WaitNoMo

By PB&J

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Abstract

PB&J is a startup software company comprised of McMaster Engineering and Computer Science students. We intend to deliver high-level technological solutions for current real-world problems which means we combine our passion and knowledge of software towards any industry that can benefit.

Amusement parks have been a huge attraction for centuries since the first fair opened in 1893 in Chicago [1]. People love to visit these parks to ride the exhilarating roller coasters, experience the special events, partake in games and so much more. It's a great opportunity to spend time with friends and family to create memories that will last a lifetime. Although these parks contain all kinds of benefits, they also harbour a major problem that needs to be addressed.

Introduction

Amusement parks are a wonderful place but one aspect no one enjoys are the long lines. Long lines lead to long wait times for many attractions. It could be a new attraction, popular attraction or even an average one on a busy day but none have appropriate solutions to tackle the time wasted. Wait times for rides can exceed one hour with worst cases being over 5 hours for Avatar Flight of Passage in Disney Kingdom, FL which had a verified wait time of 319 minutes [2]. This large amount of time is spent standing in a line instead of visiting other attractions which would benefit both the customer and the amusement park. PB&J proposes *WaitNoMo*, an application that works in partnership with amusement park owners to present a solution to eliminate majority of the time wasted standing in long lines. *WaitNoMo* will be a mobile reservation application that will allow users to reserve their place in line. Going through the PB&J application or through existing partnering applications (i.e. Disney, Canada's Wonderland), users will be able to select individual attractions to reserve their places for. Using the predicted wait times for the rides, users must wait for after confirming a reservation where they can go do anything else at the park. A notification will be sent 10 minutes prior to the end of the wait time through the application where the users must make their way back to the attraction. Afterwards, they will be able to have either direct access to the ride, access to another line or anything else the client wishes. Users will be able to reserve places for a maximum of 2 attractions to ensure fairness and to avoid cluttering at other spots in the park. This limit will be optimized for each client during the research phase.

This idea is greatly needed as long lines have been an issue for centuries and there currently is no similar solution to this in the market. Some solutions that will be mentioned in the Related Works section tackle the same problem but do not address the unique reservation system that we have come up with. Simply stated, the solutions in the market either display wait times to help the user plan their visit or they provide an expensive add on to avoid longer lines.

The key idea that PB&J will tackle is that we aim to eliminate majority of the time wasted in lines and be adaptable with any parks' existing solutions.

Related Work

Within the past decade, many major amusement park owners have presented their solutions to long wait times. These solutions fall into two categories; provide wait times or separate lines for an extra cost.

For the first category, applications exist for many of America's largest parks including Disney's "My Disney Experience", Universal Studios Orlando's "Official Universal Orlando Resort App", Cedar Point's Cedar Point Official App, and Hershey's "Hersheypark Official" [5-8]. These applications do not implement an actual reservation system but instead allow guests to view average wait times of rides around the park. This allows users to plan their day themselves by deciding whether a specific ride should be attended or not based on the wait time provided.

The second category is used by most parks these days. They implement "fast pass" ticket add-ons which enable people to pay extra money to have access to "fast pass" only lines. As a result, these lines will be much shorter than the regular lines which results in shorter wait times. This is a good way to address the issue for paying users but some attractions can still be lengthy and in some cases, the pass is too expensive for many people, especially when attending these parks with a large group/family.

As mentioned above, WaitNoMo has one primary goal – to reduce the wait time required to enter an amusement park ride. The app is targeted towards anyone who dreads the long lines at amusement parks. The current process of waiting in lines make visitors feel trapped. There are better things to be doing with time than waiting in lines for hours under the hot scorching sun. WaitNoMo allows the user to manage their time better by providing them an option to reserve their place in multiple lines at once. The user is free to do anything they please, while WaitNoMo keeps track of the time left in line. The app will notify the user a few minutes prior to the actual time they can have access to the ride. Users will be required to purchase a plan in order to use WaitNoMo as to not decrease the value of other pre-existing plans (FastPass).

WaitNoMo will be made with two main types of users in mind. The end users (Amusement Park visitors) and Admins. Both types of users will have access to different features.

Functionality for end users (Amusement Park visitors):

- New users will have the option to sign-up. Once a sign-up is successful, the user information will be stored into a SQL database.
- Returning users can login using the email and password they signed up with. The data is requested and taken from the same SQL database.
- Once the user has been verified, they will be taken to a screen with multiple options. They can purchase a WaitNoMo plan if they do not already have one. This data will be provided by the amusement park.
- They will have another option to renew their pre-existing WaitNoMo plan.
- Otherwise they can process their current ticket to begin using the app. They can choose to scan the QR code using their phone camera.
- Or they can enter the number on the back of the ticket manually. The ticket information will be added to the database under the current user. This means they will never have to scan the ticket again, unless their current ticket has expired.

