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AIRLINE RESERVATION SYSTEM

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Abstract

The web-based Airline Reservation System functionally supports airline booking and scheduling management through an automated system. The system development uses HTML, CSS, JavaScript for the front end while PHP with MySQL operates as the back end foundation that supports reservation management and flight inventory tracking and fare assessment. The system handles ticket-less transactions and protects secure credit card payments through TCP/IP network communication for intranet and internet operations. Each account owner has their personal SINE code to access the system while an individual's security profile determines their system permissions based on assigned roles. The system enables users to select flights within specified date ranges while showing different seat classes and fares and enables quick booking directly from availability and detailed manual reservations. This solution utilizes open architecture design to provide scalability and adaptability and enables integration with additional business systems which makes it an excellent solution for airline industry modern needs.

Keywords— Airline Reservation, Flight Booking, Ticket-less System, PHP MySQL, Web-based Application

INTRODUCTION

The Airline Reservation System functions as a digital program designed to automate and modernize complete airline booking operations. Manual systems operate inefficiently toward passenger management because they result in frequent mistakes alongside delays and reduced operational efficiency when dealing with high volumes of passengers. The rise of international travel and client requests for simple operations has made it crucial for airlines to develop efficient endpoint systems. The system provides its users complete booking support from flight search to reservation confirmation and secure payment handling. The system enables travel arrangements through ticket-less operations which provides customers with both fast and sustainable service. Online accessibility through internet connections provides users with round-the-clock worldwide service while doing away with both online travel agencies and in-person reservation requirements. Priceless E-Flight maintains its interactive interface through a frontend development of HTML, CSS and JavaScript alongside PHP and MySQL as back end elements. Passenger information together with flight data and transaction details are stored safely in a database which allows for quick data retrieval during booking processing. Secure login with SINE codes creates a dual authentication system for users to verify their identity and prevents unpermitted system entry. The system provides management features for various service categories together with price variations and complex scheduling capabilities based on flight availability during chosen date periods. Users can perform bookings through assisted or direct methods allowing them to choose scheduling procedures at their comfort level. Staff members have the flexibility to make fast reservations or handle complete bookings according to the customer's requirements. The system exhibits scalability because it possesses an open-framework design standard alongside modular architecture. New features and third-party system connections such as CRM, ERP and airline alliances can seamlessly integrate into the existing operations without disruption. The system's approach allows it to adapt to business requirements as well as technological progress. The Airline Reservation System achieves threefold improvements in flight booking efficiency and accuracy and accessibility benefits for customers. Airline operations receive dual advantages through this system because it provides operational management tools for airlines in combination with secure and easy-to-use travel planning functions benefiting customers.

LITERATURE SURVEY

[1] Airlines perform better through the unification of identity systems with microservices and cloud computing technology. While ensuring superior scalability along with performance these three approaches face important obstacles such as privacy concerns and interconnectivity issues and total expenditure difficulties. The review presents future outlooks that encourage the industry growth through reinforcement learning systems as well as hybrid cloud solutions.

[2] The airline industry faces escalated challenges after the pandemic which requires new safe solutions. A Java-based airline reservation system which combines blockchain features serves to protect data security and boost operational efficiency as well as user experience. The system delivers complete stability with its functions for demand price prediction together with customer behavior analysis through a reliable framework that benefits all stakeholders and users.

[3] A comprehensive research gives details about a reservation platform built with AI capabilities and microservice principles for scalability and real-time processing. The combination of ASP.NET with SQL Server and TensorFlow and PyTorch systems enables smooth data administration and interactive features with both fraud protection and automated flight recommendation capabilities. The proposed system demonstrates superior performance through simulation tests which establish its better capability in scaling operations while delivering enhanced reliability and improved user satisfaction.

The research presents a contemporary airline reservation system that combines microservices along with AI-based personalization to provide up-to-date information and enhanced user experience as documented in [4]. The services optimize through TensorFlow and PyTorch frameworks while ASP.NET together with SQL Server support front-end dynamism and data persistence for optimized operations like fraud detection and flight recommendations. Simulation data demonstrates that the new system provides better scalability together with fault tolerance and response time enhancement over standard airline operation systems. This indicates its readiness for next-generation aviation procedures.

