Heuristic Evaluation of the TripAdvisor Mobile App

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Introduction

Heuristic evaluations, popularized by Nielsen and Molich (1990), are among the most common methods for assessing user interface (UI) usability. Unlike formal user testing—which necessitates access to users, specialized labs, and equipment—this informal method allows trained evaluators to quickly and inexpensively gauge usability by assessing a UI's adherence to a set of broad design principles or heuristics (Nielsen & Molich, 1990). The evaluator identifies and rates the non-compliant UI elements on a severity scale, before generating a list of key findings and recommendations for improvement.

In order for a heuristic evaluation to be effective, however, the evaluator must select suitable heuristics for the specific interface being critiqued, as well as its context of use and audience (Holzinger, 2005). In the case of mobile applications, the most appropriate evaluation heuristics are currently the topic of intense debate. While some researchers argue that older heuristics are still applicable, others advocate for their re-interpretation and adaptation, as well as the creation of new, mobile-specific heuristics.

In this paper, I will provide an overview of the current mobile heuristic literature, identify and justify a set of appropriate heuristics and severity ratings for mobile applications, and apply these heuristics in an assessment of the TripAdvisor app for iOS (version v12.2 build 150914022, tested on an iPhone 6). While the TripAdvisor mobile app succeeds in some respects, there are numerous opportunities to enhance its overall usability.

Overview of Mobile Heuristics Literature

Arguably, the most well-known and cited set of heuristics is that of Jacob Nielsen (see Table 1) (Nielsen, 1994). Others soon followed, including the ergonomic criteria developed by Scapien and Bastien (1997) and Schneiderman's "eight golden rules" (1998). While these heuristics have aided designers in creating more usable interfaces, it is important to note that these heuristics were specifically developed for the desktop computer (Salazar et al., 2013).

Today's smartphones differ from the computers of the past not only in terms of design (e.g. form factor, screen size, input mechanisms), capabilities (e.g. camera, GPS, accelerometer) and processing power, but there has also been a dramatic shift in user behaviors, expectations, and usage contexts (Balagtas-Fernandez et al., 2009; Salazar et al., 2013). The interaction models for these small, portable, and highly versatile tools vary significantly from desktop computers. Whereas desktop computers relied on WIMP (windows, icons, menus, and pointer), mobile interactions involve touch, voice, gestures, location data, and other sensors (Salazar et al., 2013;

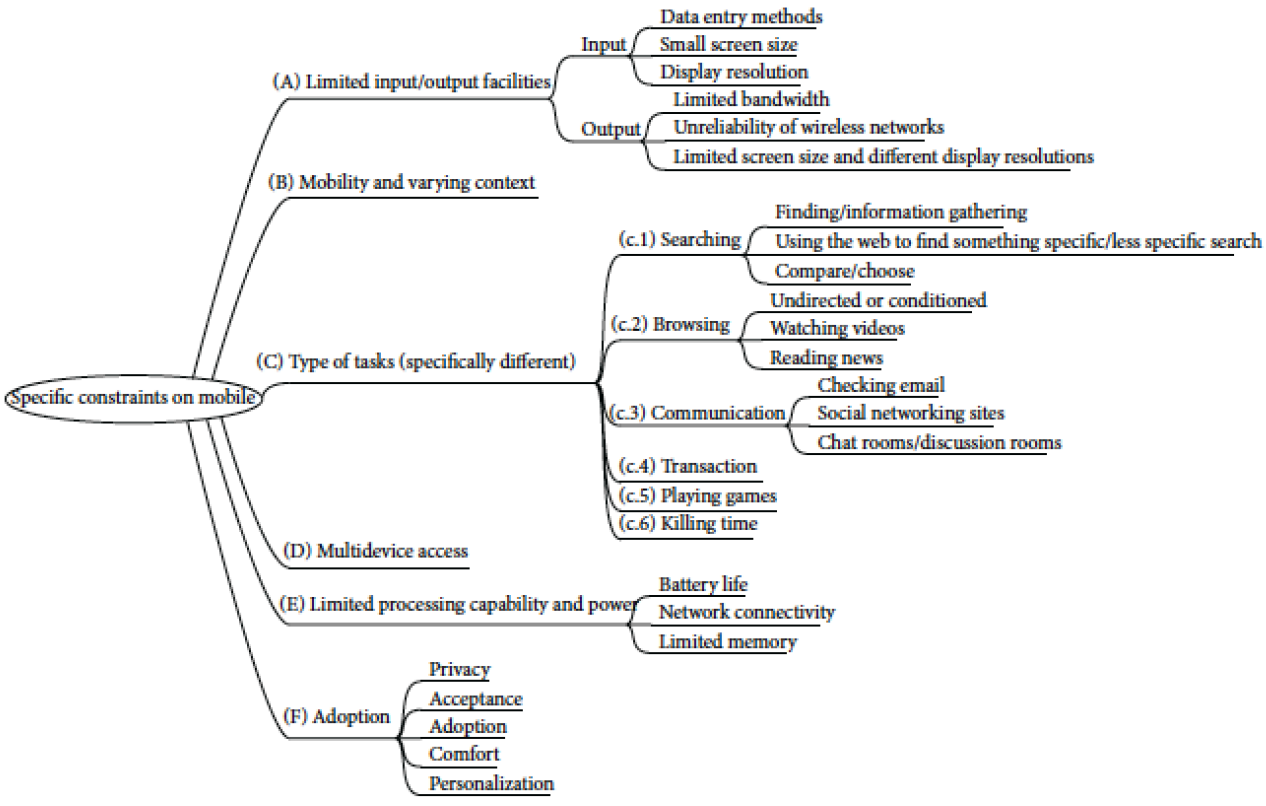
Wasserman, 2010). Chart 1 illustrates the primary constraints and considerations for mobile devices. Researchers soon acknowledged these unique variables, as well as the limitations and lack of applicability of Nielsen's heuristics in mobile evaluations (Wasserman, 2010; Bertini et al., 2006; Inostroza et al., 2013). As a result, many began to express the need to both re-interpret and adapt existing heuristics, as well as develop new ones for the mobile context (Salazar et al., 2013). These revised heuristics have been deployed with varying levels of success (Bertini et al., 2006; Inostroza et al., 2013; Joyce et al., 2015).

Since there is no clear consensus on the best heuristics for mobile as of yet, this evaluation utilizes a mix of seminal and adapted Nielsen heuristics, as well as recently published heuristics, which were deemed specifically suitable for an evaluation of the TripAdvisor mobile app.

Table 1: Nielsen's Ten Heuristics (Source: Nielsen, 1995)

1	Visibility of system status	6	Recognition rather than recall
2	Match between system and the real world	7	Flexibility and efficiency of use
3	User control and freedom	8	Aesthetic and minimalist design
4	Consistency and standards	9	Help users recognize, diagnose, and recover from errors
5	Error prevention	10	Help and documentation

Chart 1: Constraints for Mobile Devices (Source: Yanez Gomez, Cascado Caballero, & Sevillano, 2014)



Selection of Mobile Heuristics for Current Analysis

When selecting heuristics for the current mobile application review, I considered both general principles of good UI design, as well as key characteristics of touchscreen-based smartphones; namely that they are operated via a user's hands and screen size is limited. Additionally, smartphones are used in a variety of dynamic contexts in which lighting, time constraints, and hand orientation can vary (e.g. manipulating device with one hand in a dimly light subway car vs. holding the phone with both hands while sitting in bright sunlight) (Heo et al., 2009; Lee et al., 2006). The specific heuristics selected for this evaluation are defined and justified in Table 2. Taken together, these heuristics address the key components of a well-designed user interface and will assist an evaluator in surfacing the most significant mobile app usability issues.

