Load.in

Using AI and Computer Vision
to give your move a game plan.

Team Yellow
Prototype Demonstration
Old Dominion University
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Team Yellow

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The Problem

"Do It Yourself" movers lack the expert knowledge required to handle the logistics of their move.

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Do It Yourself Moving

- Professional movers reduces the time but increases cost

- DIY reduces the cost but decreases efficiency

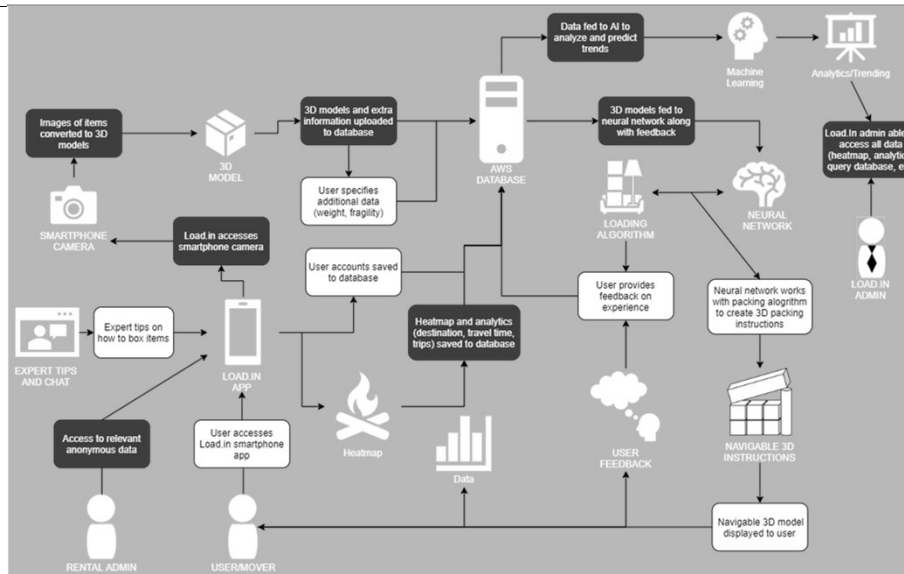### This is where Load.in comes in.

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Case Study

- Family of three:
  - Two parents
  - One child
  - A dog
- 2200 square foot house
- 20 miles across town
- Too many items to move via pickup truck

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Major Functional Components

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Prototype Major Functional Components
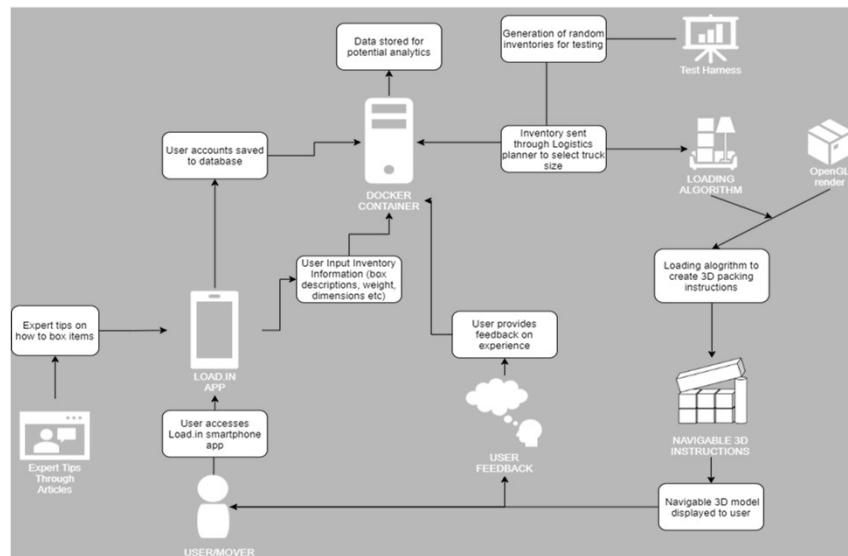
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Real World Product vs. Prototype Scope

