clinical judgement. These methods frequently result in delayed admission decisions, ineffective use of resources, overcrowding in emergency rooms, and decreased openness in patient treatment, all of which have an impact on patient outcomes and healthcare staff performance.

LITERATURE REVIEW

The main goal of this literature review is to comprehend the evolution, benefits, and drawbacks of current hospital admission management and prediction systems—both

in scholarly research and actual healthcare practice. This paper highlights current methods, technologies, and research needs pertaining to emergency department admissions, patient flow management, and data-driven decision support in hospitals, providing the background information required to support the proposed Hospital Admission Prediction System.

RELATED WORK

This project supports emergency department operations with a hospital admission prediction system, which is very helpful for clinical analysts, data holders, and healthcare administrators. The project's primary goal is to guarantee that crucial admission-related data is handled effectively and that no patient is impacted by decision-making delays. The technology assists hospitals in anticipating admission requirements early on by utilizing data mining and machine learning approaches.

EXISTING METHOD

To handle patient admissions in the present system, the majority of hospitals and emergency rooms rely on conventional and semi-manual methods such as paper records, simple hospital information systems, spreadsheets, and verbal departmental communication. Despite supporting basic patient tracking, these approaches have a number of serious drawbacks. It is challenging to manage bed availability, staffing, and resource consumption because there is no intelligent or predictive technique to estimate hospital admissions in advance. Patient data is frequently dispersed across several systems, which causes delays in data analysis and access.

PROPOSED METHOD

The suggested Hospital Admission Prediction System is a web-based program created with contemporary technologies like MySQL for data administration and Java (JSP) for the backend. Data holders can see past admission records, register and manage patient-related data, and provide real-time emergency department information using the

system's centralised portal. Additionally, the platform enables data analysts and healthcare servers to process gathered data, use data mining techniques, forecast patient admission probabilities, and track hospital admission trends. Throughout the hospital admission management process, the system guarantees efficiency, accuracy, transparency, and better decision-making.

ARCHITECTURE

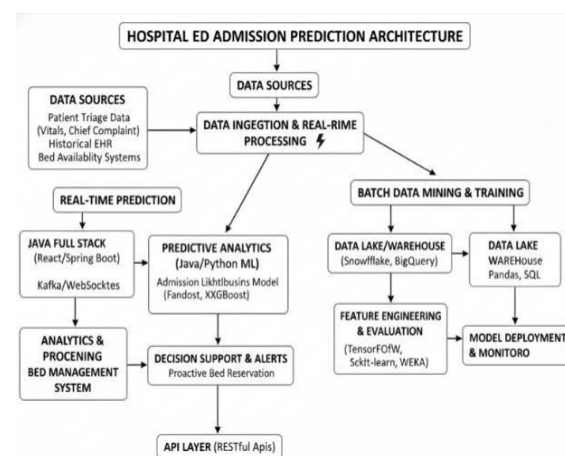


Fig1: System architecture of the Hospital Admissions from the Emergency Department

METHODOLOGY DESCRIPTION

Discovery and Requirements Gathering:

During this phase, detailed discussions and interviews were conducted with stakeholders such as hospital administrators, doctors, and data analysts to clearly define the project scope. Key objectives were identified, including predicting hospital admissions from emergency department data and reducing overcrowding.

System Design and Architecture:

Here, we In this stage, the overall system architecture was designed. This included defining the database schema using MySQL, data flow between modules, and selecting an appropriate technology stack based on Java full-stack development. stack, and designing detailed UI/UX wireframes and mockups for the dashboard.

Agile Development and Implementation:

The system was developed using an Agile approach, dividing the work into small, iterative development cycles. Backend modules were implemented using Java technologies to handle data input, processing, and prediction logic.

Testing and Quality Assurance:

Comprehensive testing was carried out to ensure system reliability and correctness. Unit testing validated individual modules, integration testing ensured smooth interaction between components, and system testing verified end-to-end workflows.

Deployment:

After successful testing, the application was deployed on the server environment. The MySQL database was configured, application files were hosted, and necessary configurations were completed. Existing sample data was migrated, and basic training was provided to users to ensure smooth adoption of the system.

Post-Launch Monitoring and

Maintenance: Post-Launch Monitoring and Maintenance ensures the system remains stable and reliable after deployment. System performance and user activities are continuously monitored, and user feedback is used to improve functionality.

RESULTS AND DISCUSSION

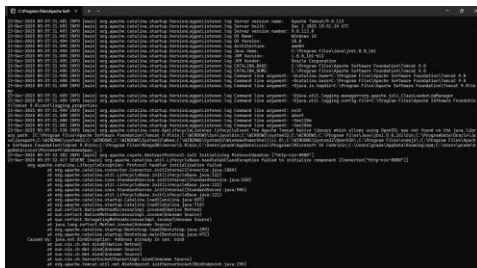


Fig 2: Power shell to run the application



Fig 3: Home Page

The home page of the Hospital Admissions from the Emergency Department



Fig 4: Data Holder Dashboard

The Data Holder dashboard provides a clear view of available healthcare data records and system resources along with healthcare

department.



Fig 5: Healthcare Server Dashboard

The Healthcare Server Dashboard allows authorized healthcare servers to manage patient admission data.



Fig 6: Emergency Dashboard

The Data Holder dashboard provides a clear view of available healthcare data records.



Fig: Data Analyzer Dashboard

The Data Analyzer dashboard provides a clear view of analyzing healthcare data records.

CONCLUSION AND FUTURE ENHANCEMENT

The Hospital Admission Prediction System has successfully achieved its objectives by improving the efficiency of managing emergency department admissions, enhancing coordination among data holders, healthcare servers, and administrators, and supporting timely, data-driven decision-making.

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