



Vacation Planning Data analysis

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Project Group

Muhammed Salim
Rumina Choudhury
Iryna Usenko

Muhammedismael2121@gmail.com
Rumstar0423@yahoo.com
irene.usenko@gmail.com

SUPERVISED BY

Victoria Mellor

CLIENT'S DELEGATE FULL NAME

Laetitia Sterling

CLIENT'S DELEGATE EMAIL ADDRESS

Laetitia_Sterlin@uk.ibm.com

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Abstract

This project involves the creation of a Power BI dashboard for vacation planning for a big company client, developed by a team of three members. The project encompasses data collection, cleaning, transformation, and visualization to provide insights for vacation planning. We built a Power BI dashboard that includes key aspects of vacation planning data analysis.

Introduction

Vacation planning is an essential aspect of ensuring a stress-free and enjoyable travel experience. However, the complexity involved in planning vacations often leads to challenges in making informed decisions about destinations, accommodations, activities, and other logistical details. Recognizing these challenges, our project aims to develop a comprehensive and interactive Power BI dashboard that simplifies the vacation planning process for users.

This project was undertaken by a team of three members with diverse skills in data analysis, visualization, and web development. Our objective was to create a tool that provides users with valuable insights and personalized recommendations based on data-driven analysis. By integrating various data sources and applying advanced data processing techniques, we aimed to deliver a user-friendly solution that enhances the vacation planning experience.

The dashboard we developed offers a range of features, including real-time weather updates, a carbon footprint calculator, shopping and restaurant recommendations, and information on tourist attractions. These features are designed to provide users with comprehensive and relevant information to make informed decisions about their travel plans. The project not only focuses on data analysis and visualization but also emphasizes user experience and accessibility.

Methodology

Data Collection

Data was collected from multiple sources, including travel websites, weather APIs, and environmental databases. This ensured a wide range of relevant data for analysis. By sourcing data from diverse platforms, we aimed to provide a holistic view of vacation planning needs.

Data Cleaning

Data inconsistencies and missing values were addressed using Excel. Techniques such as conditional formatting and VLOOKUP were used to ensure data accuracy and consistency. This step was crucial to prepare the data for reliable analysis and visualization.

Data Transformation

Data was processed and transformed to make it suitable for analysis. This included normalizing data formats, calculating additional metrics, and integrating various data sources. Transforming data involved structuring it in a way that facilitates insightful analysis and user-friendly visualizations.

Data Loading

The transformed data was loaded into Power BI for visualization, ensuring a seamless and interactive user experience. This step involved creating connections between data sets and Power BI to enable dynamic and real-time updates in the dashboard.

Substantive Chapter 1:

Data Collection

In the initial phase of the project, we focused on gathering a comprehensive dataset to provide a robust foundation for our analysis and dashboard creation. Data was sourced from multiple reputable travel websites, weather APIs, and environmental databases. These sources provided a variety of information, including:

- **Travel Data:** Information on popular destinations, accommodation options, transportation modes, and activities.
- **Weather Data:** Real-time and historical weather information to help users plan their trips based on climate conditions.
- **Environmental Data:** Data related to carbon emissions and environmental impact, which was crucial for our carbon footprint calculator.

Contributions by Team Member: Rumina

Rumina played a pivotal role in the data collection and cleaning process. Her responsibilities included:

- **Data Aggregation:** Collecting data from various sources and consolidating it into a cohesive dataset.
- **Data Cleaning:** Using Excel to clean the data, which involved removing duplicates, handling missing values, and standardizing data formats.
- **Conditional Formatting:** Applying conditional formatting in Excel to highlight significant data points and ensure data quality.
- **VLOOKUP:** Utilizing VLOOKUP to identify and rectify inconsistencies within the dataset.

Contributions by Team Member: Muhammed Salim

In addition to Rumina's contributions, I focused on:

- **Dataset Maintenance:** Regularly updating and maintaining the dataset to ensure it remained current and relevant.
- **Carbon Footprint Data:** Integrating data related to carbon emissions and environmental impact to support the carbon footprint calculator feature.
- **Data Transformation:** Normalizing and transforming data to make it suitable for analysis and visualization in Power BI.