Feature	Real World Product	Prototype
Authentication		
Login User Interface	Fully Functional	Fully Functional
User Registration	Fully Functional	Fully Functional
Reset Login	Fully Functional	Eliminated
User Login	Fully Functional	Fully Functional
DIY User Interface	Fully Functional	Fully Functional
Move Inventory:		
Furniture/Item measurement	Fully Functional	Partial
3D model generation	Fully Functional	Eliminated
Item weight	Fully Functional	Fully Functional
Item fragility	Fully Functional	Fully Functional
Box locator search feature	Fully Functional	Fully Functional
Load Plan:		
Load Plan	Fully Functional	Partial
Truck unloading instructions	Fully Functional	Partial
Logistics Planning:		
Estimated number of trips	Fully Functional	Fully Functional
Estimated time to move	Fully Functional	Eliminated
Estimated rental truck costs	Fully Functional	Partial

Feature	Real World Product	Prototype
Expert Help:		
Packing Tips & Tricks	Fully Functional	Fully Functional
Tips search	Fully Functional	Fully Functional
Move experts' articles	Fully Functional	Fully Functional
Chatbot	Fully Functional	Eliminated
Live expert	Fully Functional	Eliminated
Vendor Integration/Data Import:		
3rd party vendor web scraper	Fully Functional	Eliminated
3rd party vendor web API reader	Fully Functional	Eliminated
Box dimensions	Fully Functional	Eliminated
Truck sizes	Fully Functional	Partial
Truck availability	Fully Functional	Eliminated
Analytics:		
Location data	Fully Functional	Partial
Move data	Fully Functional	Partial
Feedback data	Fully Functional	Partial
Heatmap	Fully Functional	Eliminated
Rental interest statistics	Fully Functional	Eliminated
Tips & Tricks Search Analytics	Fully Functional	Partial

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Risks

PROBABILITY

SEVERITY		Very Low	Low	Medium	High	Very High
	Very High					
	High					
	Medium			C-1		
	Low		S-1 S-2		C-2	
	Very Low					

Acceptable: Risk is acceptable level.
Permissible: Risk is okay for now and can be fixed at a later date.
Considerable: Risk is noted and will be fixed in the next iteration.
Catastrophic: Product is placed on hold until issue is fixed.

Customer
- C-1: End users are not satisfied with the recommendations of the application.
- C-1 Mitigation: Implement a customer feedback feature that allows the users to disclose his/her issues with the applications.
- C-2: End user doesn't follow the guidelines of the application.
- C-2 Mitigation: Implement a feature that allows the user to repeat certain steps in the application as they progress.

Security
- S-1: End user want to ensure the pictures taken of personal information doesn't fall into the wrong hands.
- S-1 Mitigation: No need to worry, this feature isn't a thing.
- S-2: End user wants to ensure his/her data isn't being collected for nefarious purposes.
- S-2 Mitigation: For the prototype, the only information stored is given by the user for the purposes of the move inventory and can be deleted at any time via test harness.

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Technical Risks

SEVERITY	PROBABILITY				
	Very Low	Low	Medium	High	Very High
Very High					T-1
High				T-2	
Medium			T-3		
Low					
Very Low					

Acceptable: Risk is acceptable level.
Permissible: Risk is okay for now and can be fixed at a later date.
Considerable: Risk is noted and will be fixed in the next iteration.
Catastrophic: Product is placed on hold until issue is fixed.

- T-1: Current technology involving computer vision is a challenge.
- T-1 Mitigation: Conduct a prototype to mitigate risk of critical errors upon release.

- T-2: Artificial Intelligence prone to error due to insufficient training data.
- T-2 Mitigation: Implementing a feedback loopback in the beta phase with test users.

- T-3: Challenge to obtain accurate and timely feedback.
- T-3 Mitigation: Implement a feature for users to give feedback if the application operated correctly after completing a move.

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Prototype Demonstration

- Registration & Login
  - Presenter: Chris
- Expert Tips & Tricks
  - Presenter: Paul and Lance
- Move Inventory
  - Presenter: Chris and Greg
- Logistics Planner
  - Presenter: Paul
- Load Plan Navigator
  - Presenter: Jason and Byron
- Case Study
  - Presenter: Chris
- Random Move Inventory
  - Presenter: Jason
- Tour of Backend
  - Presenter: Byron and Lance
- Q&A

Assumptions:
- Everything is a box (only support width, height and length)
- Boxes that are too big won't go on the truck
- No rotation in load plan generation
- 3 trips per day used to calculate daily truck rental costs

Dev Environment:
- Ubuntu
- Virtual Machines
- Docker
- Android Studio
- Virtual Phone Device