Table 2: Selected heuristics for mobile application review

Heuristic	Definition & Justification
Provide immediate feedback and notification of application status	**Definition:** Inform users that their request is being processed (e.g. via message, status bar, twirling icon) to signal that the action is occurring and the system has not stopped working (Joyce et a., 2014). Alert user to system status non-intrusively, when possible and appropriate (e.g. displaying notification within the status bar) (Joyce et al., 2015). These system status updates should be prioritized by criticality (Bertini et al., 2006). **Justification:** System transparency and feedback affords the user a sense of control and confidence. If a user is not confident that his/her request is being processed, the user may abandon the task prematurely. This holds particularly true for mobile users, with studies showing that they are generally more impatient than desktop users (Nilsson, 2009). Additionally, given the plethora of alerts and notifications associated with mobile computing (e.g. text messaging, social media alerts), those alerts most crucial to system operation (e.g. low battery alert) should be given priority above others. Otherwise, they risk being missed by the user.
Use a theme and consistent terms, as well as conventions and standards familiar to the user	**Definition:** Use a theme for the mobile app such that different screens appear connected and consistent. Create a style guide from which words, phrases and concepts familiar to the user can be consistently applied throughout the UI. Utilize platform conventions and standards that users have come to expect in a mobile applications, such as having the same effects occur when gestures are used (Joyce et al., 2015). **Justification:** Consistent and recognizable design elements and interactions have a significant impact on an interface's learnability, as well as a user's ability to use it efficiently. If a mobile app does not operate as predicted, and prevents a user from transferring knowledge gained from within the app and from other, similar apps and/or operating systems, it is likely to result in user confusion and abandonment.
Structure and navigability	**Definition:** Present information in a natural, logical order that can be easily understood by the user. The user interface should be organized such that it groups together related things, and separates unrelated things (Yong et al., 2006). When possible, the system should sense its environment and adapt the presentation of information accordingly (Bertini et al., 2006; Inostroza et al., 2010). Additionally, the app should offer an efficient means of navigating between tasks and sections of the app. **Justification:** Given the limited screen space on a mobile device, a mobile app's information architecture is immensely important. Menus, navigational bars, and the like should be logically organized and enable the user to find the information they are seeking

	quickly and easily. The most relevant information should be presented first, whenever possible (e.g. If a user is searching for restaurants via the Yelp app, the app should offer up results near the user's current location, unless the user specifies otherwise).
Learnability and onboarding	**Definition:** The interface should be easy to learn (Yong et al., 2006). It should also include onboarding features (e.g. overlays) that direct the first-time user to the app's main features and the types of possible interactions. The user should be able to access this onboarding/support system whenever desired (Joyce et al., 2015). **Justification:** Users are more likely to engage with a mobile app, and succeed in reaching their goals, when it is easy to learn. Onboarding features, such as overlays, enable users to begin successfully using an app within minutes. This reduces abandonment rates. Additionally, researchers have argued that learnability of a software application is more important in the mobile context (Longoria, 2004).
Prevent errors and help users recognize, diagnose, and recover from them when they occur	**Definition:** The interface should be error-proofed as much as possible. Should an error occur, the error message/help function should be salient, precise, and easy to understand, enabling a user to quickly comprehend the issue and what specific actions are necessary for a resolution (Joyce et al., 2015). The device should speak the user's language, instead of in system-oriented concepts and technicalities (Bertini et al., 2006). **Justification:** The benefits of error reduction and prescriptive error messages is likely obvious. Following these guidelines will increase user success and minimize frustration. Additionally, I have added a saliency requirement. Given the small screen size of mobile devices, error messaging (e.g. a small red "X") that may have been sufficient in a desktop context, may not be readily apparent on a smartphone.
Employ a simple, focused, glance-able, and aesthetically pleasing interface	**Definition:** The interface should only contain essential elements (Joyce et al., 2014). The user should, ideally, be able to extract crucial data from the interface by glancing at it (Bertini et al, 2006). On-screen text should be readable in terms of size, color, and contrast. Additionally, the interface should be aesthetically pleasing (Joyce et al., 2014). **Justification:** Every element in a mobile UI imposes cognitive load on the user. Designers should seek to minimize this as much as possible. Interfaces should be intelligible at a glance since smartphone users are often on the go and under tight time constraints. Additionally, the small screen size of smartphones and varying environmental factors (e.g. solar glare, dim lighting,) necessitate the use of sufficiently large and salient typography. Attractive designs are more memorable and better utilized (Gong & Tarasewich, 2004). Users are more forgiving of pleasing interfaces and willing to wait longer for information to download, as opposed to less attractive applications (Joyce et al., 2015; Marinacci, 2012)
Design a clear navigable path to task completion	**Definition:** The interface should clearly communicate what tasks/actions are possible, as well as how a user can complete or accomplish them. **Justification:** Clear design enhances user efficiency and mobile app learnability, while reducing user frustration. Mobile app users are often under tight time constraints, and so it is all the more important for users to understand which, and how many, steps are needed to accomplish their goal(s).
User control and freedom	**Definition:** The interface should allow the users to undo and redo his/her actions and offer clear "emergency exits" so that the user can leave unwanted states (Inostroza et al., 2010). Additionally, the mobile app should allow user configuration and include shortcuts for the most common and important tasks (Joyce et al., 2014). **Justification:** Due to the small screen size and touch targets on a smartphone, errors are not uncommon. If a user was unable to undo, redo, or exit an unwanted state, this could lead to frustration and abandonment. Custom configurations and shortcuts will increase user efficiency and, in turn, pleasure, when using the app.

Ease of input	**Definition:** The mobile app should provide the user with easy ways to input data, reducing or eliminating the need to operate the device with both hands, unless necessary (Bertini et al, 2006). It should utilize auto-fill and other tools that minimize the user's need to enter information via the keyboard. It should also be forgiving of spelling errors. **Justification:** This heuristic is highly applicable to mobile applications, as smartphones are often used on-the-go and in varying contexts where users might lack access to both hands (e.g. standing in a moving subway car while reading emails).
Make appropriate use of the camera and sensors	**Definition:** When appropriate, utilize the functionality of the smartphone (e.g. camera, GPS) to improve the mobile app experience (Joyce et al., 2014). **Justification:** The unique features of a smartphone can substantially enhance usability in a mobile context, allowing a user to more easily input information, adapting the content to fit the user's location, and notifying the user when friends are nearby (Joyce et al., 2015).
Physical interaction and ergonomics	**Definition:** Touch targets for main functions should be sufficiently large, spaced apart, and accessible to users (Lo & Tan, 2012; Clark, 2015). **Justification:** This heuristic is highly applicable to a mobile context given the small screen size, diverse use contexts, and user tendency to operate smartphones while also engaging in another activity (e.g. checking email while walking down a crowded sidewalk). Additionally, users primarily operate a smartphone using their thumbs (Clark, 2015). Therefore, the most common navigational controls should be easily accessible to thumbs (Rauch, 2011).
Security and privacy	**Definition:** The system should keep user data private and safe. **Justification:** Smartphones are prime targets for thieves and can be easily misplaced or left behind due to their small size. They contain sensitive personal information and link to various user accounts (e.g. banking, credit cards). They are also used in public. Mobile applications should account for this by protecting user data (e.g. hiding alphanumerical values entered into the "password" field), offering more secure and convenient log in mechanisms (e.g. touch ID), and providing the user with an alternate means of changing a username and password, besides via the mobile app itself (e.g. via a website).

Severity Ratings for Current Analysis

There are numerous severity scales available to UX practitioners, including those of Nielsen (1992), Wilson (1999), Dumas and Redish (1999), and Rubin and Chisnell (2008). For this evaluation, I elected to use that of Joyce et al. (2015) (see Table 3), as it is very clear and easy to understand, regardless of your level of expertise.

