



Dispatch & Delivery Management App Project

LaiDelivery

Make Delivery Easy & Fast

Team 3

Instructor:

Kevin

Frontend:

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Backend:

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Hung-Hsi Lin, Mingcheng Li

System Design:

Shaoshuai Xu, Tianhao Han, Hung-Hsi Lin



Outline

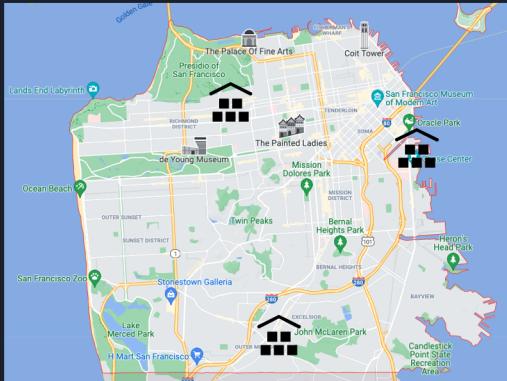
- Background
 - User requirements & Key assumptions
 - Core features & Completed functionalities
 - Technical design
- App details
 - Login/Register
 - Package info input
 - Options offered
 - Package list organization
 - Checkout
 - Tracking & notification
- Demo
- Product roadmap
- Q & A



Why us?

Features:

- Provide extremely fast and easy delivery service.
- Drones & round robot delivery.
- Service in San Francisco area.
- Distribution stations in the city.
- Our interaction design requirement is a Webapp.



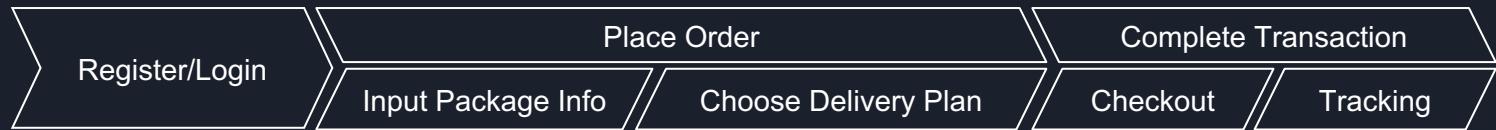


Background - Key Assumptions

- Company Assumptions:
 - The company holds the technology to run both air drones and robots with legal permission from the government.
 - The team now has 8 software developers, including 2 tech leads
 - The company has **3 distribution centers in SF**, for drone, robot, and package storage
 - Each distribution center has **unlimited space, drones and robots**
- Customer Assumptions:
 - Our customers want the item to be delivered **in a single day**.
- Service Assumptions:
 - Each air drone and robot has **limited weight capacity, and speed capacity**.
 - The **drone will travel in a straight line**, while the **robot will travel with a real routine** offered by Google Map API.
 - The real time traffic will not be considered in the MVP.

Background - User Requirements

- Customer Need & Segmentation
 - Speed oriented: light-weight packages to be delivered at the fastest speed
 - Suitable delivery method: drones
 - Economical: heavy packages to be delivered in a more economic way
 - Suitable delivery method: robots
- User Roadmap



Enter basic information such as name, username, email, password to create account and login.

Provide package information and requirements such as name, weight, size, fragile, receiver address, delivery appointment.

Factors considered when delivery plans are generated: route, number of drones/robots available in each station. Users can choose their favorable delivery plan by price or speed.

