LugTrack

Jui
Hemanth
Prajwal
Yinyin
Vinayaka

Vision:

Every year almost 7 billion people travel through airplane and not just by themselves but along with their luggage. There are always instances of the luggage being misplaced or lost in their transit. This causes high level of inconvenience for the travellers. Our product is a new application that provides notification to the commuters on their phone/computer regarding where the luggage is traveling real-time.

With this application once the commuter in on board they will get real time update on their luggage. Unlike the current solutions like LugLoc and Trackdot which uses GSM and Bluetooth tracking; our application offers a solution based on the collaboration with the airport security team, RFID, E-Mail and GSM text message; which will be more reliable and reduce the chances of the luggage being lost. This application will help all travellers to experience a hassle free commute.

Motivation:

The number of incident reported of luggage being lost or misplaced has increased three folds in recent times. Travellers have to either carry their valuable with them or they have to altogether find another alternative. As it is said "Prevention is Better than Cure" , we thought of building an application which will help them track their luggage, not only it updates the latest flight number it had been loaded, the carousel it was loaded to but also the real time location of that bag.

In 2017 alone there had been more than 380k reports of lost luggage. This is a prototype targeting only in the US and once we are completely confident then expanding on an International Scale won't be big of a task. Our goal is to create awareness about the mishaps that happen when someone loses their luggage and how to prevent those from happening.

Customer Segments:

Our product mainly targets any passenger traveling by airplane. We will be targeting a wider range of population belonging to all caste, gender, social status etc. Passengers travelling in economic &

business class both will be your primary focus. Special attention for first time airplane travellers will be looked into. To validate this customer segment hypotheses a series of questions were asked to all segments of population (right from Students to Artists, to first time travellers to frequent business travellers). Questions like What measures do you take to avoid losing your luggage during your travel, If you have ever lost your baggage during your trip or know someone who did, what problems did you/they have to face in that situation . With the feedback we received on the questionnaire help us get a clear focus on the target segment for our product. All travellers students, artistic, frequent travellers , tour travellers etc are very much open and would definitely opt to have a Luggage Tracker while travelling.

Unmet Needs:

From our detailed questionnaire we found out that travellers at some point of time have faced inconvenience in their life due to their luggage being misplaced, lost, damaged etc. It took minimum of at least 3 – 4 working days to get back the luggage. Due to this travellers at point had to miss out on their important events like a meeting or a family reunion cause of the unfortunate event. A strong desire was expressed by these set of passengers to have a product where they could locate their luggage with ease. Even passengers who had not experienced the unfortunate event of luggage being misplaced would like to have a product to assure the travellers about their luggage.

Existing Solution:

There are quite a few products in the market that track luggage by using GPS, mobile networks, Bluetooth or Wi-Fi. TrackDot, Lugloc, BagTrack, Waldo, Versa etc.
if we speak technology wise they lack the real time location as their technology is restricted to Bluetooth, GSM etc usage. Price range of these existing trackers are at a higher side. Major need for new application is the lack of accuracy and restricted platform

<u>Competitive Analysis</u>

	Our Application	TrackDot	BagTrack	Lugloc	Waldo	Versa	Horizn
Technology	GSM,Bluetooth,Wifi	GSM	Bluetooth	GSM-GPS	Bluetooth	GSM, GPS, Bluetooth and WiFi	GPS
Notification	E-mail,SMS,Push Notifications	SMS	Push Notifications	Push notification, maps,, paid additional services	Push Notifications	Push notification on a app,	SOS

Platforms	iOS/Android	iOS	iOS/Android	iOS/Android	iOS	iOS/Android	iOS
Hardware	RFID,GSM,Bluetooth	Accelerometer	iBeacons	GSM-GPS module	Bluetooth Module	Lithium-ion Batteries	GPS tracker
Features	Proximity alerts, Easy add-on to luggage	Automatic Airplane mode,Vibrate when in proximity	Distance between you and bags	Trackable via app if goes missing, auto airplane mode, easy	Track in Carousel	Auto Flight Mode, Cloud, Sleep Mode,Integrated system	Alarms
Price*	$24.99	$31.99	$62.99	$49.95	$78.74	$199	$271.93

*Price mentioned is the price for the devices offered by our competitors to their customers. Our application will charge a small fees for the services that we offer.

