Auto Dasher

A Human-robot collaboration
solution for self-driving food delivery

Product Owner: Ying Shan

Background

Why Are We Here?

- Looking for reducing operating cost for Doordash

- Wish to improve the reliable delivery times

- Plan to use robots partially replace human labor

- Manual intervention is required for robots

[Auto Dasher, reliable than ever]

Business Case

Initial Focus

Where are we starting?

- How to provide more reliable delivery services for users that matches the company goals.

Opportunity

What's the problem?

Problems：

• Last-mile delivery is the most expensive part of the supply chain (41% of the total cost.)

• Currently the robots is still required for manual intervention.

Supports：

• Automate food delivery service may reduce costs and provide more reliable delivery times.

• Doordash has already proved the concept with testing (20,000 miles & 4 million people.)

• **Helping courier and robots to achieve better human-robot collaboration is an opportunity**

Proposal

What's Our Solution?

I will build a delivery robot with a system that help Doordashers to collaborate with the robots

Key Features:

Self-drive and Traffic recognition

Real-time video of the surrounding environment

Remotely take control of robots

Delivery and robot status tracking

Abnormal alert and safely control

Return On Investment

What can we do?

The estimation of the gain is about 3600000 $ for a year

- The gain is based on the labor cost. (500 people, average salary 2000$/month)
- The impact: Decrease the labor cost 30%

The estimation of the total cost of the project is 200000 $

- The cost include labor cost and other capital cost like BOM, prototype, Server maintain etc.
- There is robot and system maintain cost, as well as hardware purchase cost.

ROI of the project is: (3600000 - 200000)/200000 = 1700%

Measurement

How will we know if we're successful?

- Reduce total food delivery costs by 15% in 1 year

- Enhance the maximum delivery capacity by 30% in 1 year

- Increase the number of users ordering by 20% in 1 year

Competitors

Food delivery company

E.G. [Meituan · uber eat · Foodhwy]

Traditional food delivery companies integrate manpower to provide takeaway food delivery services. Directly connect restaurants and consumers

Advantages: Human intervention, high trust, strong emergency capability, human services

Disadvantages: High labor costs, difficult to ensure a reliable delivery time, low controllability

Target customers: Lazy people, don't want to go outside and too lazy to cook

Profit model: Charge restaurant, advertising and service fee

Food Delivery Robots

E.G. [Scout · Kiwi · G Plus]

Robot R & D organization, using artificial intelligence technology such as autonomous driving to realize automated food delivery robots

Advantages: Lower than labor cost, strong controllability & traceability, High time reliability

Disadvantages: High maintenance costs, limited capabilities, and lack of human services

Target customers: Busy People, no time to go to restaurant for a lunch; Tech enthusiast

Profit model: Charge courier company for development and maintenance

Our Advantages

Why are we better?

• Our products and services are specifically designed for fast food restaurants

• Only focus on small-scale food delivery services within a community (less than 2 miles)

• Mainly focus on human-robot collaboration services. Neither human labor nor robot.

Roadmap and Vision

Roadmap Pillars

Where do we go from here?

- Vision:

  For Busy white-collar workers, who is looking for fast and reliable food delivery service, the Auto Dasher is a self-driving food delivery service that provide more reliable delivery times with cheaper cost. Unlike other self-driving food delivery solution, our product focus on better human-robot collaboration for more efficient and reliable service.

- Roadmap ：

  Theme 1- Robot prototype design and development

  Theme 2 - Human-robot collaboration system development

  Theme 3 - MVP smock test and validation analyze

[Theme 1]

[Robot prototype design and development]

- Designing robot shapes and sizes: Specific food sizes and load ranges

- Designing robot interaction Modes: how users take food and confirm that they get food

- Designing robot movements: The design of automated driving and path planning algorithms

- Robot modeling: Hardware BOM, mold and hardware motherboard development

[Theme 2]

[Human-robot collaboration system development]

- Remote monitoring of robots: Real-time video of the surrounding environment on mobile

- Robot remote operation: Remotely take control of robots

- Robot task management: Delivery and robot status tracking

- Abnormal alert and safely control: Abnormal alert and safely control

[Theme 3]

[MVP smock test and validation analyze]

- Front-end and rear-end adjustment of robot and monitoring console

- Robot road test and coner case experiment

- Find specific places and specific users for testing in different use cases

- Collect usage feedbacks to validate the product solution

Where do we go from here?

Widening the scope

- The next step, complete the product launch, bring the solution to the market

- Collect feedback, iteration and verification in complex scenarios and more user cases

- Eventually, takeover the delivery service within 2 miles of Doordash.