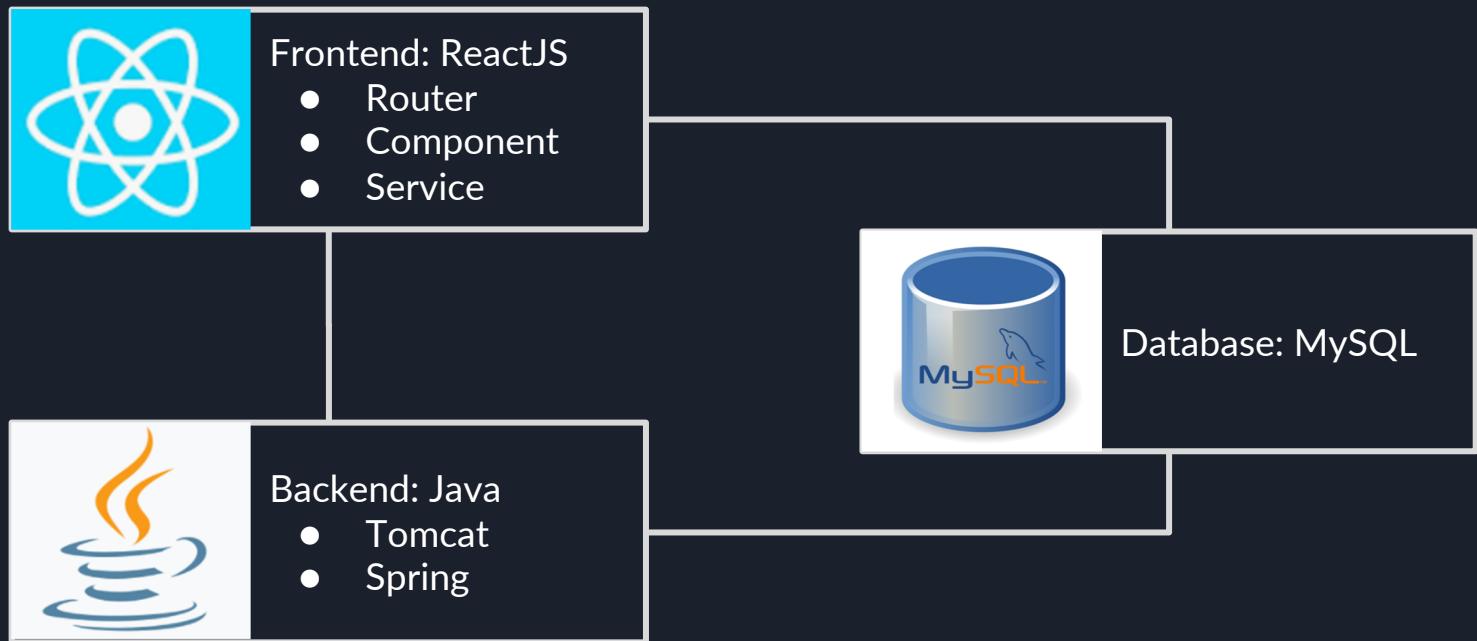
Users can confirm their order, add their delivery plan to cart and checkout. Email notification would be sent and real time google map tracking is provided.

Background - Core Features

- Register
 - Register with email and password, first name and last name and so on
- Signin
 - Login in through email and authentication
- Package input
 - Package information, size, weight, destination and so on
 - Input information validation (google API to check correctness of address, package information like size, weight will be validated using our internal setting)
- Option selection
 - Dispatch Drone or Robot through 3 distribution centers
 - Drone : Find the shortest distance through air
 - Robot: Find the shortest path on Google Map
 - Different prices based on different speed
- Package management
 - Similar to wishlist to store the items to be used in the future
 - Easier for user to update, delete and track the orders to be added into the cart
- Checkout
 - Pay for the service rendered based on unit price and distance
- Tracking
 - Realtime Tracking and Google Map Marker
- Notification
 - Notification mail will be sent to user's mail address with a tracking number



Background - Technical Design





Background - Technical Design

1. Tech stack : frontend (React), backend (SpringMVC, Spring Security), database (MySQL, hibernate)
2. Why using these tech stacks?
 - Pros:
 - React has better performance than other frameworks.
 - Spring MVC has more flexibility, which offers developers full control of HTML, convenience to test and to integrate extensions into framework.
 - Spring Security provides developers Servlet API integration, Spring MVC integration and some protections for the website.
 - MySQL is a secure and reliable DBMS, which is ideal to store web application data, and Hibernate can be applied to different kinds of databases and have good performance and high efficiency due to the use of HQL.
 - Cons:
 - React can only be applied to the View part, so developers have to use other technology to implement other parts of the project.
 - Spring Framework is too complex to quickly get started.

Database Design

Distribution Center:

Store the position and id of three distribution centers.

Customer:

Store customer's information and corresponding cart.

Cart:

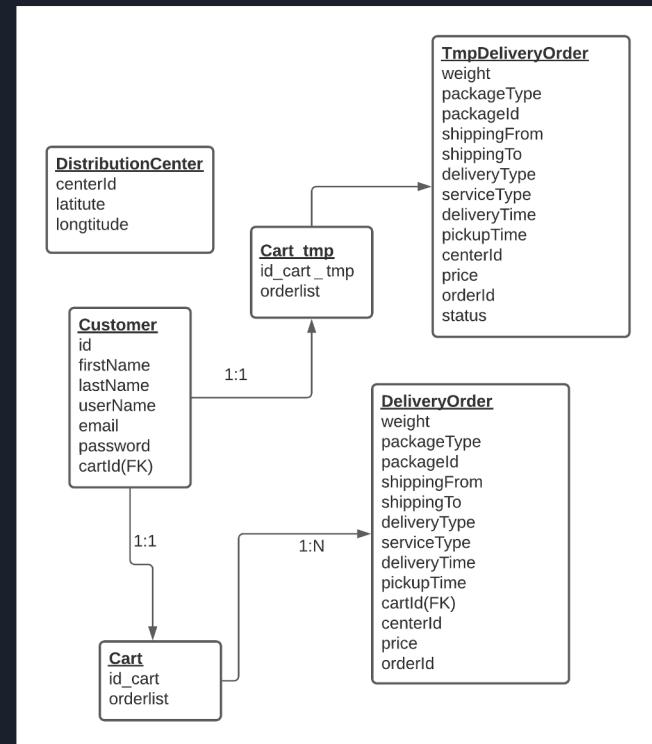
Store list of orders.