- After the user has successfully provided proof of purchase, they will be presented with a map of their respective amusement park. The map will be provided by the amusement to ensure it is always updated. The map will show all available rides in the park.
- The user can reserve a ride of their choice by simply clicking on it on the map.
- There will also be a list view of all the available rides. They will be ordered by distance by default. Users can sort them by distance, popularity, new, or estimated wait time.
- Once one or more rides have been reserved, the user can view a list of all the available rides
- This screen will give the user an option to cancel any ride of their choice.
- Ride wait time will also be clearly visible on this screen.
- The app will have a news section which will contain news about new attractions, or events at the respective amusement park
- The user can choose to view the direction to ride a ride of their choice
- Real-time location tracking will use the phones' GPS to keep track of the users current location on the map.
- Save favorite rides
- App customization
- User will have the ability to customize the theme of the app, view their favorite rides, or view their ride history.
- All the sorting in our app will be done using a Quicksort algorithm. This is because quicksort has the best running time in average case for most inputs.
- To scan the ticket QR code with the camera, we will be using pre-existing APIs and libraries, such as Barcode API, or Android QRCode scanner library.
- The searching in our app will be done by a Binary Search algorithm
- Google Maps API will be used to get directions to the rides

Admin Features:

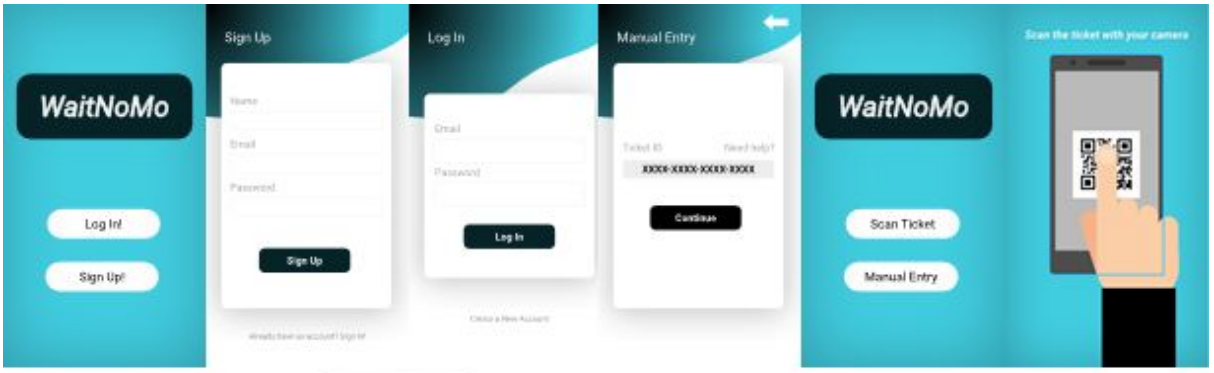
- Admins will have the ability to change any user settings.
- They will be able to view all usage data
- Can check which rides are the most popular by checking their respective number or favorites and reservations. This data can be used by the Amusement Parks to improve rides that does not appear to be doing as well as the others.

Platform

WaitNoMo will be primarily targeted towards two main platforms: Android and iOS. To create the app on Android, we will be coding in the Java language. For iOS, we will be doing in Swift. We will be constantly hiring experienced full-stack Android and iOS developers. They must have a rich background in UI/UX design and have developed fully functional mobile apps. The team will monitor the status of the app and perform maintenance as soon as possible if necessary. If the app receives enough attention, and has enough funding, our team will try to expand the app onto other platforms.