METHODOLOGY

The Airline Reservation System development utilizes a modular structure with front-end and back-end components which achieves integrated user interfaces alongside protected data storage methods. The system utilizes HTML and CSS and JavaScript to build an interface that enables searches and availability views and bookkeeping for flight reservations. The backend utilizes PHP for handling server operations and MySQL operates as the data storage and management system through its relational database infrastructure to maintain flight details and passenger records and booking information and payment data. This system uses an open platform architecture for building scalability while enabling integration with other external services.

Users and agents can securely log into the system using a SINE code for authorization purposes as each user possesses a unique identification that tracks and evaluates transactions with pre-assigned access permissions. Users can utilize the booking module to pick flights within specified dates along with visibility into available seats in multiple classes before confirming reservations whether complete flight information is provided or not. .absolute security measures protect payment processing of credit cards and the system enables environmentally friendly ticket-less traveling while operating efficiently/. The booking system uses TCP/IP protocols to connect modules and external systems and ensures network operations on both intranet and internet setups.

The system incorporates data validity tests which operate simultaneously across server-side and client-side platforms for purposes of both data reliability and system integrity. The reservation process operates in real time to show present availability which helps avoid overbooking and creates correct seat bookings. The system stores transaction records related to agents' SINE codes to provide secure tracking as well as increased security. The security system supports role-based access control methods to provide each user type including administrators and travel agents along with customers with permissions to access necessary system functions. The defined approach brings together an interface that accommodates users efficiently and defends the system while keeping it highly flexible for airline industry advancements.

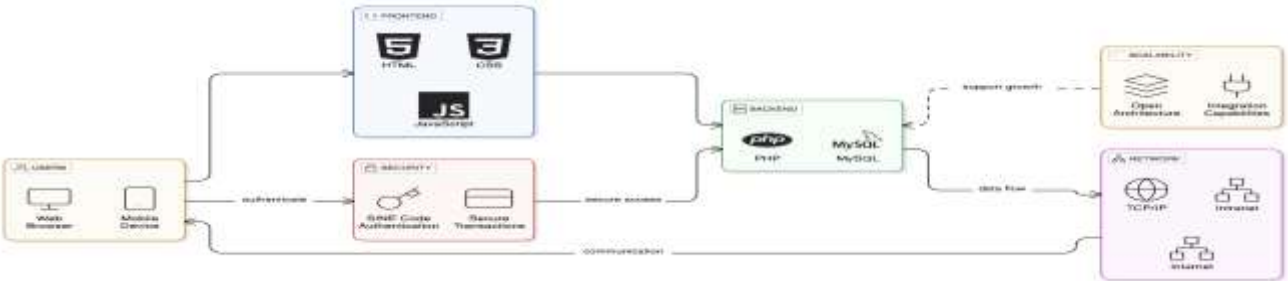

Fig.1. Architecture Diagram

Existing system

The airline reservation systems that currently exist show characteristics of monolithic design with booking payments, user management and flight status features tightly linked together. Such linked architectures make system updates extremely difficult because changes to any feature require modifications to the entire structure. These systems fail to deliver updates in real-time so they provide insufficient specialized features that ultimately results in diminished customer satisfaction. The management of security alongside data presents issues for operations involving substantial transaction volumes and numerous customer records.

Most present systems operate without incorporating AI technology along with blockchain which results in restricted capabilities to offer features such as smart pricing solutions and fraud monitoring and customized recommendation options. Microservice architecture absence leads systems to perform poorly when handling high traffic volumes and prevents them from tolerating application failures effectively. Users who lack real-time API integrations receive late updates on flights together with delayed notices. The present system reveals the industry's requirement for contemporary secure and scalable reservation solutions in airline services.

V. PROPOSED SYSTEM

A new automated airline booking management system exists as a proposal to operate under a centralized hub. The system achieves three benefits when it moves from manual operations to digital operations: it reduces human mistakes while cutting operational wait times and improving overall customer satisfaction. Through an internet browser users gain complete access to view flight schedules and check seat availability and perform bookings without any spatial limitations. The ticket-less booking process enhances both user convenience and sustainability by eliminating paper usage during operations. The platform presents an interface that works as users interact with it in a clear and adaptable way which provides an easy experience regardless of their technical abilities.