DeliveryOrder:

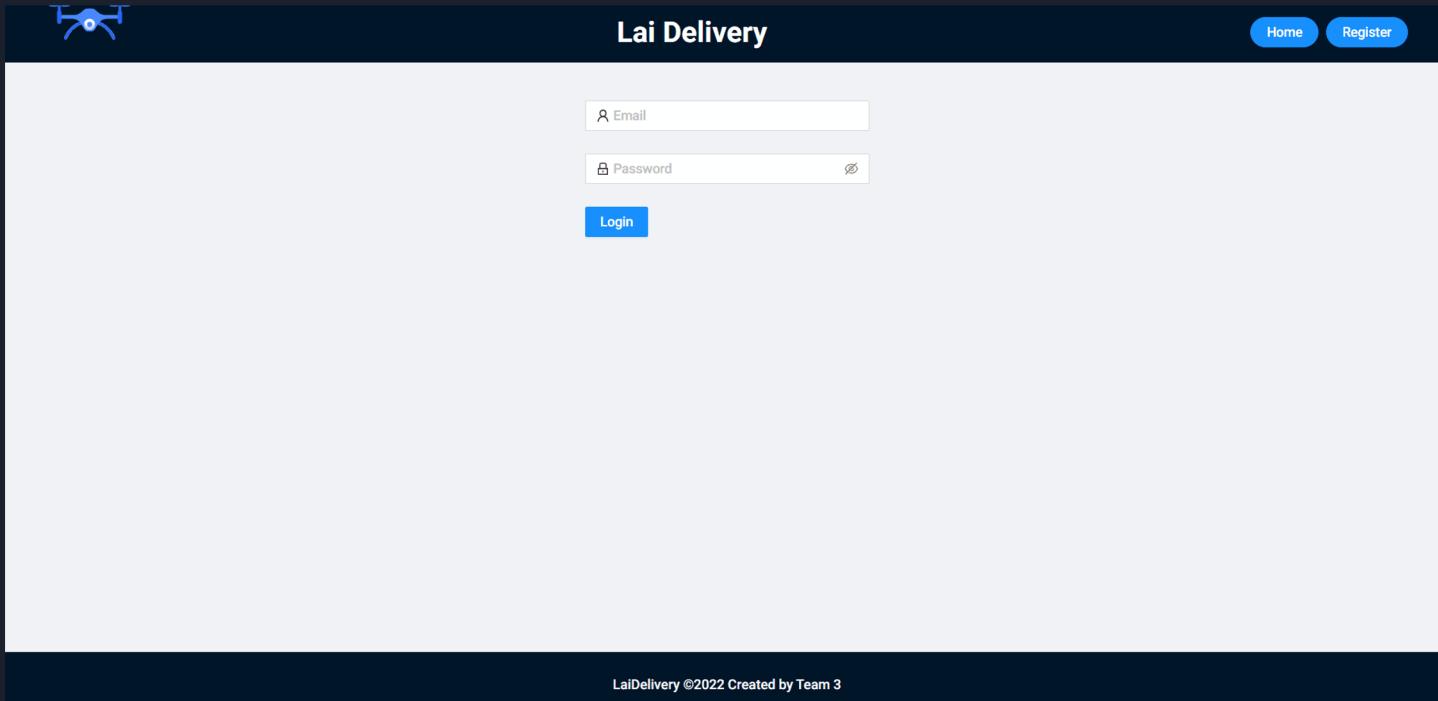
Store the ordered package information.

Tmp. deliveryOrder:

Store the package information which hasn't been added into cart.