Differentiation:

Knowing that we have a wide customer segment. Our market potential is really huge as there are almost four billion passengers travelling every year. Competitors for the luggage locator are just few in the market also they haven't proved very effective and accurate. Aviation industry one of the biggest in the world, would be a huge promoter and facilitator for Luggage Locator.

Verbal/Visual Walkthrough of Use Cases:

1. **Businessman:**

    Luggage was placed correctly I learned the hard way never to put my home address on the outside of my suitcase. I was on a three-month work assignment to China and my huge suitcase was lost. I checked with the airlines, apparently the suitcase was not on the plane. After I encountered this issue, I download luggage tracker app and install the device on my traveling suitcase. I create an account and input the unique id of the device to make sure they are linked together. Later, I need to flight to France. When I was boarding, I clicked 'track my luggage' on the app, entered the airline number to the app, I received an email and a text message that says " your luggage is already on the plane, wish you enjoy your trip!" . By receiving these messages, I know that my suitcase was correctly placed on the

plane. - luggage was placed incorrectly After I boarded on the plane, I clicked 'track my luggage' on the app, entered airline number, then I received an email and a text that says "your luggage is on the wrong transportation car, please check with the airline!" I contacted the crew member, so they checked the luggage transaction and made sure my suitcase was placed correctly on the plane.

2. **Luggage company:**

   Sales department take 'better way to have eyes on your luggage' as an advertisement to try to attract customers. They bought luggage tracker service and install the device on luggages, so when they sold the luggage, they ask customer to download app, create an account and link the account with the bag. By doing this, more customer come to buy the luggage, the luggage company is able to increase the sales.

   The image below gives the overall flow of the LugTrack application.
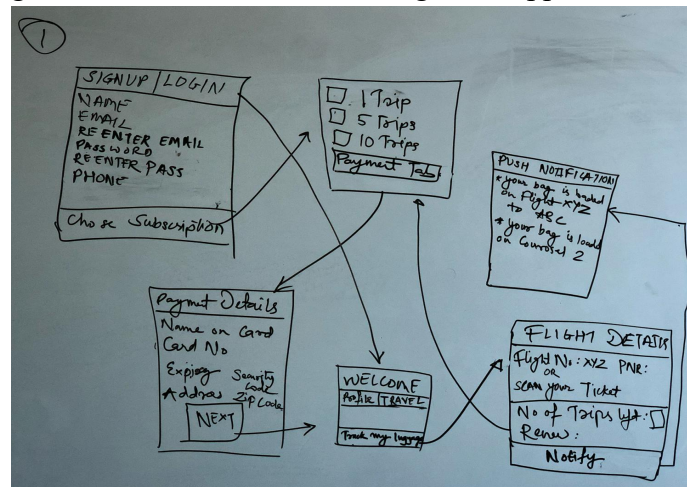
Details Design & Feature Description
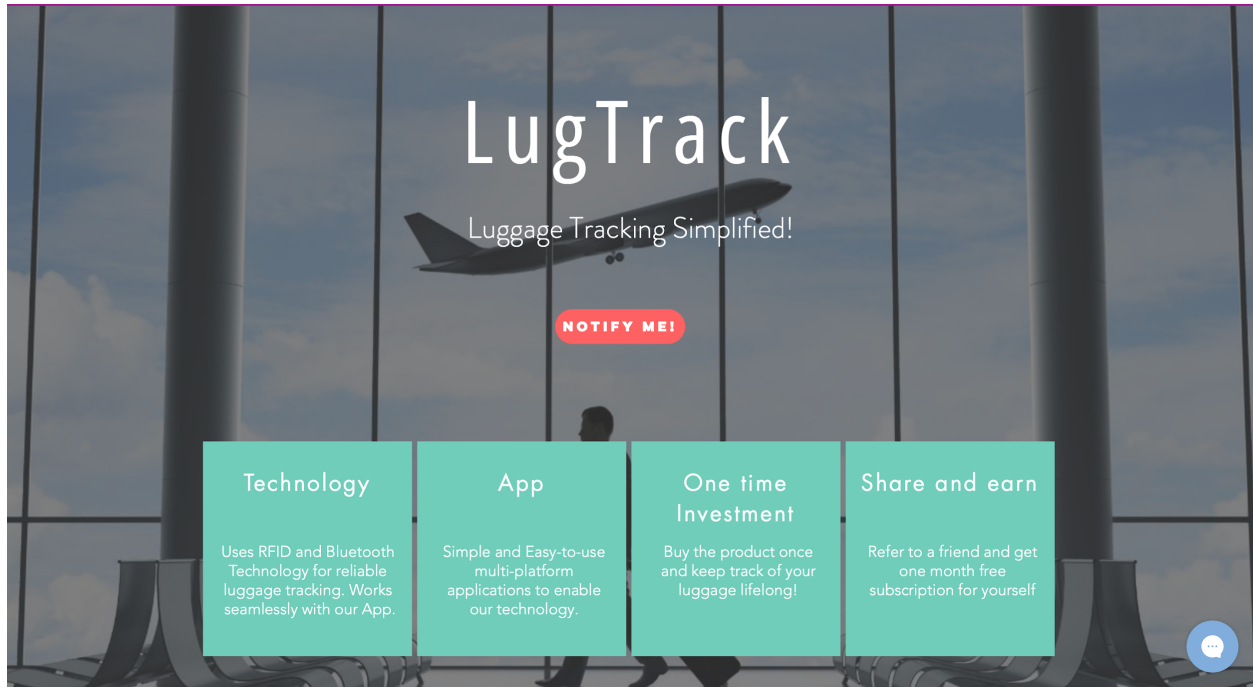
For building a good Luggage Tracking Application, these are the few thing we have kept in mind as our design principles