The proposed system introduces SINE codes to integrate between agents and users for tracking all secure digital transactions. Agents benefit from the SINE code functionality because it enables role-based access which prevents them from seeing any booking data outside their assigned agency responsibilities. Users can search flights across distinct date periods and view multiple travel classes before comparing rates and picking optimal solutions available through the system. There are two booking options available for customers to choose from: direct sale reservations involving known flight information or availability search based on customer preferences.

The constructed system implements an open framework which enables straightforward application between airline management tools together with customer relationship management (CRM) systems and enterprise resource planning (ERP) software and third-party application programming interfaces (APIs). The system's flexibility enables modification and expansion while maintaining scalability through future features like mobile support together with automated alerts and enhanced analysis capabilities. The proposed Airline Reservation System brings together powerful core features and secure extensive scaling capabilities to address all critical requirements of contemporary airlines.

IMPLEMENTATION

Front-End Design

Html, CSS, JavaScript is used to develop the front end of the Airline Reservation System which turns out to be a responsive and user friendly interface. HTML defines the content and the layout of the web pages, CSS gives the styles and the responsive design to place the content as per the size of the screen. Client side interactivity could be implemented using JavaScript and it works on the form validations, dynamic content loading and smooth transitions. With modules for flight search, booking, user login, confirmation, and details of ticket, user interface is easy to use and easy to navigate for users and agents.

Back-End Development

Using PHP, the back end of the system is implemented that handles the server side logic and processes client requests. Management of user authentication, the process of reservations, transactional storage of payment, flight inventory maintenance, and the issuance of confirmation emails are all the responsibility of PHP scripts. To keep user sessions secure, sessions and cookies are used. A SINE code is linked with each action taken by a user or agent to track the transaction and ensure security. The admin, agent, and customer functionalities are role based access controlled to grant data privacy and control.

Database Design

In this case, the relational database used in the system is MySQL which is used to store and manage data in an efficient manner. The schema of the database has multiple tables related to each other associated with Users, Flights, Bookings, Payments, and Agents. Normalisation of each table is done to decrease the redundancy and avoid data integrity issues. It uses relationships between records and maintains relationships between records such as primary and foreign keys. In fact, each booking entry is tied to a particular flight and user via unique identifiers. Real time queries are performed on MySQL, retrieving and updating data, and making it possible to dynamically interact with the data such as querying the database to check availability, confirm reservations, and view flight information at the time.

Reservation and Booking Module

This is the core module that gives the ability to search flights within a selected date range, see available seating classes and make bookings. It allows the user to enter flight details for direct booking and provides the search based on the real time availability as a booking. The system then selects a flight, runs through available seats in the flight to determine which seats are available, calculates the fare using the class and distance and then goes to the payment gateway. When paid successfully, booking is confirmed and stored on the database. User is received an e-ticket without paper ticket generation and a unique booking ID is generated.

Security and Authentication

Login credentials and SINE codes for each user and an agent are used to secure access and to ensure integrity of transaction. In the database, passwords are stored in an encrypted format. Different types of agents are assigned different levels of access so they can view and modify records in the scope only. It supports the secure data transfer between intranet and internet environments through all communications using TCP/IP protocol. To prevent unauthorized access, input validations and session timeouts are implemented to ensure existence of authorized source of inputs and prevent session timeout.

Integration and Scalability

The architecture is left open, precisely for the system to be highly adaptable and scalable. It can be integrated into mobile apps, hotel and travel insurance booking third party API, airline alliance, customer loyalty programs, etc. for future enhancements. The modular design permits all the components to be upgraded or replaced without influencing the system functionality as a whole. The system, thanks to this flexibility, is future proof to any changes that the airline industry undergoes across.