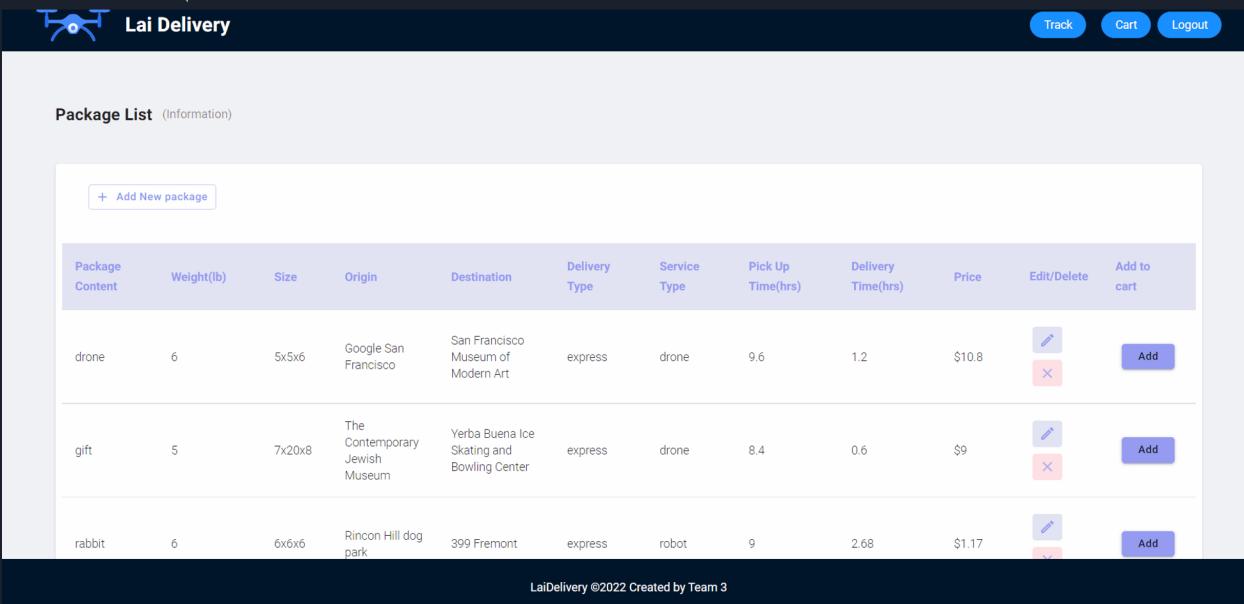
1. Login/Register



The image shows a screenshot of the Lai Delivery website's login/register page. The header features a dark blue background with a light blue and green diagonal graphic on the left. The title "Lai Delivery" is centered above two buttons: "Home" and "Register". On the left side of the main content area is a small icon of a drone. The main form contains fields for "Email" (with a magnifying glass icon) and "Password" (with a lock icon), followed by a "Login" button.

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2.1 Package Input & Delivery Options



Lai Delivery

Track Cart Logout

Package List (Information)

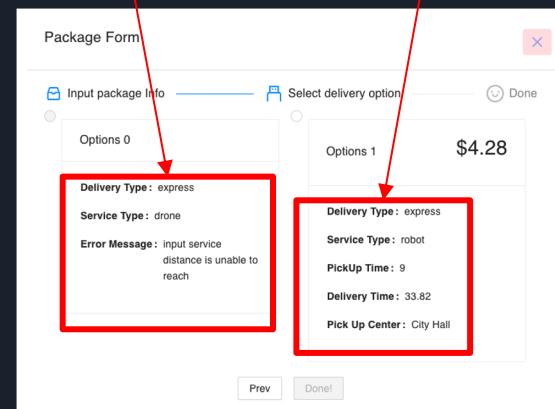
+ Add New package

Package Content	Weight(lb)	Size	Origin	Destination	Delivery Type	Service Type	Pick Up Time(hrs)	Delivery Time(hrs)	Price	Edit/Delete	Add to cart	
drone	6	5x5x6	Google San Francisco	San Francisco Museum of Modern Art	express	drone	9.6	1.2	\$10.8			
gift	5	7x20x8	The Contemporary Jewish Museum	Yerba Buena Ice Skating and Bowling Center	express	drone	8.4	0.6	\$9			
rabbit	6	6x6x6	Rincon Hill dog park	399 Fremont	express	robot	9	2.68	\$1.17			

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Invalid options weight / location

