Melbourne Explorer: A Tourist's Guide to Hotels & Restaurants

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1. Introduction

Melbourne, a global destination celebrated for its diversity, landmarks, and cuisine, is the focus of our 'Melbourne Explorer' project. This endeavor offers a detailed exploration of the city's hospitality landscape, customized for tourists seeking enriching experiences. Through a comprehensive Tableau Storyboard with R Shiny integration, we provide data-driven insights and recommendations for Melbourne's hotels and restaurants, aiding tourists in making informed choices during their stay. This report delves into the project's design decisions, functionalities, use cases, and intriguing patterns, serving as a valuable resource for both academia and the broader tourism industry.

2. Design Summary

In designing our project, we opted for a Tableau storyboard, featuring distinct tabs for hotel and restaurant dashboards. It draws inspiration from scholarly sources like 'The Visual Display of Quantitative Information' [1], stressing the importance of clarity and simplicity when presenting complex data. In accordance with the 'Visual Information Seeking Mantra' [4], which advises "overview first, zoom and filter, then details-on-demand," our approach aims to streamline cognitive load management [2] and mitigate information overload [3] without being overwhelmed with unnecessary details. By separating the dashboards, we allow users to focus on specific aspects of their trip, adhering to Gestalt principle of proximity [5], which aids users in forming meaningful mental groupings of the data.

2.1. Restaurants Page

Our Restaurants page was designed meticulously to provide tourists with an enticing and user-friendly interface for navigating Melbourne's diverse dining scene. In pursuit of a more appealing and intuitive interface, we departed from the conventional dropdown or checkbox-based filters and traditional map markers, incorporating image-based filters and markers instead. Recent studies [6][7] highlight people's innate attraction to visuals, and our approach capitalizes on this pre-attentive processing, making it more intuitive for users to explore the interface.

Furthermore, understanding the proximity of restaurants to key landmarks is paramount for tourists. To facilitate this, we have included street-level views of the city, providing users with a clear and detailed understanding of restaurant locations and their surroundings.

In line with the principles of inclusive design, we have taken color contrast into careful consideration. The use of colored images and fonts against a white background not only elevates the visual appeal but also ensures accessibility for users with color blindness [8].

Our Restaurants page boasts a range of user-friendly features that simplify the process of exploring various dining options:

1. **Clickable Interactive Filters**: Users can easily refine their dining choices by clicking on visually engaging image-based filters, simplifying the process of selecting from various cuisine styles.
2. **Street-Level Map**: An integrated map with clear markers provides a quick overview of restaurant locations and nearby points of interest.

3. **Tooltip for Detailed Restaurant Information**: Upon selecting a restaurant on the map, a user-friendly tooltip reveals comprehensive information, including the restaurant's name, address, contact details etc. for reservations.
4. **Top-Rated Restaurants by Category**: We showcase top-rated restaurants by user's selected category, offering users a convenient way to access essential details about the best in each dining category, tailored to their preferences. This was achieved using context filters to first filter the restaurants by category and then by ratings.

2.2. Hotels Page

Our Hotels page was scrupulously designed to facilitate tourists' navigation through Melbourne's various accommodation offerings. To augment user experience and cater to individual preferences, we have incorporated a suite of filters within our interface. Specifically, we have implemented a '±' option for selecting accommodation occupancy requirements, a slider mechanism for specifying price ranges, and a dropdown menu for indicating the desired room type. These filter options were intentionally selected due to their familiarity to users [9], maintaining consistency with established design patterns found on various other hotel booking websites [10].

Next, we have incorporated two key visual elements: a bar graph facilitating insightful analysis of average nightly prices, categorized by room type, and a scatterplot visualizing the nuanced relationship between accommodation prices and review scores, both enhanced by user-specific filtering, helping users decide the kind of room type they should target. The decision to use a bar graph aligns with conventions for nominal variables, while the scatterplot excels at conveying the relationship between numerical variables [1]. Moreover, the application of Stevens' Power Law underscores the importance of bar graphs in enhancing comprehension of the magnitude of the price differentials [11].

Incorporating a clustered map view into our interface follows best practices in information visualization by simplifying the user's experience through cognitive offloading [12] and forming a visual hierarchy[4][9], while improving its aesthetic value. By grouping accommodation locations into clusters that dynamically expand as users zoom in, we enable travelers to easily identify nearby landmarks and explore hotspot areas, ultimately aiding their decision-making process.

This page was developed using R Shiny, chosen for its robust functionality, significantly elevating the interactive elements of our dashboard design. Its primary focus on data professionals and notable computational strengths allow for sophisticated data manipulation, extending beyond the creation of just interactive graphs [13].