Table 3: Severity Rating Scale (Source: Joyce et al., 2015)

Rating	Definition
Minor	Causes some hesitation or irritation
Moderate	Causes occasional task failure for some users or causes delays and moderate irritation
Critical	Leads to task failure or causes extreme irritation

Heuristic Evaluation of TripAdvisor Mobile Application

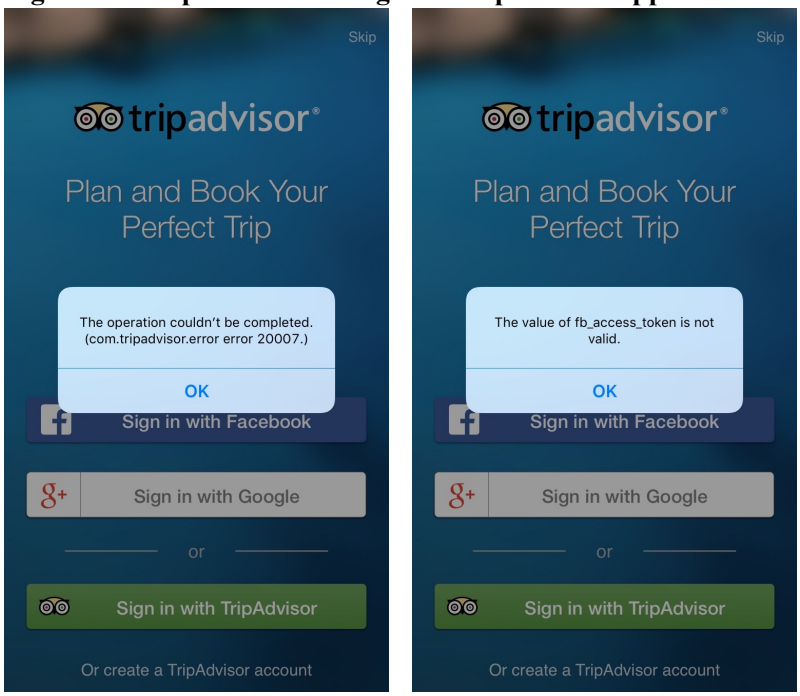
As with the website, the TripAdvisor mobile app assists users in researching and booking hotels, rental properties, flights, and popular travel attractions. In addition to researching and booking travel, users can read and write reviews, as well as post questions to traveler forums.

To ensure a comprehensive evaluation of the app, I identified and executed several key tasks: signing into the app, searching for a restaurant, researching and booking a hotel, writing a hotel review, and searching flights. I then assessed whether the interface and UI elements encountered during those tasks were in violation of the heuristics identified in Table 2. Those that were in violation were rated on the Joyce et al. severity scale above (see Table 3).

Key Findings and Recommendations

Finding 1: Error messages during "sign on" use technical jargon, as opposed to plain language. The app offers four means of signing into the app (i.e. via Facebook or Google +, via an existing TripAdvisor account, or by creating a new TripAdvisor account). I initially attempted to use Facebook to log into the app. However, I was presented with a series of indecipherable error messages (see Figure 1). This is in violation of the "Prevent errors and help users recognize, diagnose, and recover from them when they occur" heuristic, as the app failed to communicate the error in clear language, instead utilizing technical jargon. **Severity: Critical.** Unintelligible error messages that fail to identify the issue as hand are a source of extreme irritation. This issue is particularly critical as it prevents users from accessing the app. Users who are unable to quickly discern and correct the error, and log into the app, are liable to abandon the app entirely. **Recommendation:** Communicate any and all error messages in plain language (e.g. "Unable to log in. Please click here to grant TripAdvisor access to your Facebook account." The link would then direct the user to the "settings" menu within the iPhone, where they could grant the TripAdvisor app access to their Facebook account)

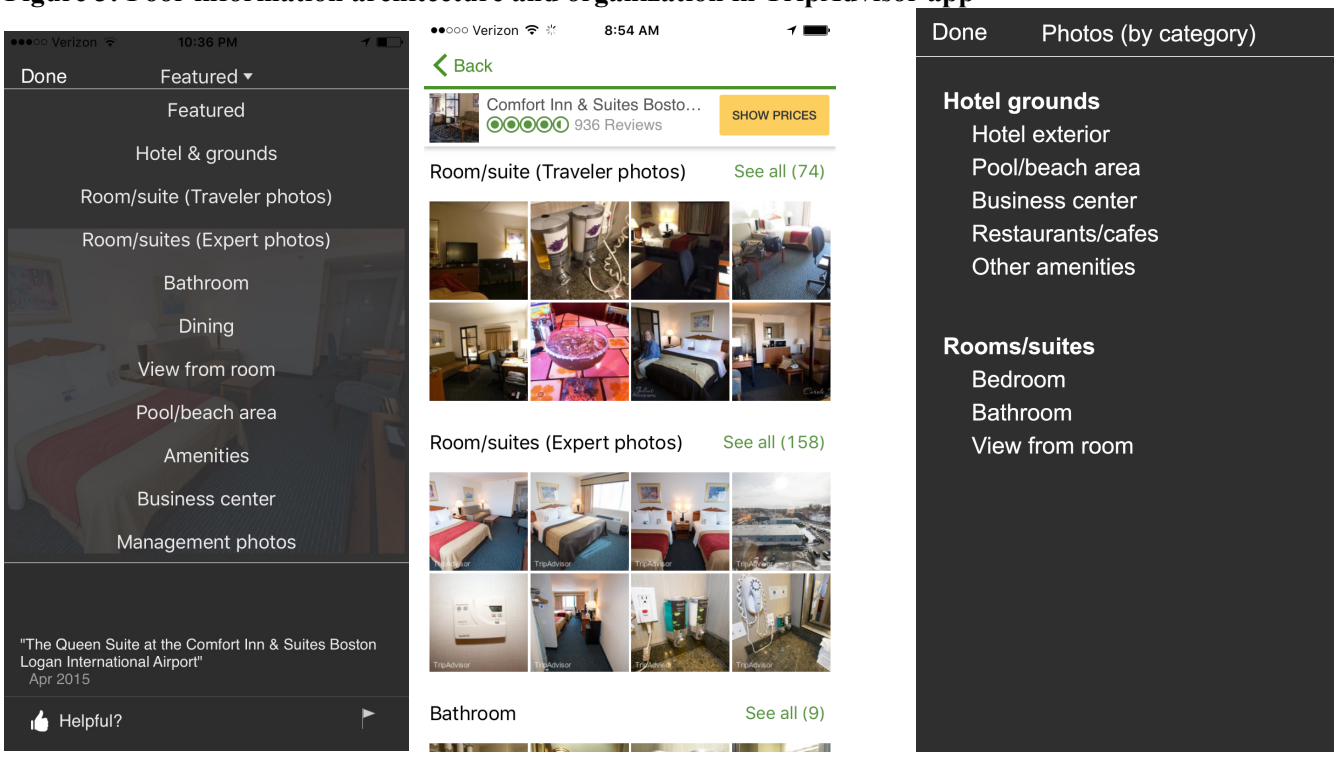
Figure 1: Sample error messages in TripAdvisor app



Finding 2: Lack of onboarding or mobile app-specific help functionality. The TripAdvisor app does not offer introductory onboarding screens or overlays explaining the main features of the app, rather users are left to learn it themselves. The only assistance available is the "Help Center" which routes users to the TripAdvisor.com help features that explain general guidelines of website use, and other website specific information and features. The app fails to provide any mobile app-specific help. This violates the "learnability and onboarding" heuristic as well as the "prevent errors and help users recognize, diagnose, and recover from them when they occur" heuristic. **Severity: Moderate.** While the TripAdvisor app is fairly intuitive, the complete lack of help support within the app is problematic and may lead to user frustration and task abandonment. **Recommendation:** Build in a short series of concise onboarding overlays that appear the first time a user opens the app, with an option to "skip" if so desired.