valid options estimated time / price



Package Form

Input package info Select delivery option Done

Options 0 Options 1 \$4.28

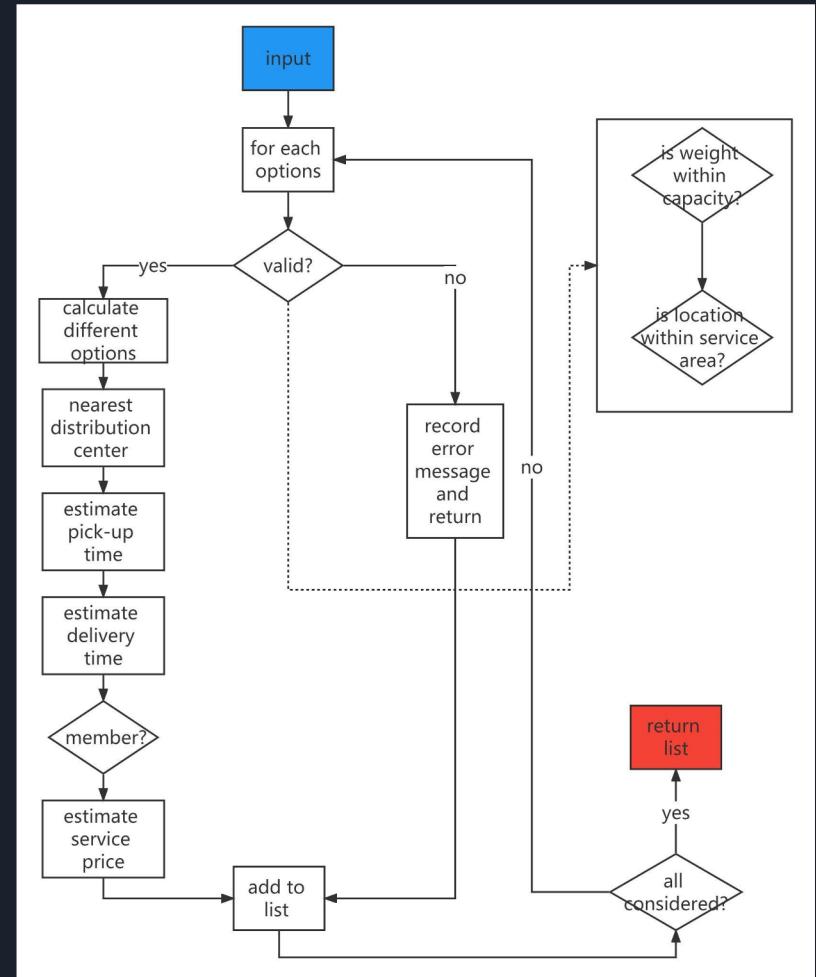
Delivery Type: express
Service Type: drone
Error Message: input service distance is unable to reach

Delivery Type: express
Service Type: robot
PickUp Time: 9
Delivery Time: 33.82
Pick Up Center: City Hall

Prev Done!

2.2 Option Algorithm

- Two options: drone & robot
- Corner case check
 - weight
 - location
- Calculate pick-up time and delivery time
 - drone: straight path / robot: car path
 - find nearest distribution center (priority queue) and calculate the estimated pick-up time
 - calculate the estimated delivery time
- Calculate the service price
 - check if user is a member
 - based on pickup & delivery time



3. Package List

- Plan to send a package but not sure about the details?
No big deal, you can save a draft order and edit/delete/checkout it at any time!
- Package information will be sync with our database, and no need to worry losing them