1. The Tracking should be real time and accurate - when an user is trying to track their luggage, it is very essential that our RFID pulls information from the exact same Unique Code and retrieves the latest and accurate information of its status

2. We are focusing on creating and application which is very customer centric and as free flowing as possible, we want to keep the hardship people face when they lose their luggage and design this application accordingly

3. Performance and Usability should be fast and clean and the connections to various pages should be smooth and seamless. Application will have a FAQ/Help/Search Bar on every screen to make it more compatible, we don't want to add stress to the already stressed user with losing their luggage

4. Speaking of Compatibility, we as a tracking designer team want to focus on the configuration of the application that it can run with the minimum of the configuration effortlessly.

5. Security is one of the aspect of this application, as many users sign up and chose to save their bank details for renewals along with tracking information which contains their PNR

code of the flight. This information is very crucial as it can be used against anyone if it is in the wrong hands, so communicating on an encrypted channel is very important

6. Testing - it is very important to test all the features and possible hiccups that can concur in near future and that we are ready with last minute cushions
   - Testing includes flow of the application, its response to various services, payment gateway error troubleshooting etc
   - Testing the application against load and low configuration determining the performances
   - Most importantly the real time tracking of the RFID tags and the response to the application, its storing capacity of accurate information
   - Usability of the application is also another end to look at which provides insight on the user end
   - PCI and PII Compliance testing is also included to secure personal information and their credit or debit card informations.

User Stories:

Story 1: Subscription Service
"As a frequent business traveler, I want to subscribe to this luggage tracking service instead of having to pay for it every time I travel, so that I can save the money which I would have otherwise spent on insurance when I check-in my luggage".
"As a frequent tourist, I would love a subscription based service so that I want to, not have to go through the hassle of paying everytime I travel to a destination".

Acceptance Criteria- Subscription - Auto payment for monthly service - Free trial for the first week - Reminder for renew the subscription at the end of the term

Definition of done- Fully working subscription process - Passes testing per acceptance criteria items - Security for the payment is fully developed

Story 2: Reliability
"As a photographer, I want to be able to check-in my camera gear and not worry about it not reaching me at the destination so that I do not have to go through extra security checks or lug around a heavy backpack throughout my travel."

"As a traveller who is seeking relaxation, I want to able to travel without worrying about my luggage so that I do not have to buy the items that I will require at the destination because I just lost my luggage".

Acceptance Criteria- Gold Membership - Fragile Item High Priority Tracking - Optional insurance of the product by the airlines - Optional damage protection offered by the airlines

Definition of Done- Functional tracking - Real time Updates on platforms

Story 3: Pairing Feature
"As a user, I want to do a initial setup ping to the tracking device to ensure that my luggage tracker is paired to my phone before checking-in my luggage. This would give me reassurance that my luggage is trackable."