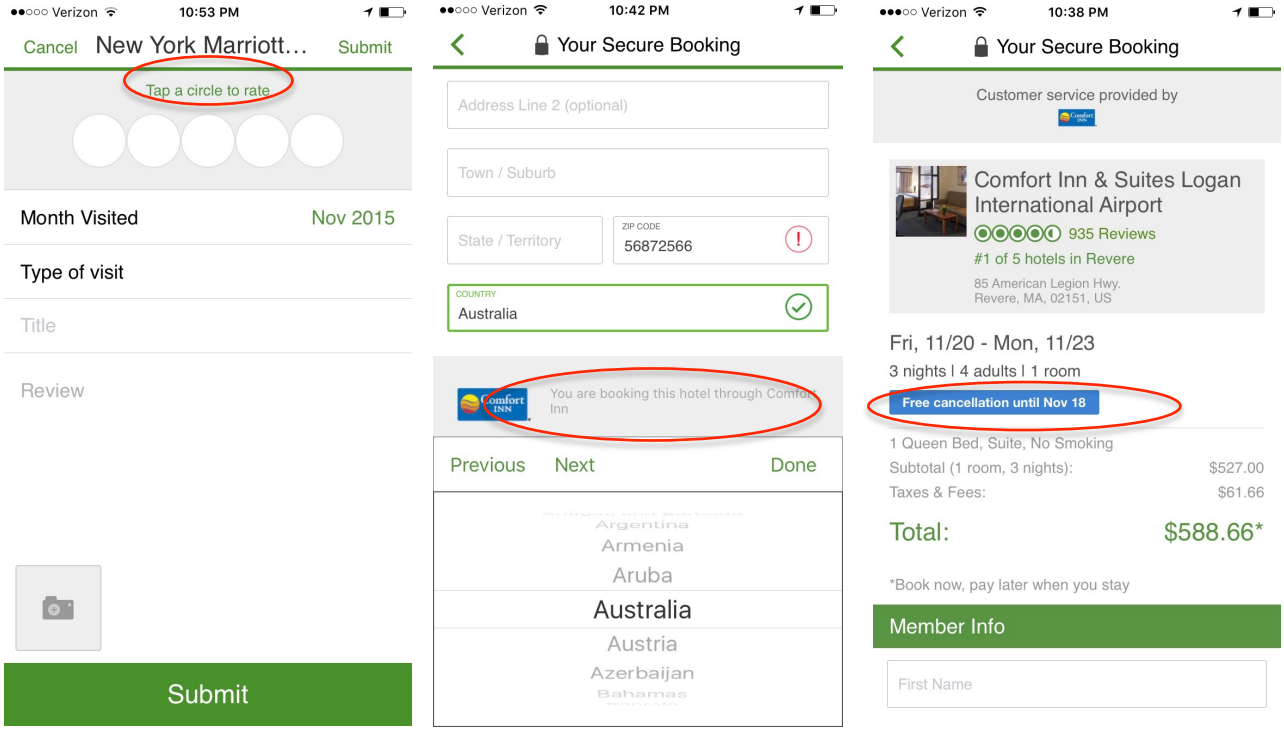
Finding 3: Poor information architecture and organization in select sections of app. The categories of photos in the drop down menu below (see Figure 3) appear to be listed arbitrarily, separating photos of the "rooms/suites" from photos of the "view from room." "Pool/beach area," which arguably belongs in the "hotel & grounds" category, is separated out and is visually distant from the latter in the drop down menu. This violates the "structure and navigability" heuristic, as related concepts are not grouped together, but rather separated. Additionally, "room/suite" photos are subdivided by those taken by "travelers" and "experts." These subcategories do not exist for the other photo category headings. Instead, there is a "management photos" heading at the bottom of the list. It is unclear how "management photos" differ from "expert photos" and whether "management photos" contains photos of all of the above settings (e.g. hotel & grounds, bathroom, dining, amenities). **Severity: Moderate.** This issue will likely delay and frustrate users to a moderate degree. It is likely most users will find the information they are seeking, but it will require more time devoted to examining the UI. Select users may also abandon the task if they are confused by the categories and/or are unable to find photos of what they are seeking within a reasonable time frame. **Recommendation:** Re-organize the drop down menu, such that related photos are grouped under clear headings (e.g. "rooms/suites") with subcategories ("bathroom" "view from room"). Once users have selected a category, and are presented with the photo viewer interface, allow them to filter the photos by creator (e.g. photos taken by "travelers," "expert reviewers," and/or "hotel management") (see rightmost image in Figure 3).

Figure 3: Poor information architecture and organization in TripAdvisor app



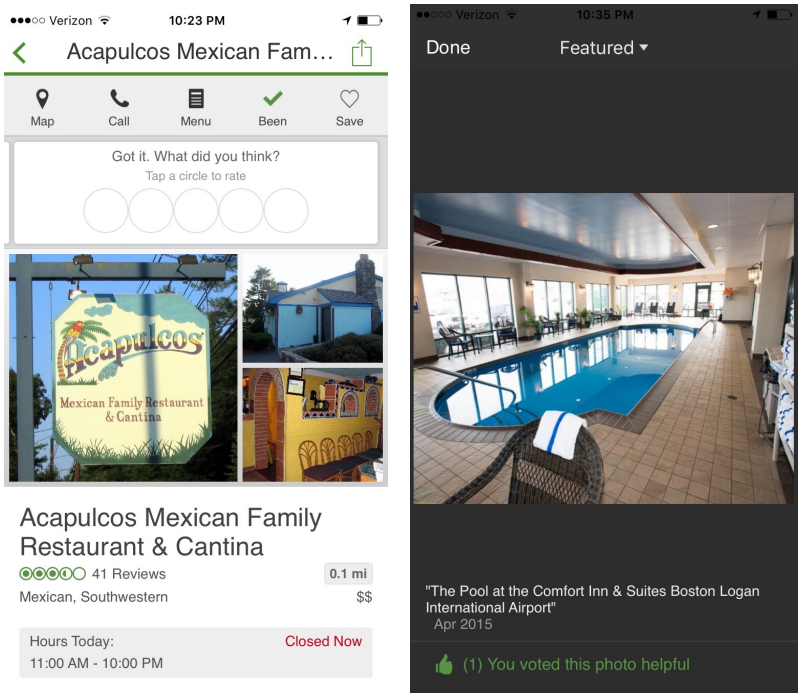
Finding 4: Poor readability of text. There are numerous screens within the app that utilize font that is of insufficient size and inappropriate color for the mobile context. For instance, the small green text that encourages users to "tap a circle to rate" is very hard to discern against the gray background (see Figure 4). The center and rightmost images illustrate additional instances of poor readability and contrast (i.e. dark gray font on gray background, white font on blue background). These examples are all the more concerning as the information being communicated in the text body is vital (i.e. confirming the hotel being booked and cancellation deadline) These examples clearly violate the "Employ a simple, focused, glance-able, and aesthetically pleasing interface" heuristic, as the interface lacks glance-ability and readability. **Severity: Moderate.** While many sections of the app utilize clear and salient typography, there are numerous violations, which are likely to lead to irritation, errors, and even task failure. **Recommendation:** When possible, utilize black font on white backgrounds, as this has been found to be more readable (Taylor, 1934). Keep blue font to a minimum as it is harder for older adults to perceive (Cooper, Ward, Gowland, & McIntosh, 1991)

Figure 4: Examples of poor readability in TripAdvisor app



Finding 5: Certain actions are "undoable" (e.g. once a user has selected that they have "been" to a restaurant or hotel or rated a photo "helpful"), there is no way to undo the action (see Figure 5). This violates the "user control and freedom" heuristic, since the user lacks the ability to control their experience. **Severity: Moderate.** This inability to control or undo/redo actions is likely to cause occasional task failure and user frustration. It could also negatively impact the accuracy of TripAdvisor's rating system. If these "false positives" accumulate, TripAdvisor's algorithms and trustworthiness as a brand may be negatively affected, potentially increasing the severity rating to critical. **Recommendation:** Allow users to undo the selection of icons (e.g. "been" icon and "helpful" photo thumbs up). For instance, one click could activate the icon, a second click could inactivate the icon. This interaction convention is already established in other iOS apps (adhering to the "use a theme and consistent terms, as well as conventions and standards familiar to the user")