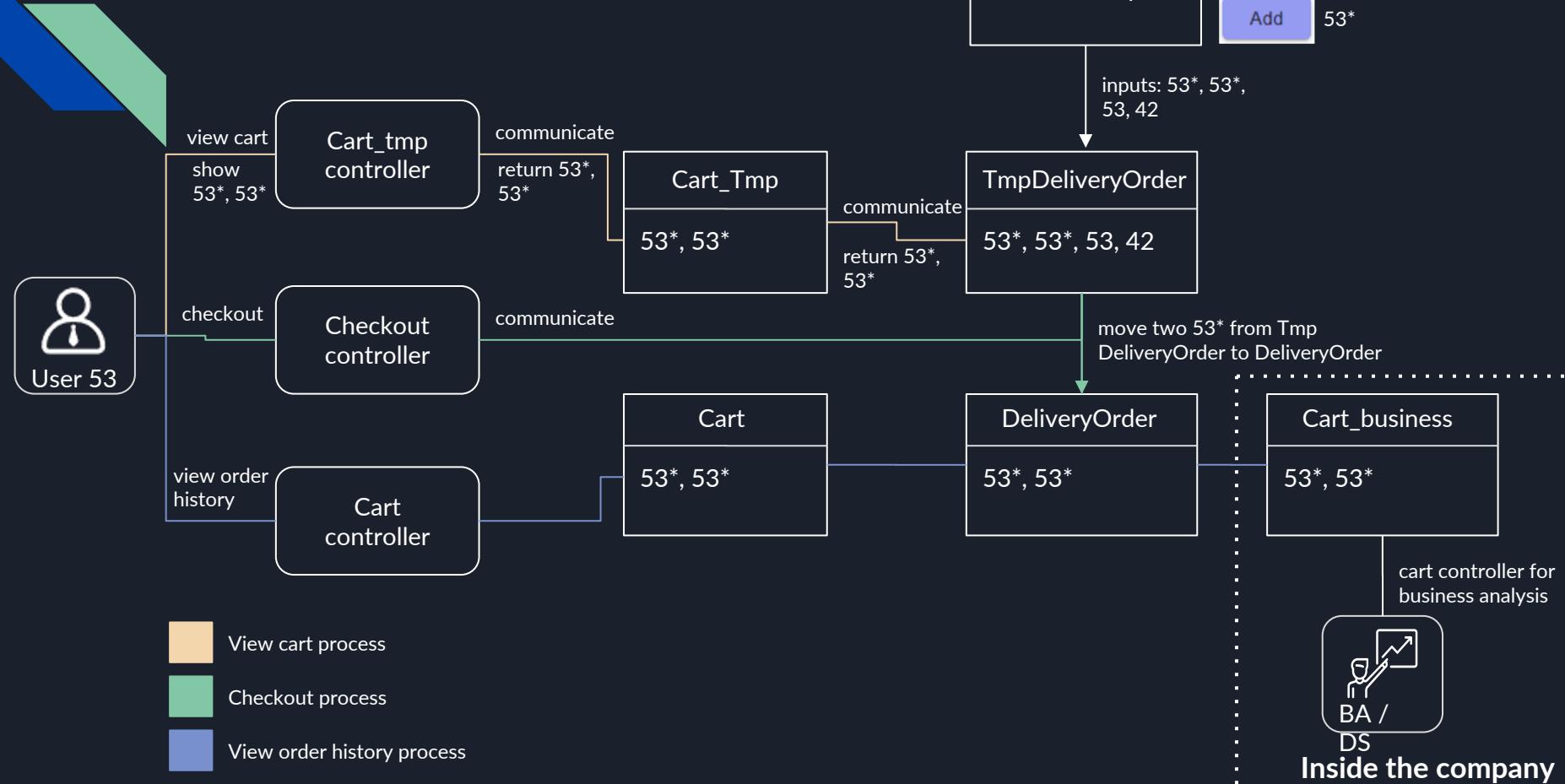
The screenshot shows the Lai Delivery website's package list page. At the top, there is a header with a drone icon, the text "Lai Delivery", and three buttons: "Track", "Cart", and "Logout". Below the header, the page title is "Package List (Information)". A button labeled "+ Add New package" is visible. The main content is a table with columns: Package Content, Weight(lb), Size, Origin, Destination ↑, Delivery Type, Service Type, Pick Up Time(hrs), Delivery Time(hrs), Price, Edit/Delete, and Add to cart. There are three rows of data in the table:

Package Content	Weight(lb)	Size	Origin	Destination ↑	Delivery Type	Service Type	Pick Up Time(hrs)	Delivery Time(hrs)	Price	Edit/Delete	Add to cart	
rabbit	6	6x6x6	Rincon Hill dog park	399 Fremont	express	robot	9	2.68	\$1.17			
drone	6	5x5x6	Google San Francisco	San Francisco Museum of Modern Art	express	drone	9.6	1.2	\$10.8			
gift	5	7x20x8	The Contemporary Jewish	Yerba Buena Ice Skating and Pavillion Center	express	drone	8.4	0.6	\$9			

4. Cart & Checkout

+ Add New package

53



5. Email Notification

- Feature:
 - Adopted Java Mail to send order confirmation email with tracking number
- Pros:
 - Simple but efficient
 - Obvious tracking number which can be used to tracking package easily

The image shows two screenshots illustrating the LaiDelivery email notification and tracking process.

Email Notification Screenshot: On the left, a screenshot of an email inbox is shown. A red box highlights the subject line: "Your LaiDelivery order <1947|SICOMTQ28TS> has been received!!". Below the subject, the recipient's email address is listed as "laidelivery1@gmail.com" with the note "发送至 我". The body of the email contains the message: "No big deal, it's just a package sent by cool robots and drones that changes your delivery experience forever :)" and a link "[邮件部分隐藏] 查看邮件全文". At the bottom are standard email reply and forward buttons.

Delivery Tracking Screenshot: On the right, a screenshot of the Lai Delivery website is shown. The header reads "Lai Delivery". The main content features the tagline "Lai Delivery Made Everything Easy" and a promotional offer: "Sign up today and receive \$150 in credit towards your next payment.". Below this are two buttons: "Get Started" and "Or". A red box highlights the tracking input field where the tracking number "1947|SICOMTQ28TS" is entered, followed by a "Track" button. The footer of the page includes the copyright notice "LaiDelivery ©2022 Created by Team 3".

6. Track & Order History

- Clear order status and description

Lai Delivery

Manage Packages Cart

robot1 \$1.55

Shipping From: 399 Fremont
Shipping To: San Francisco Museum of Modern Art
PickUp Time: 02/02/2022, 03:58:02
Delivery Time: 01/02/2022, 21:26:02
Pick Up Center: City Hall
more

gun \$9.6

Shipping From: 399 fremont
Shipping To: woodlands market
PickUp Time: 9:6
Delivery Time: 0
Pick Up Center: Golden State Park
more

Ordered Our robot/drone is on the way

Picked Up Almost there!