Fig.2. Block Diagram

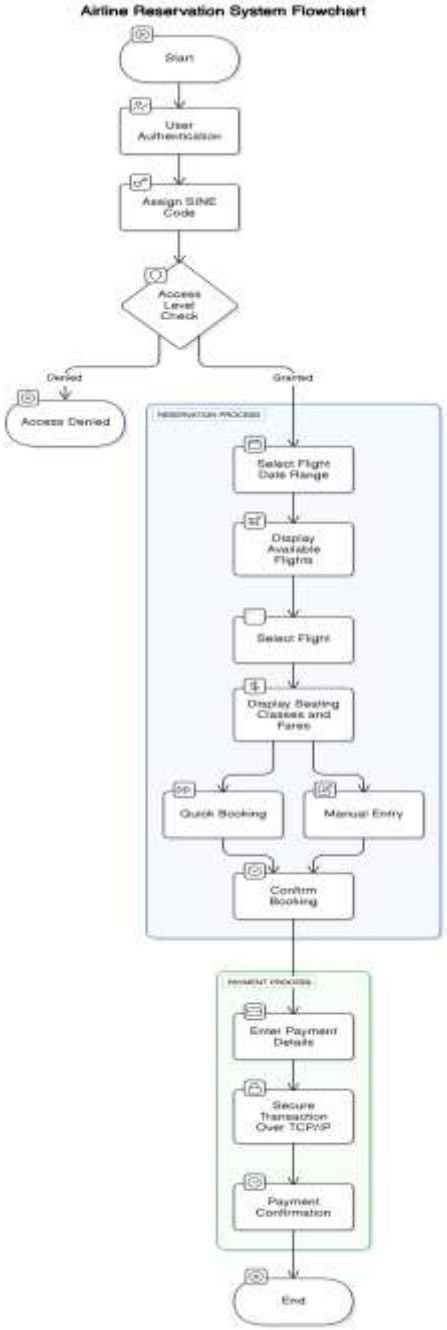

Fig.3. Workflow Diagram

RESULT

The implemented Airline Reservation system has produced a powerful and safe solution to significantly facilitate the procedure of flight booking. With a responsive front end and a solid PHP-MySQL back end in place, little user search, selection, and reservation effort is required, plus there are real time inventory updates. SINE codes and role based access controls that supplemented the system have improved security and accountability of agents as well as end users, whereas the secure handling of credit card transactions over TCP/IP networks has improved users' trust and internal efficiency. Moreover, the operation of the system without tickets and its open architecture facilitates the scalability of the system, and the system is ready to act as a future ready tool for passenger handling in the airline industry that is evolving.

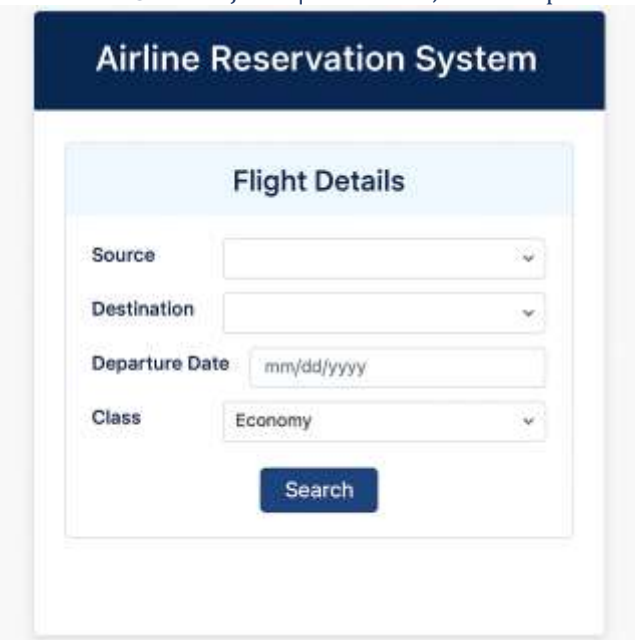

Fig. 4. Flight booking main page.

Fig. 5. Mental Health Assessment Web app

CONCLUSION AND FUTURE ENHANCEMENTS

It is able to successfully streamline and automate the booking of airline tickets, flight schedules as well as the calculation of fares. It is web based and has a great backend integration that provides users and agents with a comfortable, secure and efficient platform of managing reservations. The system allows for real time availability of flight, reduces manual intervention, minimizes errors and facilitates smooth transactions.

There is one thing that the project shows, and that is how the combination of front end technologies like HTML, CSS and JavaScript with the enormous force of the PHP MySQL system can be used. Through SINE codes, ticket-less operations and secure login mechanisms are incorporated, which makes the data safe and helps the environment. This architecture not only improves maintainability but enables other functionalities to be added incrementally, thus becoming a complete solution for the current airline business operations.

With future integrations like a mobile app for on the go booking, the third party hotel and cab booking, real time flight tracking and AI powered fare prediction systems, the system can be expanded further. Airline administrators can get help from advanced analytics dashboards to keep track of the customer trends and optimization of route planning. Since the system needs to be globally

competitive, it is also a good idea to implement some multi-language support and a chatbot assistance mechanism so that users can have easier access to the system.

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