Acceptance Criteria- Pair mode on the phone application - Record time of ping response from the tracking device - "Last seen" time for each ping

Definition of Done- UI to pair the luggage and enable tracking - Screen showing successful pairing - History of pings with time and location - "Tracking mode activated" after pairing

Product Roadmap

Themes	Q1	Q2	Q3	Q4

Launch	**Goal**: Product Launch with free trials **Effort**: M **Priority**: High	**Goal**: Limit free trails and incentivise referrals **Effort**: L **Priority**: High	**Goal**: Implement "voice of the customer" requests into the app **Effort**: M **Priority**: Medium	**Goal**: Launch app for airport officials **Effort**: M **Priority**: Medium
Marketing	**Goal**: Increase awareness of consumers **Effort**: L **Priority**: High	**Goal**: Secure funding (from investors) **Effort**: L **Priority**: High	**Goal**: Generate new leads **Effort**: M **Priority**: Medium	**Goal**: Acquire new customers (company tie ups) **Effort**: M **Priority**: Medium
User Experience	**Goal**: Achieve app with zero bugs. **Effort**: L **Priority**: High	**Goal**: Improve User interface **Effort**: L **Priority**: High	**Goal:** To add feature enhancements **Effort**: M **Priority**: Medium	**Goal :** Implement app and website integration **Effort**:M **Priority**:Medium
Helpdesk	**Goal**: Help with in app navigations and questions **Effort**: Low **Priority**: Medium	**Goal**: Improve on solving problems **Effort**: Low **Priority**: Medium	**Goal**:Add quickhelp and common FAQ **Effort**:Low **Priority**: Low	**Goal**:Add shortcuts/popups for common problems **Effort**:Medium **Priority**: High
Software Development (application)	**Goal**: Simple working APP for all types of phone **Effort**: L **Priority**: High	**Goal**: Advertisement for the APP should be sent to potential customer digitally **Effort**: L **Priority**: High	**Goal**: Build an analysis of customer pattern through machine learning algorithm **Effort**: M **Priority**: Medium	**Goal**:At the backend make a KPI measurement visualization **Effort**: M **Priority**:Medium
Customer Satisfaction	**Goal**: Customer Acquisition **Effort**: L **Priority**: High	**Goal**: Introduction of Family Plans **Effort**: L **Priority**: High	**Goal**: Feedback from the Customer on various aspects **Effort**: L **Priority**: High	**Goal**: Customer Retention **Effort**: M **Priority**: High

Metrics

- Number of people using it - it is crucial to know that how many times the app is being used and installed and needs to be monitored on a monthly basis further reducing it down to weekly and so on, this will give us an idea on how to promote the product and how to approach the market in terms of Advertising and Marketing
- In App Events - Having specific features or funnels within the application like "issue about previous tracking", "contact customer service", "tracking records", "login/logout", and various other options can prove to be vital when we take in account the speed of the application
- Number of Users signing up for the Tracking is also important, as that will bring in more business for us
- Heatmap - Counting of Touches and recognizing the major areas our customers are attracted and also the features they are not exploring will prove to be one of the important aspect in feature selection
- Number of people reviewing the product with effective tracking, which will eventually lead to the popularity of the product, therefore a continuous tracking of this is essential
- Number of Active Users - an insight into the engaged users who have been actively using this for every trip of theirs is an important aspect of people loving our product. We can reach out to them with regards to target advertising via social media applications too
- Number of returning customers, this will help us with the retention rate of our app and we can focus on how to boost it. It is crucial that people come back to our app once they have used it
- App Feedback Metrics - In Application Feedback on the performance and also on the tools will prove to be a very good way to evaluate the risk of adding new features

All these metrics will help us understand and evaluate the performance of our application on a much deeper level and helps us understand the hidden trends and patterns. It will also prove to be a vital aspect with feature selections of further upgrades and thus enhancing the performance and stability of the application

International

Luggage tracker is an app meant for any passenger travelling by airplane. We will target the launch initially in the United States. With the feedback from this initially launch we will upgrade our app and necessary features will be added By 2022 we will try target the other continents and make the

app available for the travellers. Promotional offers will be made for free subscription to their first two trips to experience the app on their own basis the potential positive results we will be confident to convert the first time users to our target market audience.

Taking into consideration the rules and regulations for international travel and airports, we eventually plan to extend our services to international flights. This would require us to get various permissions and clearances from the government and airport authorities. We believe that luggage tracking is an absolute necessity for international flights. Hence, it is our highest priority to extend our services to international flights as soon as possible.