Delivered Your order has been delivered

Utilized Google Maps API to dynamically show the delivery path of the drone and robot

Elegant order information card

- Easy to switch different package and track it

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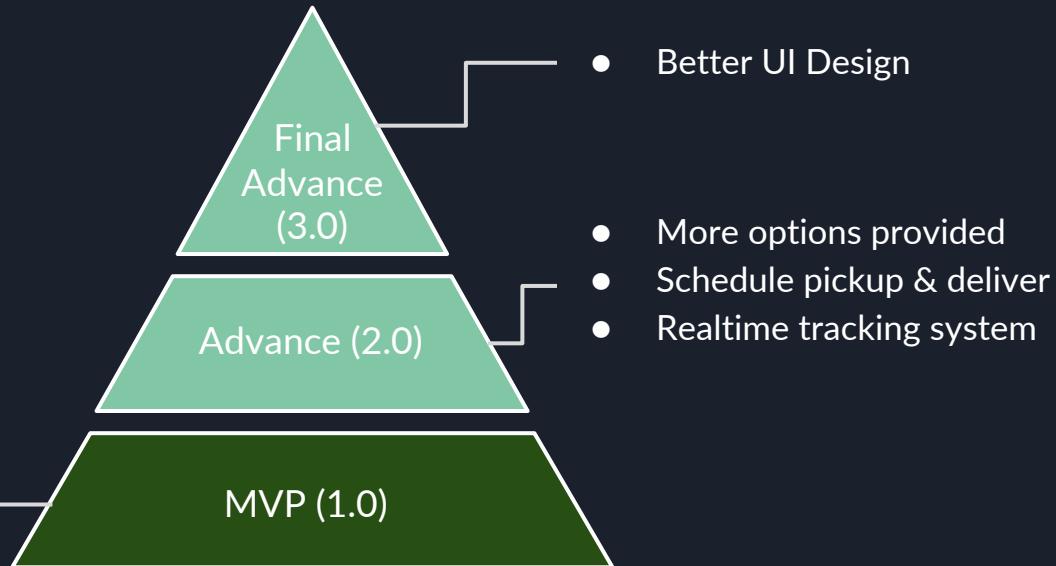
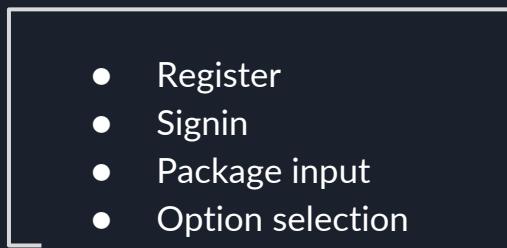
Demo