Challenges and Solutions

During the data collection and cleaning phase, we encountered several challenges:

- **Data Inconsistencies:** Different data sources had varying formats and structures. To address this, we developed a standardized format and used transformation techniques to ensure uniformity.
- **Missing Values:** Some datasets had missing values, which could potentially skew the analysis. We employed techniques such as data imputation and interpolation to handle these gaps effectively.

Substantive Chapter 2

Dashboard Design

The design of the Power BI dashboard was centred around user experience and functionality. Our goal was to create an interactive and visually appealing tool that provides comprehensive insights into vacation planning. Key design elements included:

- **User Interface (UI):** A clean and intuitive interface that allows users to navigate through different sections of the dashboard easily.
- **Colour Scheme:** A visually appealing colour scheme that enhances readability and user engagement.
- **Interactivity:** Interactive elements such as filters, drop-down menus, and clickable charts to allow users to customize their view and get personalized insights.

Features of the Dashboard

1. Real-time Weather Integration

- Integrated real-time weather updates to provide users with the latest weather information for their selected destinations.
- Used APIs to fetch current weather data and display it dynamically on the dashboard.

2. Carbon Footprint Calculator

- Developed a tool that allows users to assess the environmental impact of their travel plans.
- The calculator considers various factors such as transportation modes, accommodation types, and activities.

3. Shopping and Restaurant Recommendations

- Provided personalized recommendations for shopping and dining based on user preferences and historical data.
- Leveraged data analytics to identify popular shopping and dining locations in different destinations.

4. Tourist Attractions and Recommendations

- Included a section dedicated to tourist attractions, providing users with information on popular sights and activities.
- Recommendations were based on user preferences, reviews, and historical data.

5. Front-end Development

- Created the front page of the dashboard using HTML, CSS, and JavaScript.
- Ensured the website was responsive to mobile devices, providing a seamless user experience across different platforms.

Contributions by Team Member: Rumina

Rumina was instrumental in the design and development of the dashboard. Her key contributions included:

- **Dashboard Design:** Ensuring the dashboard was presentable with an appropriate colour scheme and creating all charts, graphs, maps and calculations.
- **Front-end Development:** Creating a responsive front page using HTML, CSS, and JavaScript.

- **Real-time Weather Integration:** Including real-time weather information to enhance user convenience.

Contributions by Team Member: Muhammed Salim

His contributions to the dashboard included:

- **Carbon Footprint Calculator:** Designing and integrating the carbon footprint calculator.
- **Shopping and Restaurant Recommendations:** Developing this feature to provide personalized suggestions.
- **Data Loading:** Ensuring seamless data loading into Power BI for dynamic visualization.

Contribution Team by Member: Iryna Usenko

Iryna conducted an in-depth analysis of hotel sustainability practices, focusing on carbon footprint and renewable energy usage.

- Analyzed the Cornell Hotel Sustainability Benchmarking Index 2024, encompassing over 27,000 hotels worldwide.
- Utilized the Hotel Carbon Measurement Initiative (HCMI) methodology to measure carbon emissions.
- Identified benchmarks for industry standards by analyzing minimum carbon footprint and maximum renewable energy usage levels.
- Highlighted significant variations in sustainability practices across different countries and hotel types.
- Focused on sustainability practices in the United Kingdom, providing valuable insights for enhancing the General Sustainability Index.

Substantive Chapter 3

Agile Methodology

Our team adopted an agile methodology to ensure effective collaboration and timely delivery of project milestones. Key aspects of our agile approach included:

- **Regular Meetings:** Holding weekly meetings to discuss progress, address challenges, and plan upcoming tasks.
- **Sprints:** Working in short, iterative sprints to focus on specific features and deliverables.
- **Feedback Loops:** Continuously gathering feedback from team members and stakeholders to refine and improve the dashboard.

Team Contributions

Each team member brought unique skills and perspectives to the project, contributing to its overall success. The collaborative efforts included:

- **Data Collection and Cleaning:** Joint efforts in gathering and preparing data for analysis.
- **Feature Development:** Collaborative development of dashboard features, ensuring they were aligned with user needs and project objectives.
- **Testing and Validation:** Conducting thorough testing to identify and fix any issues, ensuring the dashboard was reliable and user-friendly.