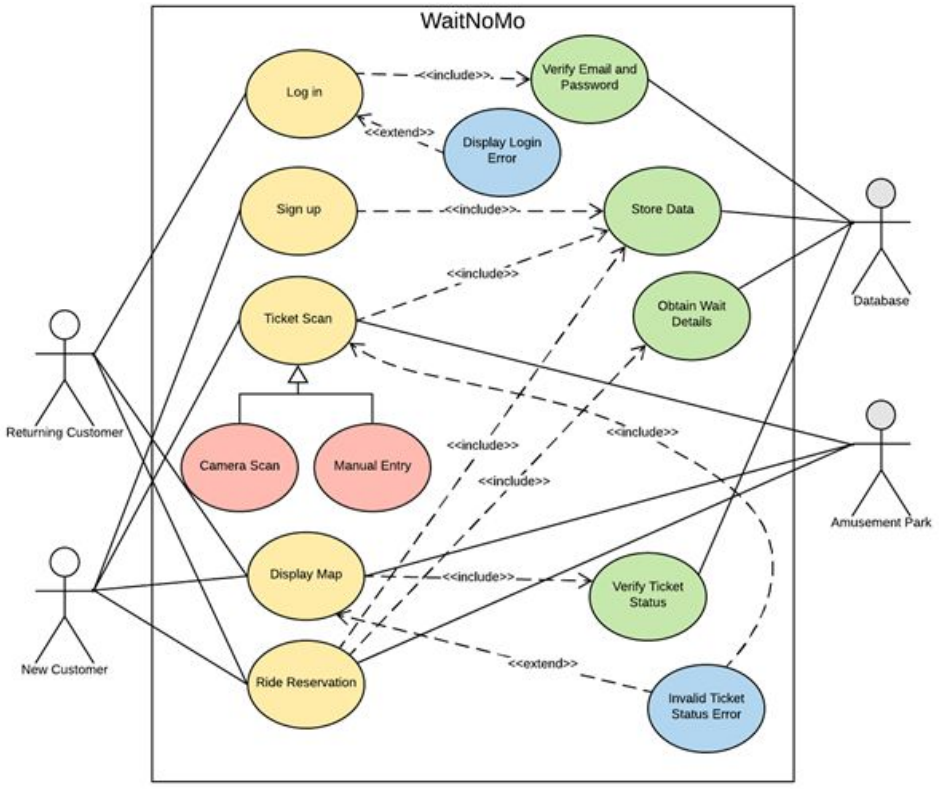
Design

WaitNoMo must be colorful yet simple. Components of the app should be uncluttered. To provide the best user experience possible to the customers, we will be collecting data through surveys. The user will have the option to take part in the survey if they choose to. Whenever a drastic change is made to the apps' UI, we will conduct a new survey to get the customer opinions. These surveys will be taken into consideration for the next iterations of the app to enhance the user experience.



Use-Case Diagram

The following use case diagram summarizes all the main features of our app. It shows how the new and returning customers interact with each feature, how each feature gets its' necessary information, and what it does with the user inputs.



Financial Plan

Phase 1: Initial Development

The initial development phase will take approximately 1-3 years and will be spent on development of our base product and establishing a marketing strategy that allows us to enter the market. We estimate that our expenses will total around an estimated $10,000 per month during this phase. Approximately 60% of this will be incurred by technical development costs, and 40% by marketing.

Technical development will involve on turning our idea and algorithm into a functioning prototype. Since our team has the technical capability to accomplish this, we expect no additional employees will be needed. Therefore, all expenses incurred in this phase will be due to overhead from software development; data storage fees, (minor) technical equipment expenses, and sufficient compensation for team members' day-to-day expenses.

Social media outlets such as Facebook, Instagram, Reddit, Twitter, and Email will be the primary marketing platforms due to their high benefit to cost ratio. Direct advertisements (including website advertisements, magazine and newspaper articles) will also be considered as a secondary platform in order to reach potential clients that do not use social media.

This advertising will be targeted towards two audiences: event-hosting companies and event-attending individuals. Though revenue will come directly from event-hosting clients that use our products, it is imperative that marketing is also targeted at event attendees so to maintain a sufficient number of users such that the product is a benefit to the event-hosting companies. Furthermore, raising awareness and positive feedback from event-attendees helps to promote our product to new clients.

In this phase, we intend to market to companies that host small events such as local carnivals and small fairs. More specifically, we will target events with <10,000 average daily attendees in order to refine our software platform. We will offer a special cost of only 2% of overall ticket sales in addition to overhead cost (a flat-fee based on expenses incurred from server hosting, travel, and data usage expenses). We believe that offering our services with no additional base fees, despite sacrificing some revenue in the initial phase, will encourage clients to help in testing and development of our framework.

At the end of year 1, our monthly target will be to provide a service for 2 events, with a minimum combined total of 10,000 attendees. After years 2 and 3, we expect to increase this minimum to 20,000 and 40,000 attendees per month, respectively. Through market research, we have identified a ticket price of $20 to represent a low-end market average, from which to calculate a minimum estimated monthly revenue. Using this standardized average, we estimate an average monthly revenue of $16,000 by the end of year 3. This projection means that beginning early-mid year 2, we will begin generating monthly profits.

Phase 2: Profit Generation and Technological Expansion

With additional capital available from growing profit margins, we intend to invest heavily in market and technological research and development. Our goal during this phase will be to gradually expand our platform into a system that is scalable to events that see 10,000-20,000 average daily attendees. Technical research and development will be focused on optimizing our attraction-queueing algorithms and an effort to transform our platform into an easy-to-implement framework. Our marketing strategy will maintain its directive via the aforementioned social media outlets, while also adding obtaining new clients resulting from the networking process. Overall, we aim to continue to appeal to event-holding companies and event-attending individuals alike by adapting to changes and overcoming challenges in the market future.