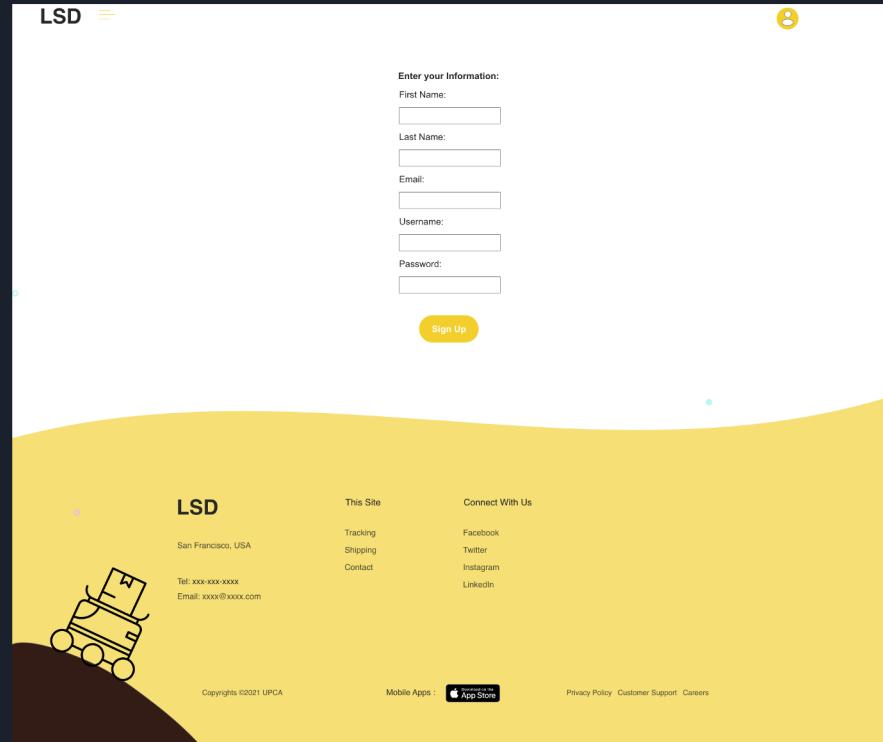
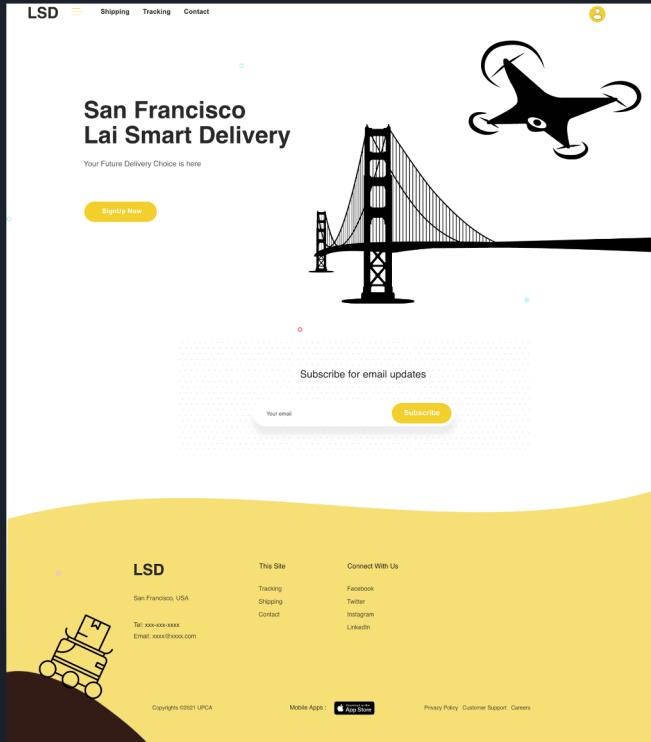
Product Roadmap

To be completed

Completed

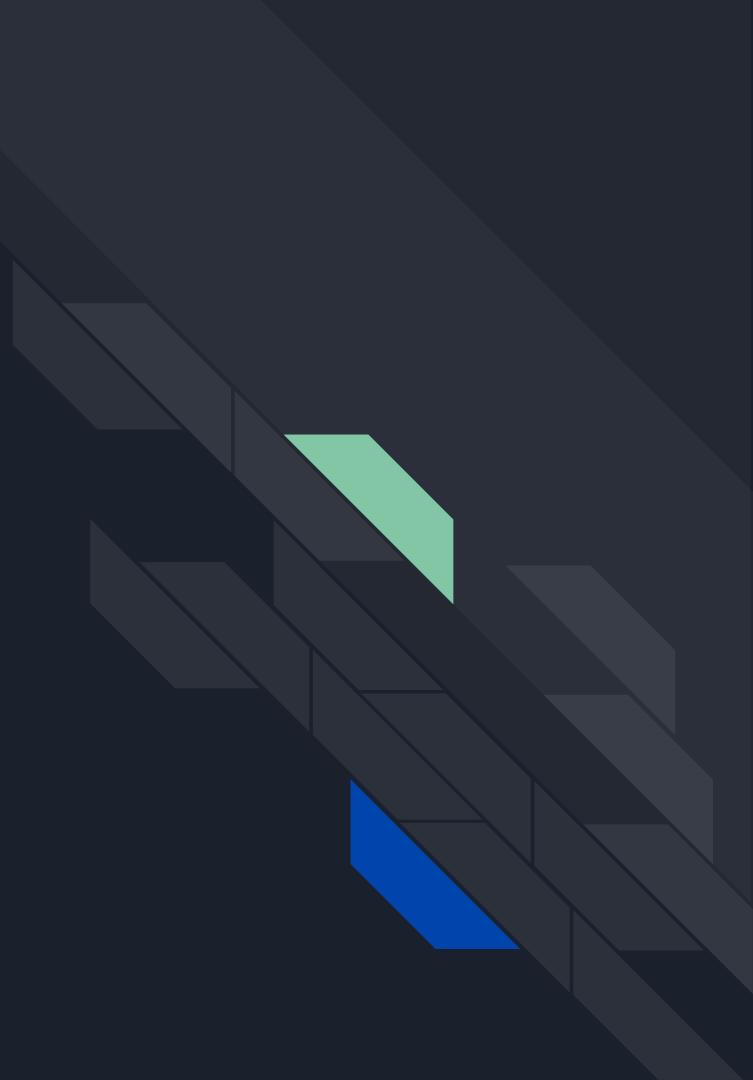


Better UI design





Appendix



Work Flow Design