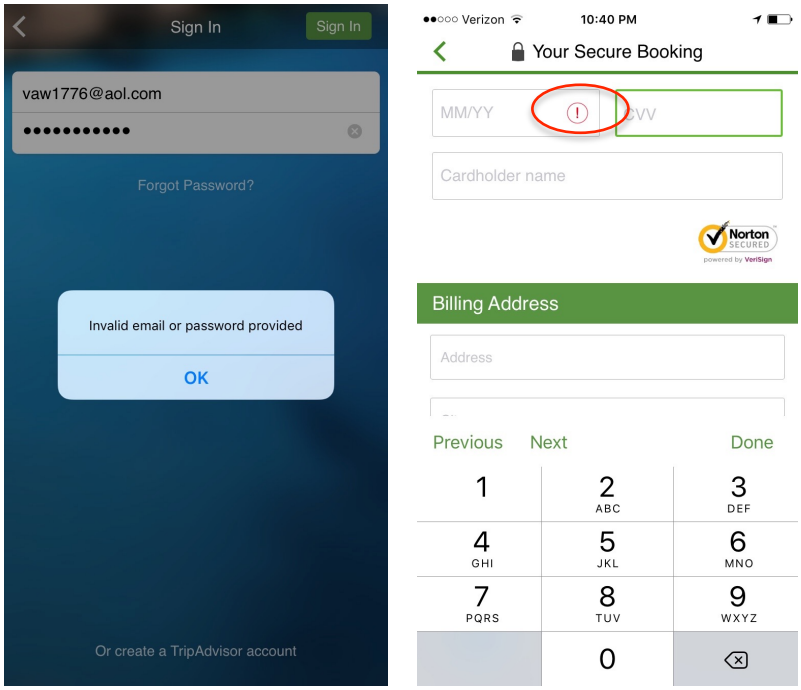
Figure 5: Lack of user control in TripAdvisor app



Finding 6: Error messages are inconsistent in appearance and lack saliency. Select error messages, such as those in Figure 6, utilize a white pop up box with black text. This contrasts with other error messages within the app, such as the red exclamation mark (see Figure 6). This violates the "Use a theme and consistent terms, as well as conventions and standards familiar to the user" heuristic. Additionally, the red check mark is small, hard to discern, and fails to provide concrete details as to why there is an error. This violates the "Prevent errors and help users recognize, diagnose, and recover from them when they occur" heuristic. **Severity: Moderate.** Failing to see or understand an error message is likely to cause delays, and possibly even result in abandonment.

Recommendation: In lieu of the red exclamation point, utilize a dialogue box that specifically states the issue and/or resolution needed (e.g. Expiration date must be in MM/YY format (e.g. 11/15)). Additionally, designers should visually differentiate error message dialogue boxes from other types of dialogue boxes, such as through the use of the color red. This will help the user discern between the two types of messaging and ensure important error messages are sufficiently salient.

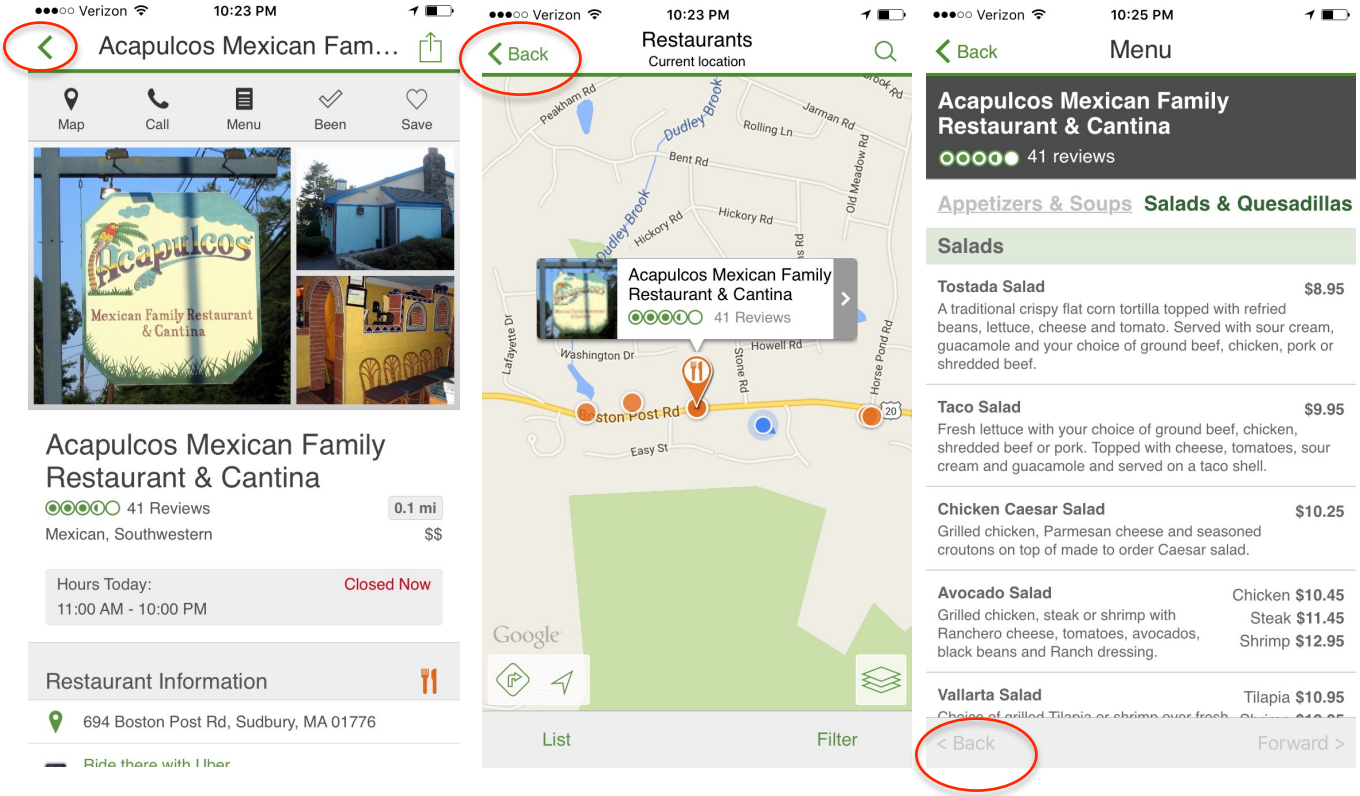
Figure 6: Inconsistent and inconspicuous error messages in TripAdvisor app



Finding 7: Lack of easy navigational tools, including a home button that allows users to return to the main page. When engaged in any task flow, the only method a user has of returning to the home/main landing screen is by hitting the "Back" button repeatedly. This is a violation of the "Structure and navigability" heuristic. **Severity: Moderate.** The lack of easy navigational tools and menus within the app is a significant problem that negatively impacts user efficiency and overall usability. **Recommendation:** Offer an ergonomic bottom navigational bar or other tool (e.g. hamburger menu) that facilitates movement from one section of the app to the other.

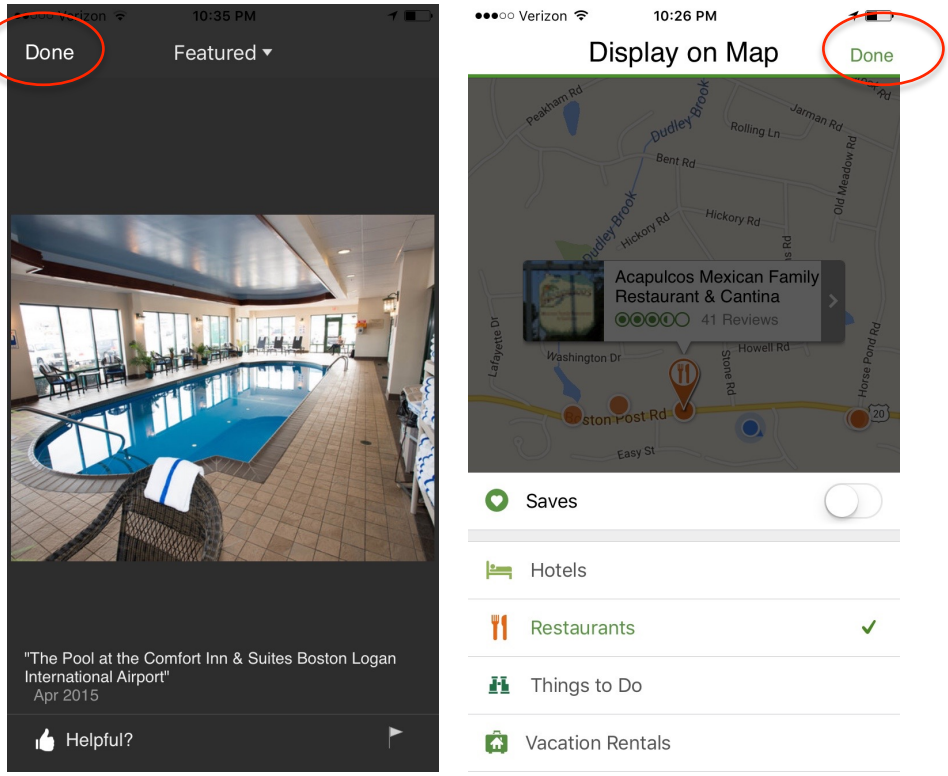
Finding 8: Inconsistent "back" button treatment. The TripAdvisor app utilizes three different types of "back" button (see Figure 8), which violates the "Use a theme and consistent terms, as well as conventions and standards familiar to the user" heuristic. **Severity: Mild.** While potentially confusing to the user, they are still likely to be able to correctly understand and navigate the app. **Recommendation:** Whenever possible, strive to use the standard iOS "< Back" convention.