Our Hotels page offers user-friendly features for personalized lodging choices:

1. **Personalized Filters**: Users can easily customize their search by specifying occupancy, price range, and room type, helping them find the exact lodging options that they desire.
2. **Interactive Map with Cluster View**: An interactive map with accommodation locations grouped into clusters, which dynamically expand as users zoom in, allowing travelers to locate nearby landmarks, explore interesting areas of interest, and choose a neighborhood ideal for their stay, without overwhelming them with heaps of data.
3. **Top 10 Accommodations**: We showcase the best-reviewed accommodation options filtered to users' preferences.
4. **Room and Host Information Panel**: A reactive panel providing comprehensive details on the room (price, type, amenities) and the host (identity, reviews, previous interactions) upon selecting a lodging option from the map for a transparent and trustworthy booking experience.
5. **Visual Data Insights**: Users gain deeper insights and make data-driven decisions through average nightly rate graphs and price vs. reviews scatter plots for the different accommodation types, filtered to their needs.

3. Pattern and Use Case Summary

3.1. Interesting Patterns

In this section, we attempt to discover the hidden beauty and secret spots in Melbourne using our interface, presenting some interesting patterns to help tourists uncover valuable insights about Melbourne's food and lodging scene.

We start by exploring the Restaurants page of our interface. It is without a doubt that Melbourne is a true melting pot for foodies with a wide array of flavors from around the world. Upon scrutinizing the interface, we came up with the following findings:

1. **Asian Culinary Hub**: A bustling hub for Asian cuisine can be found in the CBD of Melbourne, especially at the intersection of Little Bourke St with Russell St and Lonsdale St. With numerous restaurants serving Chinese, Japanese, Thai, and Vietnamese cuisine, this pattern highlights the city's love for Asian flavors. Additionally, Melbourne's large Asian population may contribute to the widespread popularity of this cuisine.
2. **Highly Rated Bars**: Melbourne is renowned for its vibrant nightlife, and our data shows that there is no shortage of high-rated bars to be found throughout the city, becoming a top destination for those seeking a memorable night out.
3. **Opportunities for Indian and Middle Eastern Cuisine**: Restaurants of these cuisines are underrepresented in the CBD, suggesting an opportunity for entrepreneurs to introduce these culinary traditions.
4. **Riverfront Lounging**: Several lounges are located near Flinders St, especially along the Yarra River. Residents and tourists alike enjoy leisurely moments by the waterfront, creating a serene escape from the bustle of the city.

Melbourne's culinary diversity is revealed through these patterns, but so are its changing dining habits, as well as its entertainment hotspots. Whether it's savoring diverse international cuisines, enjoying vibrant nightlife, or relaxing by the river, Melbourne's food and entertainment scene offers something for everyone.

Next, we explore the Hotels page of the interface. The wide range of options in Melbourne's accommodation market provide tourists with a variety of choices based on their individual preferences and requirements. Analysis of this page revealed the following:

1. **Family-Friendly Accommodations**: The most cost-effective option for families of three is to rent an entire apartment or home. There are many options available, all offering relatively low prices with an average nightly price of around $180, high ratings, and a variety of amenities, making them an appealing and cost-effective option for a family-oriented vacation.
2. **Proximity to Public Transport**: The proximity of most residences and flats to public transport, especially within Melbourne's free tram zone, underlines the city's commitment to accessible transportation. Such transit options enhance the convenience of tourists' experiences, eliminating the need for lengthy journeys.
3. **Hotel Locations**: Our interface reveals that hotels are primarily clustered in bustling areas like Carlton and Southbank. These locations offer guests easy access to key attractions and vibrant neighborhoods, immersing them in Melbourne's cultural and entertainment scenes. Visitors to Melbourne can look forward to a lively and exciting stay in these dynamic districts.

   Overall, Melbourne's accommodations cater to diverse travelers, each with their unique preferences and budgets, offering personalized and memorable experiences for people from all walks of life.

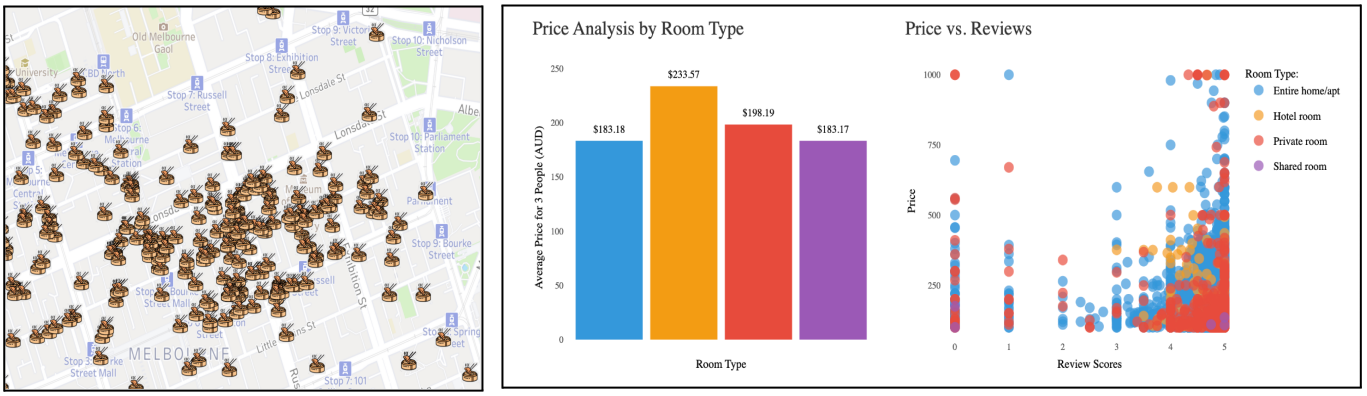

Fig 1. (left) Restaurants page showing the cluster of Asian restaurants around Melbourne CBD; (right) Hotels page revealing the cost-effectiveness and high-ratings of entire homes for a family of three