Lastly, during this phase we intend to obtain any patents to our queuing and wait time estimation algorithms deemed necessary to maintain our market foothold. However, due to the unreliability and inconsistency in software patenting laws, we aim not to rely on patents alone, but rather our value proposition as defined above.

Phase 3: Entering the Amusement Park Market

Following the product development and expansion phases, for years 3-5 we will continue to target larger companies, including state fairs and expositions, while also entering the amusement park market via small amusement parks.

In this phase, we expect our costs to rise variably to approximately $20,000-$50,000 per month. This will account for the increases in marketing, workforce expansion, and the product R&D necessary to scale our framework to such large events. During this phase our business model will see significant changes in order to increase profit. Along with competitive partnership acquisition, we will examine other potential means to increase

revenue. One likely method will be charging a base cost, which will vary depending upon the size of the event. Typically, this base fee will be around $1 per expected attendee for an event. This fee is to ensure protection against potential losses that could occur due to inclement weather or other unforeseen events. Rates will also increase while remaining competitive, to approximately 5% of total ticket sales. Our target number of attendees will then increase to approximately 100,000-200,000 per month, thus increasing our revenue to $200,000-400,000 per month.

Phase 4: Continuous Growth

Years 5+ will continue the same relative pattern as in phase 3, with a shift of focus on partnership acquisitions to large amusement park companies such as Disney and Universal Studios. Costs will remain relatively steady, with potential minor fluctuations to remain competitive while maximizing profit margins. There will be various challenges in this stage, many of which may be unforeseen at the current time. However, we expect new competition to be one of the major challenges in this stage. Since by this time our proprietary technology will be fully developed, our expense structure will shift to a marketing-first approach, with as much as 70% of money spent on market research and advertisements, and 30% on continuing technological research and development.

Long term resources

For the next 3-5 years we needed different resources to sustain our product as well as our company.

In our business plan, following the initial development phase, for years 3-5 we intend to enter the expansion phase target larger companies such as state fairs and small amusement parks. In this phase, we expect our costs to rise variably to approximately $20,000-$50,000 per month. This will account for increases in marketing as well as company expansion.Our target number of attendees will then increase to approximately 100,000-200,000 per month. It becomes clear that In the long term development, the resources we needed are large amount of customers, $20,000-$50,000 of funding, as well as the development labs and personals.

Although these resources are seemed hard to achieve, we would have developed enough reputation of our product in the starting point of out product. We will raise funds by attending technology fairs or other similar events to present and greatly advertise our product to funding companies,large event holders, or amusement park owners to raise funds. Other options include loan from local banks or participate in government funding programs.

In order to gain the attendees we required, the process includes cooperating with event holders as well as getting well-known with general users we will make use of different advertising tactics including direct advertising on local papers or magazines to gain the interest of the public. There are also other options such as communicating with local schools and provide services to students on field trips or attending some lecturing events to make more connection with the event holders.

The labs and employees our company will be gathered by the funds we had risen or our revenue of income, moreover, we will provide internships or co op opportunities for college students in order to find extra employees.

We'll not only use these resources to further increase our area of service from event holders to large amusement parks, and also improve and expand the functions of our product, for example introducing more convenient UI, or adding new features like user's review.

Conclusion

Our overall goal for our app is to allow users to reduce their wait time in lines at amusement parks by a significant amount. The app will allow the user to reserve a spot in a line and it will notify the user when it is their turn to enter the ride or attraction.
The following functions will be added to the the application in future developments:

- Busy hours prediction, similar with the feature in google map, will let the users to plan their visit ahead of time.
- Users review, an important aspect which allow the visitors to write an review for the amusement park and let the owners to reply to visitors, it can not only let other visitors to get an overview of the quality of the amusement park or event, but also provide suggestions to amusement park owners or event holders to let them make necessary improvements.
- Accident record, this function allow this app to record the accident happening on every attraction and also the crime record near or in the amusement park or event location.I can increase the safety of the customer's when they are visiting.

We think that adding these features will provide the users a more comfortable experiences of using our product.

Resources

[1]
https://www.pastemagazine.com/articles/2016/01/time-travel-the-history-of-theme-parks.html
[2]
https://www.thetravel.com/10-disney-world-rides-with-the-longest-lines-10-with-the-shortest/
[3]
https://www.statista.com/forecasts/311215/amusement-and-theme-parks-revenue-in-the-us