Figure 8: Different back buttons utilized by TripAdvisor app.



Finding 9: Inconsistent "done" button placement. The "done" button, which traditionally appears in the top right corner in iOS apps, appears in different and inconsistent places with the app (see Figure 9). This violates "Use a theme and consistent terms, as well as conventions and standards familiar to the user" heuristic. **Severity: Mild.** This inconsistency may cause errors and/or task performance delays as users are conditioned to tap the upper right-hand corner of their screen in order to exit/close a task. **Recommendation:** Always place the "done" button in the upper right hand corner of the screen to maintain consistency and mirror iOS conventions.

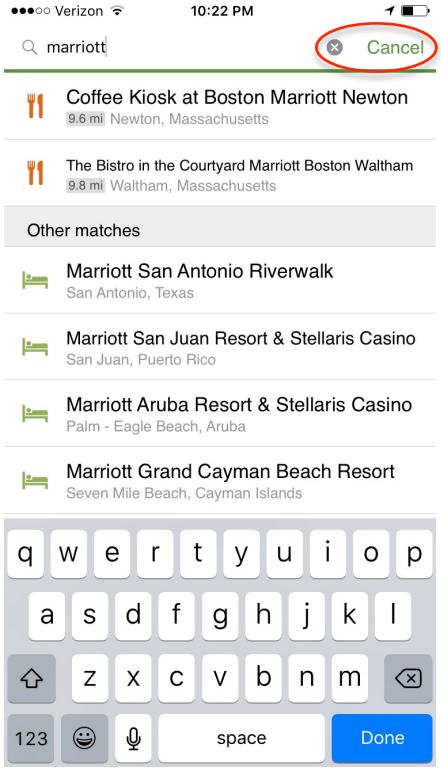
Figure 9: Examples of inconsistent "done" button placement in TripAdvisor app



Finding 10: Inadequately sized touch targets appear in several places within the app (see Figure 10). This violates the "Physical interaction and ergonomics" heuristic. **Severity: Moderate.** Being able to accurately select interface elements and carry out desired tasks is fundamental to application usability. This is all the more important for touch-screen based smartphone apps, given that users often engage with them on-the-go, when hands may be unsteady. A "misclick" is likely to lead to a significant degree of frustration and task abandonment.

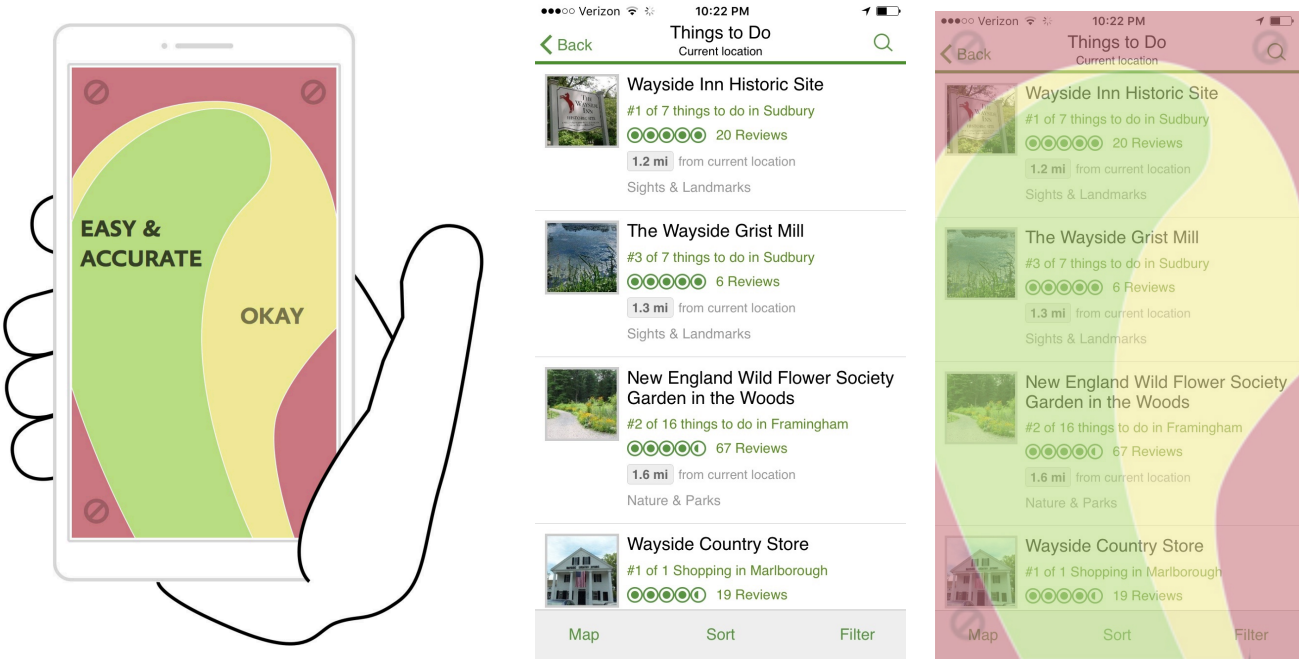
Recommendation: Make any and all targets sufficiently large and spaced apart. For instance, increase the size of the "Cancel" button below (Note: Use the text and eliminate the small gray encircled "X") and ensure there is a buffer between the "Cancel" button and first search result below it.

Figure 10: Examples of inadequately sized touch targets TripAdvisor app



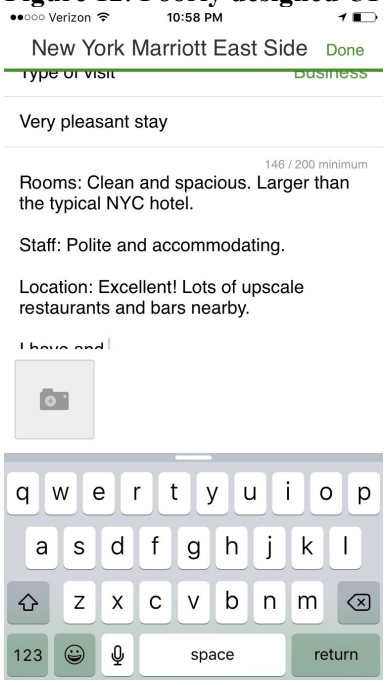
Finding 11: Main navigation buttons are not easily accessible via thumbs. The majority of smartphone users (49%) operate their device with one hand (Clark, 2015). This means that they are reliant on their thumbs for navigation. The TripAdvisor app fails to take this ergonomic factor into account, placing the key navigational buttons in the top 1/8 of the screen, out of easy reach for thumbs (See Figure 11). This violates the "Physical interaction and ergonomics" heuristic. **Severity: Moderate for one handed users, Mild for others.** Since one-handed navigation of the app is challenging, users are either forced to strain their thumbs in an attempt to press the navigational buttons, or they must revert to a two handed grip. The latter might not always be possible, depending on the context of use, and may result in frustration and occasional abandonment. **Recommendation:** Place key navigational bar at the bottom of the screen, which is more easily accessed by thumbs and/or utilize gesture based commands, enabling a user to swipe forwards and backwards to advance and backtrack within the app. Note: If designers opt to utilize a bottom navigational bar, this approach should be applied throughout the app for consistency, in lieu of a separate top navigation bar.

