

AeroFinder

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Group #11

Introduction and Description of the Work to Be Undertaken

The project aims to develop a web-based flight comparison platform that enables users to quickly and efficiently compare all possible flights from their current location to their desired destination. The platform will aggregate flight data from multiple airlines, allowing users to sort and filter results based on price, number of connections, airlines, and other relevant criteria. Additionally, the platform will incorporate a chatbot powered by OpenAI API to provide personalized destination recommendations based on user preferences. The goal is to simplify the flight booking process, save users time, and help them find the most cost-effective travel options.

The platform will consist of a user-friendly frontend built with HTML, CSS, and JavaScript, and a robust backend powered by PHP and MySQL. Flight data will be sourced from APIs such as Amadeus or Skyscanner, ensuring real-time and accurate information. The chatbot will leverage OpenAI's natural language processing capabilities to interact with users and provide tailored suggestions.

Statement of the Starting Point

The starting point for this project is the identification of the problem: travelers often struggle to find the best flight options due to the overwhelming amount of information available across multiple platforms. Existing flight comparison tools may lack comprehensive filtering options, real-time data, or personalized recommendations. This project will address these gaps by creating a centralized platform that combines real-time flight data, advanced filtering, and AI-driven recommendations.

The development team will begin by conducting market research to understand user needs and preferences. This will be followed by the design of the platform's architecture, including the frontend interface, backend database, and API integrations. The team will then proceed with iterative development, testing, and deployment.

Description of the Substance and Structure of the Project

Key Concepts

1. **Flight Aggregation:** The platform will aggregate flight data from multiple sources, ensuring users have access to a wide range of options.
2. **User-Centric Design:** The interface will prioritize ease of use, with intuitive search, filtering, and sorting functionalities.
3. **Personalization:** The chatbot will provide personalized destination recommendations based on user preferences such as budget, travel dates, and interests.
4. **Real-Time Data:** Integration with APIs like Amadeus or Skyscanner will ensure that flight information is accurate and up-to-date.

Major Work Items

1. **Frontend Development:**
 - Design and implement a responsive user interface using HTML, CSS, and JavaScript.
 - Create search forms, filters, and sorting options for flight results.
 - Develop a chatbot interface for destination recommendations.
2. **Backend Development:**
 - Set up a MySQL database to store user preferences, search history, and chatbot interactions.
 - Implement PHP scripts to handle user requests, process API data, and manage database interactions.
 - Integrate Amadeus or Skyscanner API for real-time flight data.
3. **Chatbot Development:**
 - Integrate OpenAI API to enable natural language processing for the chatbot.

- Train the chatbot to understand user preferences and provide relevant destination recommendations.

4. Testing and Optimization:

- Conduct usability testing to ensure the platform is intuitive and user-friendly.
- Optimize the platform for performance, ensuring fast load times and smooth interactions.

Relations and Relative Importance

- The frontend and backend are equally important, as they work together to deliver a seamless user experience.
- The chatbot is a key differentiator, adding value through personalization and enhancing user engagement.
- API integration is critical for ensuring the accuracy and reliability of flight data.

Data Structures and Algorithms

- **Data Structures:**
 - Flight data (e.g., airline, price, departure/arrival times, connections) will be stored in a structured format retrieved from APIs.
 - User preferences and chatbot interactions will be stored in a MySQL database.
- **Algorithms:**
 - Sorting algorithms will be used to organize flight results by price, duration, and other criteria.
 - The chatbot will use machine learning algorithms (via OpenAI API) to analyze user input and generate recommendations.

Criterion for Success

The success of the project will be determined by the following criteria:

1. **Functionality:** The platform must successfully aggregate and display flight data from multiple sources, with accurate filtering and sorting options.
2. **User Satisfaction:** Users should find the platform intuitive and helpful, as measured through feedback and usability testing.
3. **Performance:** The platform should load quickly and handle multiple user requests simultaneously without delays.
4. **Chatbot Effectiveness:** The chatbot should provide relevant and accurate destination recommendations, enhancing the user experience.
5. **Retention Rate:** The percentage of users that come back to the platform after their first visit

Plan of Work

Timetable

1. **Week 1-2:** Design frontend interface and backend architecture.
2. **Week 3-5:** Develop frontend components (search, filters, sorting, colour scheme for different themes i.e. dark mode, light mode, high contrast light, high contrast dark, etc.).
3. **Week 6-8:** Implement backend functionality (database setup, API integration).
4. **Week 9-10:** Develop and integrate the chatbot (training model for FAQs).
5. **Week 11:** Conduct testing and optimize performance (by using various sorting algorithms to see which ones perform best, as well as minimising load on user's computers).
6. **Week 12:** Launch the platform and gather user feedback.

Milestones

1. **Week 2:** Completion of frontend design.
2. **Week 8:** Successful API integration.
3. **Week 10:** Chatbot implementation.
4. **Week 12:** Platform launch.

Resource Requirements

Software

- **Frontend:** HTML, CSS, JavaScript.
- **Backend:** PHP, MySQL.
- **APIs:** Amadeus API // Skyscanner API, OpenAI API.
- **Development Tools:** Visual Studio Code, Git, Postman (for API testing).

Site Map

1. Homepage:

- Search bar for flight comparisons.
- Quick links to popular destinations.

2. Search Results Page:

- List of flights with sorting and filtering options.

3. User Profile Page:

- Saved preferences and search history.

4. About Us:

- Information about the platform and its features as well as who created it.
- Contact information

5. Suggestions:

- Form for user inquiries and feedback.

6. Chatbot:

- The chatbot bubble will be available in the bottom right of every page.

References

1. Amadeus API Documentation: <https://developers.amadeus.com/>
2. Skyscanner API Documentation:
<https://rapidapi.com/skyscanner/api/skyscanner-flight-search>
3. OpenAI API Documentation: <https://platform.openai.com/docs/>
4. PHP and MySQL Best Practices: <https://www.php.net/manual/en/>
5. Frontend Development Guides:
<https://developer.mozilla.org/en-US/docs/Web/Guide>
6. Postman Beginner Guides:
<https://www.youtube.com/watch?v=wEOLZq-7DYs>