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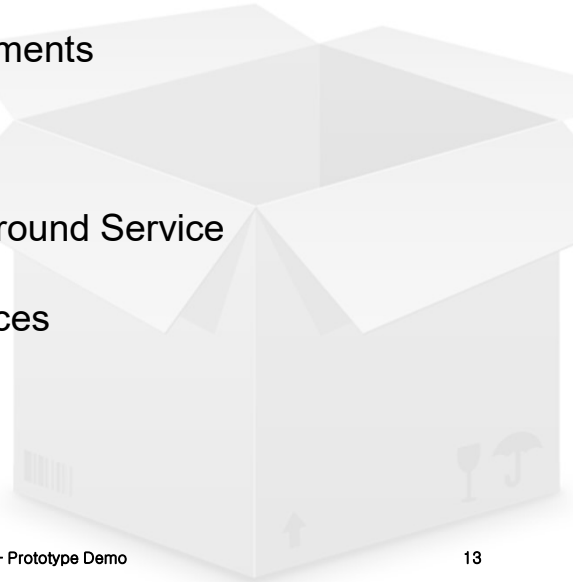## Future Plans

- Photogrammetry for box measurements

- Load Plan – Rotation

- Load Plan Generation as a Background Service

- Sharing Load Plans between devices

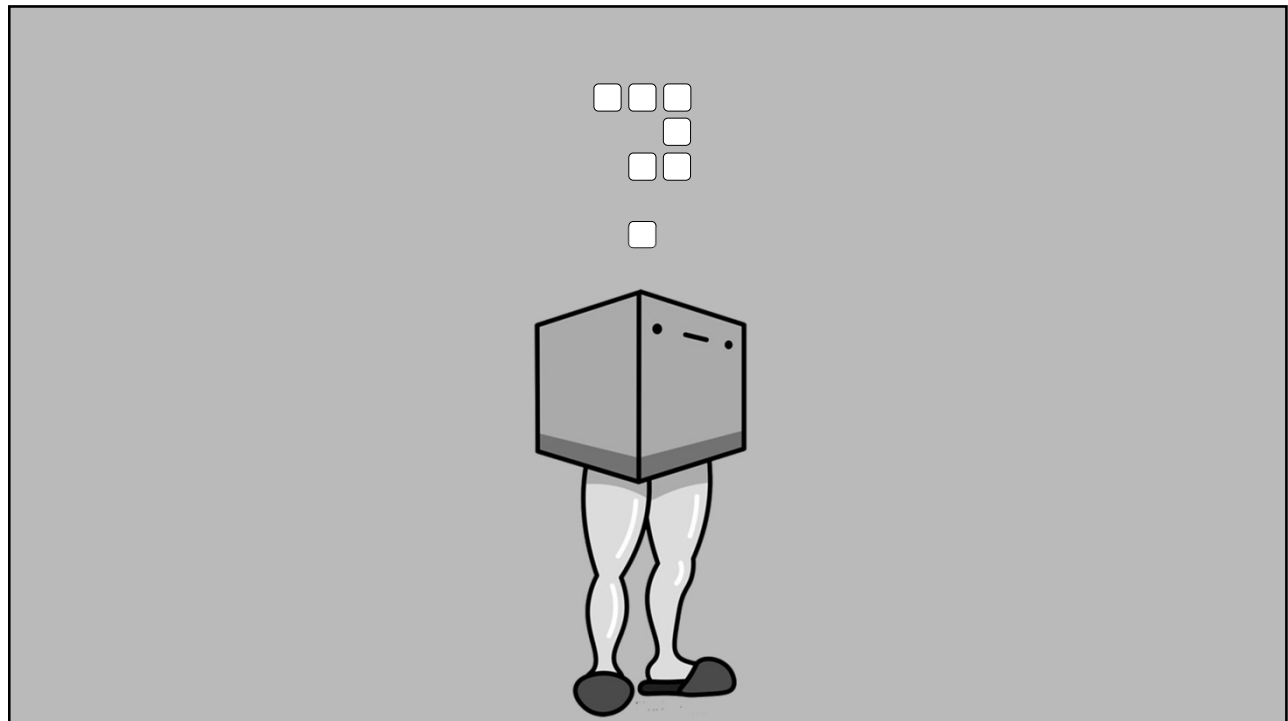- Analytics

- Vendor Synchronization

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