Figure 11: Diagram of screen areas accessible to thumbs (left image, source: Clark, 2015). The green thumb zone is the most comfortable and accurate region for one-handed smartphone users. Clark suggests avoiding the red areas, or compensating with larger than usual touch targets. **Sample navigational screen in TripAdvisor app (middle image) and with overlay (right image).**



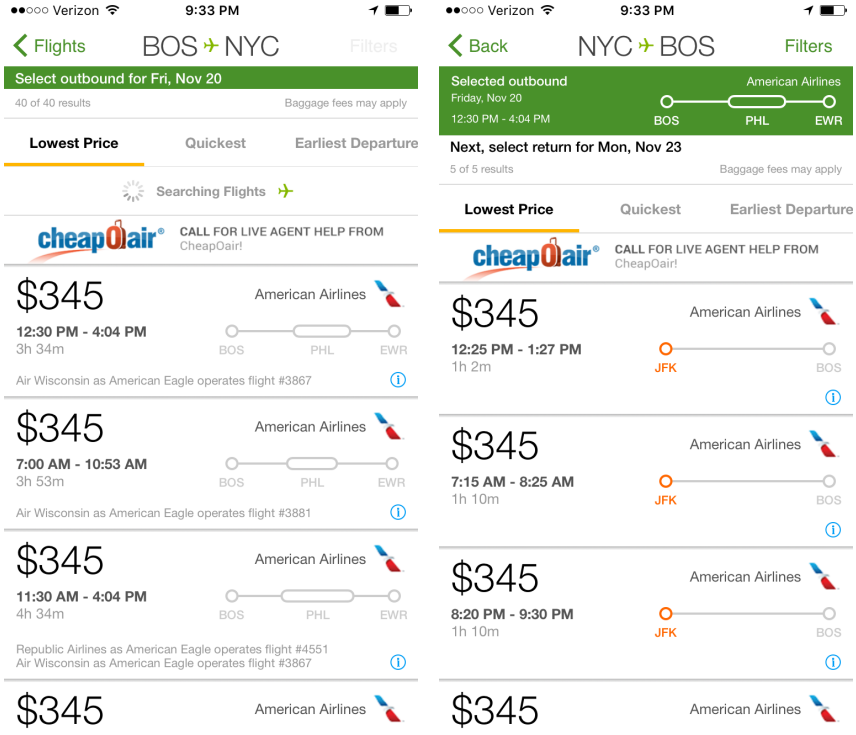
Finding 12: Users cannot view drafts of TripAdvisor reviews in their entirety (see Figure 12). This violates the "user control and freedom" heuristic. **Severity: Critical.** TripAdvisor is dependent on user reviews that are honest and thorough. Additionally, the app is often used on-the-go (e.g. while traveling), making the mobile app a popular means of posting reviews. If users cannot write, proof, and post reviews, then the mobile app fails to support two of its primary functions: facilitating the finding of excellent hotels, rentals, and tourist attractions, and incentivizing and aggregating a rich archive of travel reviews. **Recommendation:** This "write a review" interface should be fixed as soon as possible to enable users to view a message in its entirety before publishing to the main site.

Figure 12: **Poorly designed UI for drafting and posting reviews in TripAdvisor app**



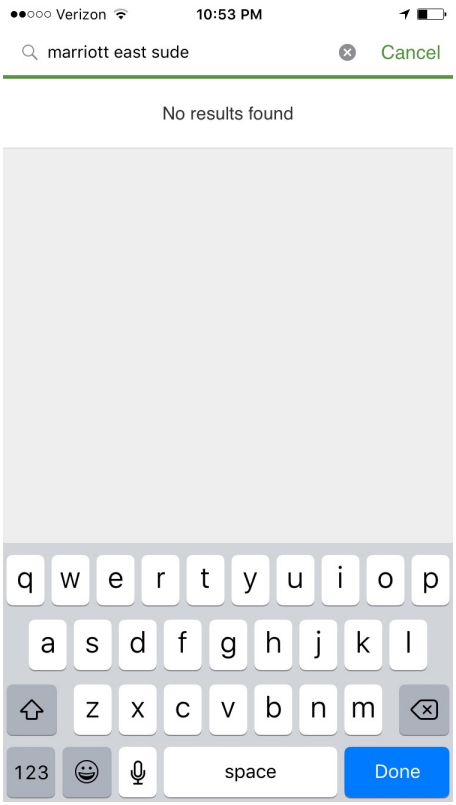
Finding 13: The steps necessary to select and purchase airfare are unclear. For instance, after a user has selected their preferred departure and return dates, they are presented with a set of flight options (see Figure 13). There is no salient indicator of how to proceed in choosing flights. If one selects one of the listed flights in the first screen below, the screen changes to the second screen below, but there is no salient feedback that the first flight was selected. In fact, given the similarity of the two screens, users may believe their first flight selection was not processed. It is only through a very careful examination of the screens, which are overwhelming due to the crowded layout and amounts of multi-colored text, that one sees that the second screen is asking the user to select their return flight. This violates the "Design a clear navigable path to task completion." **Severity: Critical.** Being able to search and book flights is a core feature of the TripAdvisor app. However, the app leaves the user adrift, with no clear sense of how to reach their goal. This issue must be addressed, as it is likely to cause intense frustration, user errors, and task abandonment. **Recommendation:** Streamline the flight booking screen in terms of layout and text. Provide clear and salient action prompts ("Choose your outbound flight"), as well as feedback when a user takes specific actions (e.g. User selects outbound flight "Great job! Now select your return flight.")

Figure 13: Sample screens from flight booking process in TripAdvisor app.



Finding 14: The search feature requires exact search terms and does not accommodate typos. Whereas other tools like Google will offer suggestions (e.g. "Did you mean…"), TripAdvisor requires exact search terms (see Figure 14). As a result, the app violates the "Ease of input" heuristic. **Severity: Moderate.** Users will likely become frustrated by the apps' demand for exact, spelling-error free search terms, as users are often on-the-go and typing on a small smartphone keyboard is unexacting. **Recommendation:** Offer up both exact search results and close matches, to account for user errors.

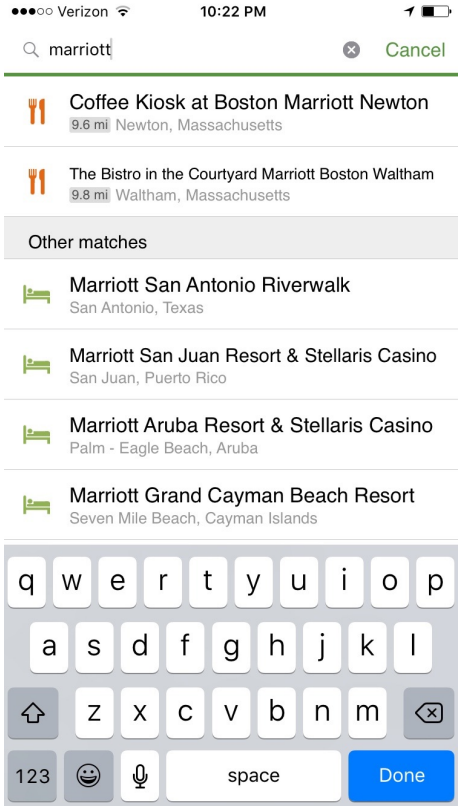
Figure 14: Example of search requiring exact terms



Finding 15: The app fails to present the most relevant search results first (i.e. closest attractions) (see Figure 15). Additionally, the search algorithm appears to differ between the restaurant and hotel searches. While the restaurant results utilize the phone's GPS and order the list by those restaurants close by, the hotel search results are irrelevant and seemingly arbitrary. This violates several heuristics: "Use a theme and consistent terms, as well as conventions and standards familiar to the user"; "structure and navigability"; and "make appropriate use of the camera and sensors." **Severity rating:** Moderate**.** Users are still able to utilize the app, albeit less efficiently. The irritation caused by this inconsistency and illogical search results is moderate. **Recommendation:** Develop search algorithms that feature the most relevant info to the user (e.g. based on current location). Ensure search functions

have the same settings regardless of whether the search is conducted for restaurants or hotels (unless the user consciously tailors their settings to do otherwise). Allow the user to tailor or filter their searches by the criteria most important to them (e.g. location, price, rating).