Projected Cost

The projected time for the MVP is 12 months.
The projected cost for the MVP is as follows:

Application development:
1 Project Leader, 3 Software Developers, 4 Interns, and 2 Data Architects.

Considering average compensation in Boston for each role:

Total Salary for Project Leader: 1 * $108,000		= $108,000
Total Salary for Software Developers: 3 * $85,000		= $255,000
Total Salary for interns: 4 * $20/hr * 40hrs/week * 52 weeks		= $166,400
Total Salary for Data Architects: 2 * $90,000		= $180,000

3 Yr. Total Cost of Ownership		
	On-Premises	**AWS**
Server	$ 86,123	$ 5,661
Storage	$ 78,070	$ 18,633
Network	$ 63,568	$ 37,525
IT-Labor	$ 12,150	$ 15,340
Total	**$ 239,911**	**$ 77,158**

AWS cost includes business level support

Cost for AWS for 1 year: $77,158/3	= $25,719
Total Cost for 1 year:	**= $735,119**

Hardware Costs:

Manufacturer: Foxconn, Taiwan.

Minimum order for manufacturer is 5000 units.

The most basic device for the MVP will have the RFID tag with unique serial number.

RFID tags are available for as low as 20 cents for 5000 units and can be further reduced if ordered in large volumes.

An Integrated chip with Wifi, Bluetooth and GSM costs $11.5

Manufacturing cost of outer casing = $0.80

Total unit cost for unit = $0.20 + $11.5 + $0.80   = $12.5

Total cost for 5000 units = $12.5 * 5000   = $62,500

Shipping costs: 1 time: = $250

Total cost for hardware   **= $62,750**

Office Space:

Office space and operational costs in Boston: 10,000/month * 12 months = **$120,000**

Total estimated cost for MVP is : $917,869

Operational Needs

To ensure a successful application we would need support services from the below teams

- **Engineering Team:**
  - This is crucial Team and will work hands on with the R&D Team. They will help in developed code and built the app and design their functioning.
- **Operations Team:**
  - They will manage the Operational activity and monitor the work done and maintain data and records of the Activities. They look into the customer care services and also address the grievance of the travelers. This team will also be responsible for the feedback and advice for improvement of the app.
- **Airlines Contract:**
  - This is crucial part of the app as we will have tie ups with the commercial airlines
- **Marketing Team:**
  - They will promote the app and help gain attention and awareness in the society. This tea, will create a buzz about this app on various platforms and social media.
- **Research and Development Team:**

- ○ They will be responsible to keep track of the technology used and to innovate the process. Also look into if there is any adverse effects or pitfalls in the app.
- **Finance Team:**
  - ○ To maintain and ensure budget for the app. To gather finance and to allot them to the necessary activity.
- **Legal Team:**
  - ○ To Sign the terms and condition and adhere to the Law of the country. Also responsible for policy making
- **Copyrights & Patent Team:**
  - ○ To ensure there is no misuse of the app

Addressing Risk

Risk is a part and parcel of any successful business. Addressing these risk is very important to help your product sustain and grow.

Risk	Stakeholder	Description	Strategies
Technology Challenges	Users/Organization	As this app will help us locate the luggage on real time basis hence there will be technical challenges to locate the same.	Our Customer Care service will be operating 24/7 to address the issues on the location of the missing luggage and provide assisting. The App will be updated on frequent basis with additional features

Adoption of the app	Users/Organization/ Commercial airlines	Lack of awareness may result to poor subscription of the app. There may be pre conceived notion of this app being same like others hence there would lack of adoption possibility.	While launching the app the target audience must be made aware of their feature and key points. Demo must be showcased to know the product.

User Interface

Screen 1

09:52 AM

Welcome

Hi, Mike

| Profile | Travel history |

Profile

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[Track my luggage]

Screen 2

09:52 AM

Welcome

Hi, Mike

| Profile | Travel history |

Travel History

Date	distination	PNR
2019/1/3	Shanghai	SHYXX123
2018/12/12	Boston	SHYXX121
2018/8/17	New York	SHYXX1RG
2018/5/23	LA	SHYXX122

[Track my luggage]

Screen 3

09:52 AM

Flight Details

Flight Number: _____

PNR: _____

Or

Scan your Ticket 📷

Number Of Trips Left:

[Renew]

[Notify]