3.2. Use Cases

- **Restaurants Page Use Case 1**: Meet Jack, a European traveler exploring Melbourne with his wife and young child. He's on the hunt for a European restaurant that aligns with his culinary preferences and accommodates his toddler's needs. Jack seeks a restaurant with a high rating, a central location near public transportation, and a menu customizable to his child's nutritional requirements. Our Restaurant interface's user-friendly filters effortlessly guide him to European restaurants that meet his requirements. Utilizing the tooltip information, he contacts the chosen restaurant to inquire about their kid-friendly arrangements. Our interface provides precise addresses, simplifying navigation, and creating a hassle-free dining adventure for Jack's family.
- **Restaurants Page Use Case 2**: Meet Lisa, an ardent coffee enthusiast and tourist in Melbourne, on a mission to discover the city's top-rated coffee gems. She is in pursuit of coffee shops celebrated for their exceptional brews, having good public transport accessibility. Lisa uses the intuitive filters to explore only the highest-rated coffee shops in this city. With a detailed table-view of information providing ratings and precise addresses, Lisa's coffee quest becomes a delightful and caffeine-infused adventure. Our intuitive interface ensures she navigates Melbourne's rich coffee culture with ease, savoring the finest brews it has to offer.
- **Hotels Page Use Case 1**: Meet Alex, an adventurous soul who planned an unforgettable birthday bash in Melbourne. They scoured Airbnb for the perfect spot, accommodating 10 guests, complete with a pool and BBQ area. Filtering for "10 guests," "mid-range (under 1500 AUD)," and "Entire Home/Apt," they insisted on top-rated places, even if they were farther from the CBD. Alex swiftly located the ideal listing in the "Top 10 Airbnb Listings" tab, confirmed its amenities, and navigated to the property's website. Thanks to our platform, they found a friendly host who went above and beyond to make their birthday party one of the best they'd ever had.
- **Hotels Page Use Case 2**: Meet Sarah, a solo business traveler in Melbourne with an upcoming urgent trip. She's in need of a budget-friendly, one-person accommodation near her office but is unsure of the accommodation type to stay in. Using our interface, Sarah quickly compares average nightly prices and ratings of the different available options to find the perfect match. With this newfound clarity, she skillfully navigates our clustered map, zooming in to explore her preferred options nestled conveniently near her office, and feels confident in her choice thanks to the detailed information provided. She chooses an option with a fast-responding host, streamlining her urgent solo travel experience.

Data Sources

1. Restaurant Data: Yelp! Open Dataset. https://www.yelp.com/dataset.
2. Restaurant Page Image Filter Icons: Flaticon, Freepik Company. https://www.flaticon.com/icons.
3. Accommodations Data: Melbourne Airbnb Open Data. http://insideairbnb.com/get-the-data/.

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Group Member Contribution

Name	Contribution to the Project	Percentage Contribution
Rafsan Al Mamun	- **Team Coordinator:** scheduled meetings; planned approaches; delegated weekly tasks; monitored the project progress and its alignment with the defined goals - **Interface:** designed overall interface; designed and developed the Tableau storyboard; developed the restaurants page; co-designed the hotels page and fixed major bugs in the R script - **Report:** wrote the introduction and the design decisions for Tableau storyboard; co-wrote design decisions for hotels page; edited others' portions to fix grammatical errors, sound coherent and academic, and conform to provided guidelines - **Presentation:** designed and created the presentation slides; presented the introduction to Melbourne Tourism and goals for the project sections; edited and merged everyone's presentations into the final video - Wrote the README.txt file	35%
Sanskar Bhatia	- **Team Liaison:** handled communication among team members - **Interface:** started but could not complete development of transportation page due to contracting COVID-19; had to scrape off due to time shortage - **Report:** wrote the design decisions for restaurants page and its functionalities, and the functionalities of the hotels page; co-wrote the use cases and pattern summary - **Presentation:** presented the interesting patterns discovered using the tool and the rationale	25%
Jay Utkarsh Acharya	- **Interface:** co-designed and co-developed the hotels page - **Report:** co-wrote the pattern summary and hotels page use cases - **Presentation:** presented the design decisions for the storyboard; demonstrated the restaurants page, and explained its design decisions and use cases	20%
Muath Sulaiman Almahasin	- **Interface:** co-designed and co-developed the hotels page - **Report:** co-wrote the design decisions for hotels page - **Presentation:** demonstrated the hotels page, and explained its design decisions and use cases	20%