Figure 15: Poor and inconsistent search results in TripAdvisor app

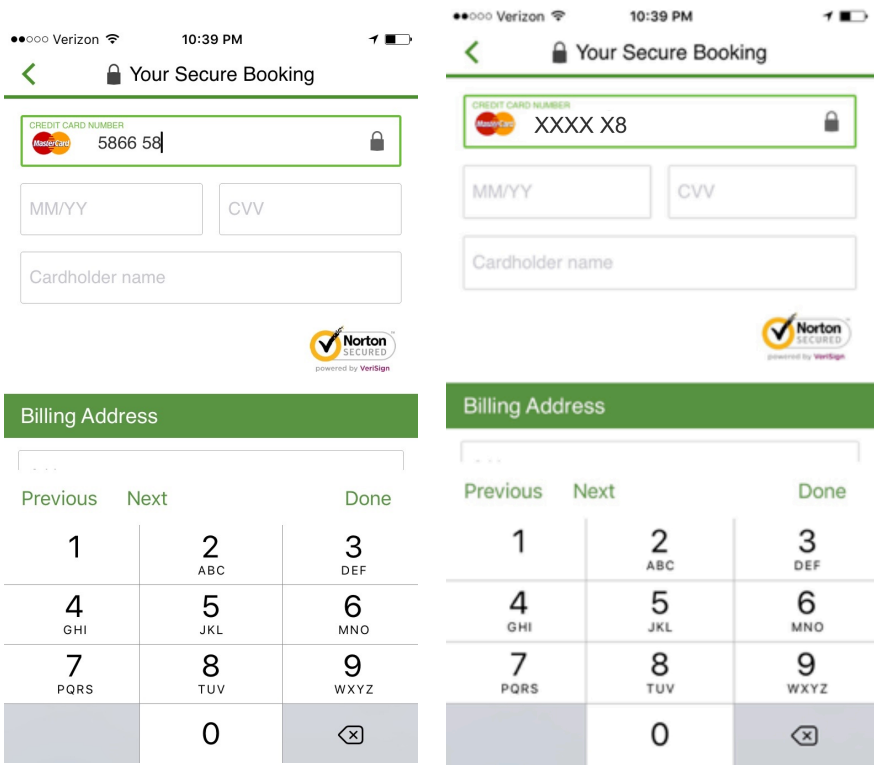


Finding 16: Poor security when inputting financial information; credit card number is not hidden/encrypted (see Figure 14, left image). Given that users often operate smartphones in public spaces, sometimes in close proximity to others (e.g. subway), having a credit card number visible puts the user's personal information at risk.

Severity: Critical. Financial security is a major concern for users. If an interface or app does not appear to protect their personal data, it erodes user trust, creates anxiety, and may result in the user abandoning the task and rejecting the app in its entirety. This can have potentially damaging effects on the brand as well, in this case TripAdvisor.

Recommendation: When a user is entering credit card data into the provided field, visually obscure what is being typed. Many apps on the market opt to do this by momentarily showing the letter that was typed and then immediately turning it into an "X." This provides helpful feedback to the user that they are typing the correct letters, but also protects their personal data (see Figure 14, right image).

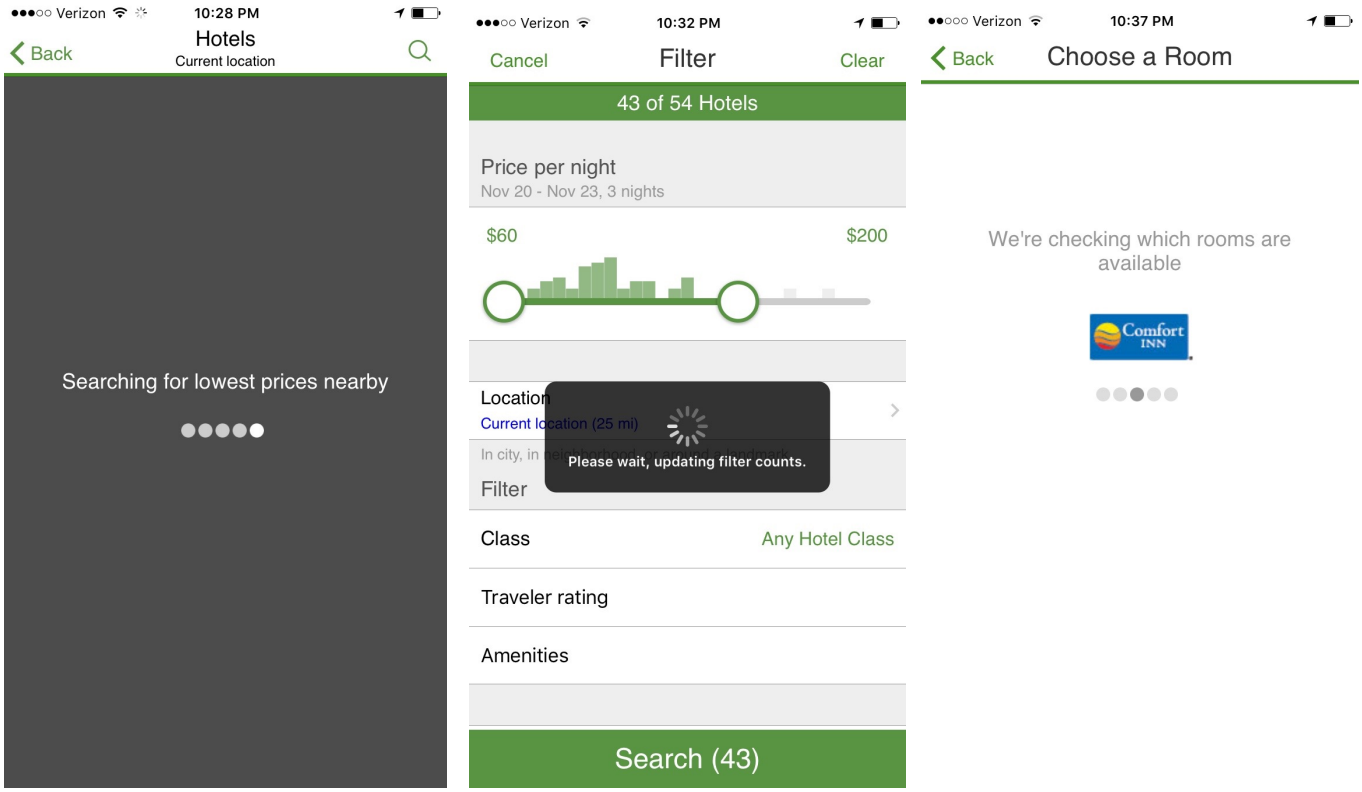
Figure 16: Example of poor privacy and security measures within app (left image) as well as redesign (right)



Conclusion

Clearly, the heuristic evaluation has surfaced many usability issues with the TripAdvisor app. While the evaluation focused on areas for improvement, it is also important to note an area in which the app largely succeeds: providing immediate feedback and notification of application status. This is evident whenever the app is aggregating search results. Rather than obscuring system activity, the app clearly communicates an active search process via a spinning dial (see Figure 17). This affords the user a sense of confidence and control that the app is operational and completing the desired task. TripAdvisor could further increase user confidence, efficiency, and delight by implementing the recommendation listed with this evaluation, ultimately resulting in a better user experience.

Figure 17: Example of immediate feedback in TripAdvisor app



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