Conclusion

The vacation planning data analysis project successfully met its objectives, providing a comprehensive, user-friendly tool for vacation planning. By leveraging data from multiple sources, we created a robust dataset that forms the backbone of our Power BI dashboard. The process of data cleaning and transformation ensured that our data was accurate and reliable, ready for insightful analysis and visualization.

Our Power BI dashboard integrates key features such as real-time weather updates, tourist attraction recommendations, and a carbon footprint calculator, offering users a well-rounded view of their vacation plans. The dashboard's interactive design and visually appealing interface make it easy for users to explore different options and make informed decisions.

Working collaboratively as a team, we employed agile methodologies to ensure efficient project management and timely completion. Each team member contributed their unique skills and expertise, from data collection and cleaning to dashboard design and front-end development. The inclusion of conditional formatting and VLOOKUP functions helped maintain data integrity, while the responsive website design ensured accessibility across devices.

This project not only enhanced our technical skills in data analysis and visualization but also improved our ability to work effectively in a team and manage a complex project. The insights gained from this project will be invaluable for future endeavours in data analytics and beyond.

Overall, the vacation planning dashboard offers significant value to users by simplifying the planning process and providing essential information at their fingertips. It demonstrates the power of data-driven decision-making and the importance of a user-centric approach in designing analytical tools. The success of this project lays a solid foundation for further enhancements and potential expansions to include more personalized features and additional data sources.

Recommendations

Based on the findings and experiences from this project, we offer the following recommendations to enhance the vacation planning data analysis tool and improve future projects:

1. Expand Data Sources:

- **Diversify Data:** Integrate more diverse data sources, such as social media reviews, local events, and seasonal activities, to provide a more comprehensive picture of vacation destinations.
- **Real-Time Updates:** Incorporate APIs for real-time data updates, including traffic conditions, emergency alerts, and live events, to keep users informed of the latest developments.

2. Enhance User Experience:

- **Personalization:** Implement machine learning algorithms to offer personalized recommendations based on user preferences, past behaviours, and demographic data.
- **Interactive Features:** Add more interactive features, such as drag-and-drop itinerary planners, cost estimators, and virtual tours, to make the dashboard more engaging and user-friendly.

3. Improve Data Quality and Management:

- **Automated Data Cleaning:** Develop automated scripts for continuous data cleaning and validation to maintain high data quality over time.
 - **Advanced Analytics:** Utilize advanced analytics techniques, such as predictive modelling and sentiment analysis, to extract deeper insights and trends from the data.
4. **Integrate Additional Tools and Services:**
- **Booking Integration:** Link the dashboard with travel booking platforms to allow users to book flights, hotels, and activities directly from the dashboard.
 - **Financial Planning:** Include budget planning tools and currency converters to help users manage their vacation expenses effectively.
5. **Enhanced Collaboration and Feedback Mechanisms:**
- **User Feedback:** Create a feedback loop by incorporating user reviews and ratings to continually refine and improve the dashboard.
 - **Collaboration Tools:** Add features that enable users to share their plans with friends and family and collaborate on itineraries in real-time.
6. **Sustainability and Responsible Travel:**
- **Environmental Impact:** Expand the carbon footprint calculator to provide detailed insights into the environmental impact of different travel choices and suggest eco-friendly alternatives.
 - **Local Culture and Ethics:** Include information on local customs, cultural etiquette, and sustainable travel practices to promote responsible tourism.
7. **Future-Proofing and Scalability:**
- **Scalability:** Design the dashboard architecture to be scalable, allowing for the addition of new features and the handling of increased user traffic without compromising performance.

- **Technology Upgrades:** Stay updated with the latest technologies in data analytics, visualization, and web development to ensure the tool remains cutting-edge and competitive.
- 8. Training and Support:**
- **User Training:** Offer tutorials, webinars, and user guides to help users maximize the benefits of the dashboard.
 - **Support Services:** Establish a dedicated support team to assist users with any issues or queries they may have.

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Appendix

Appendix A: Team Member Contributions

Rumina:

- **Data Collection and Cleaning:** Collected and cleaned the vacation planning data from multiple sources and Ensured data quality by handling missing values and inconsistencies.
- **Dashboard Design:** Designed the Power BI dashboard with a focus on user experience and visual appeal. Chose an appropriate colour scheme and layout.
- **Tourist Attraction and Recommendation Dashboard:** Developed the main Power BI dashboard featuring tourist destinations and recommendations, including reviews of restaurants and popular shopping places. Integrated a calculation feature to show how many people visited various places.
- **Real-Time Weather Integration:** Incorporated real-time weather information into the dashboard for user convenience.
- **Front-End Development:** Developed the front-page using HTML, CSS, and JavaScript, ensuring the website is responsive across different devices.

- **Carbon Footprint Calculator:** Created a calculator to help users assess their carbon footprint based on their travel plans.

Muhammed:

- **Carbon Footprint Analysis:** Integrated the carbon footprint feature into the dashboard, enabling users to evaluate the environmental impact of their travel choices.
- **Data Management in Excel:** Managed, cleaned, and maintained the dataset using Excel, including tasks like conditional formatting and VLOOKUP to ensure data accuracy.
- **Developed a separate Dashboard with pie charts and graphs:** Developed a separate Power BI dashboard focused on the travel carbon footprint, highlighting destinations with high and low carbon footprints.
- **Shopping and Restaurant Recommendations:** Created a module in Power BI to provide shopping and restaurant recommendations for travellers.
- **Report Writing:** Compiled the comprehensive report documenting the data analysis, methodology, and findings of the project.

Irnya:

- **Data Transformation:** Processed the collected data to make it suitable for analysis and visualization.
- **Database Management:** Handled database tasks including the setup and maintenance of Azure databases.
- **Visualization and Analysis:** Conducted explanatory and exploratory data analysis and created visualizations to represent key insights.
- **Agile Collaboration:** Participated in agile team meetings, contributing to the prioritization of features and overall project management.

Appendix B: Data Sources

- **Travel Data:** Collected from various travel websites and APIs, including tourism boards, travel agencies, and user-generated content platforms.
- **Weather Data:** Sourced from reliable meteorological services to provide real-time weather updates.

- **Environmental Data:** Data for the carbon footprint calculator was obtained from environmental research databases and sustainability reports.
- **Local Business Data:** Information on shopping and restaurant options was gathered from local business directories and review sites.

Appendix C: Tools and Technologies Used

- **Data Collection and Cleaning:**
 - Microsoft Excel: Used for data cleaning, transformation, and management.
 - Python: Scripts for automated data cleaning and pre processing.
- **Dashboard Development:**
 - Power BI: Main tool for creating interactive and visually appealing dashboards.
 - HTML, CSS, JavaScript: Used for developing the responsive front-end of the website.
- **Real-Time Integration:**
 - APIs: For integrating real-time weather data and other live information.
- **Collaboration:**
 - Agile Tools: Jira and Trello for project management and team collaboration.
 - Communication: Discord for team meetings and updates.

Appendix D: Methodology

9. **Data Collection:**
 - Aggregated data from multiple reliable sources.
 - Ensured diversity and comprehensiveness of data to cover all aspects of vacation planning.
10. **Data Cleaning and Transformation:**
 - Identified and handled missing values, inconsistencies, and duplicates.
 - Applied conditional formatting and VLOOKUP functions in Excel to ensure data accuracy.

11. **Data Loading and Visualization:**
 - Loaded cleaned data into Power BI for visualization.
 - Created various interactive dashboards to represent key insights, including tourist attraction recommendations and real-time weather updates.
12. **User Experience Design:**
 - Focused on creating an intuitive and user-friendly dashboard interface.
 - Integrated real-time data and interactive features for enhanced user engagement.

Appendix E: Project Timeline

13. **Week 1-2: Project Planning and Data Collection**
 - Defined project scope and objectives.
 - Collected initial datasets from various sources.
14. **Week 3-4: Data Cleaning and Pre processing**
 - Cleaned and transformed data using Excel and Python.
 - Ensured data quality and consistency.
15. **Week 5-6: Dashboard Development**
 - Developed Power BI dashboards for various aspects of vacation planning.
 - Integrated real-time weather data and carbon footprint calculator.
16. **Week 7-8: Testing and Refinement**
 - Tested the dashboards for accuracy and usability.
 - Made necessary refinements based on feedback.
17. **Week 9: Documentation and Final Review**
 - Compiled project documentation and report.
 - Conducted a final review and made last-minute adjustments.
18. **Week 10: Presentation and Delivery**
 - Prepared for the final project presentation.
 - Delivered the project to the client and gathered feedback.