#tractorexperience-dgk

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Stage 1: Research

Team

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Client

David Hedley, Caterpillar UX

Long Term Goals

Our prime task here is to improve the usability aspects of vehicle by concentrating on one prime factor of Safety. Caterpillar has set high bar in the market with its product and providing better user experience in Safety, Comfort, Convenience and Commercial viability. Our main goal is to disrupt the UTV market and to differentiate from the competitors in terms of user experience. Here user experience is considered as a collective improvement in overall usability and safety.

Challenges

- The vehicles are used on farmlands, construction sites or other rough terrains, probably in adverse weather conditions. These utility vehicles are also open and

not covered. Will any new technology that we might install in the vehicle, such as monitors or cameras, withstand these weather conditions?

- Even if the technology withstands the weather conditions now, how durable and viable will they be in the long run over extended usage?
- Are there any safety measures that are already implemented? How can we enhance those measures.
- Underage/Unauthorized driving is cause of 50% of the accidents. Can we use technology to improve safety?
- What are all the sensors that we can use in a collective manner to increase the safety of the vehicle?
- How can we utilize Artificial Intelligence/Machine Learning technology to provide the safety and convenience to the users while maintaining the cost criteria?
- The vehicle when used in forest area or construction site can cause accidents on blind spots. Can we implement solution for the safety of pedestrian or workers?
- Communication is a major problem in huge sites with drivers driving in critical situation and areas with low connectivity. Can we use technology that would help driver communicate with drivers in nearby areas through the dashboard?
- Areas with difficult terrains could hamper movements of the vehicle, many times putting driver safety in jeopardy. Can we implement a solution to ensure driver safety in these scenarios?
- What if drivers are stranded in remote areas with no contact. Can we implement technology to safeguard driver safety?
- Are there any mechanism installed that secure driver safety in case of accidents?
- Can we implement remote access to UTV?
- Can we implement path locator that would ensure the driver safety is guaranteed?

Commercial viability

Convenience

Comfort

Safety

Challenges

1) Payload 1000 lbs
2) Weather condition
3) GPS

Competitor ⇒
- 1) John deere
- 2) kubota

- 1) Mahindra
- 2) Polaris

Goal → 1) Design a dashboard

1) Caterpillar pricier

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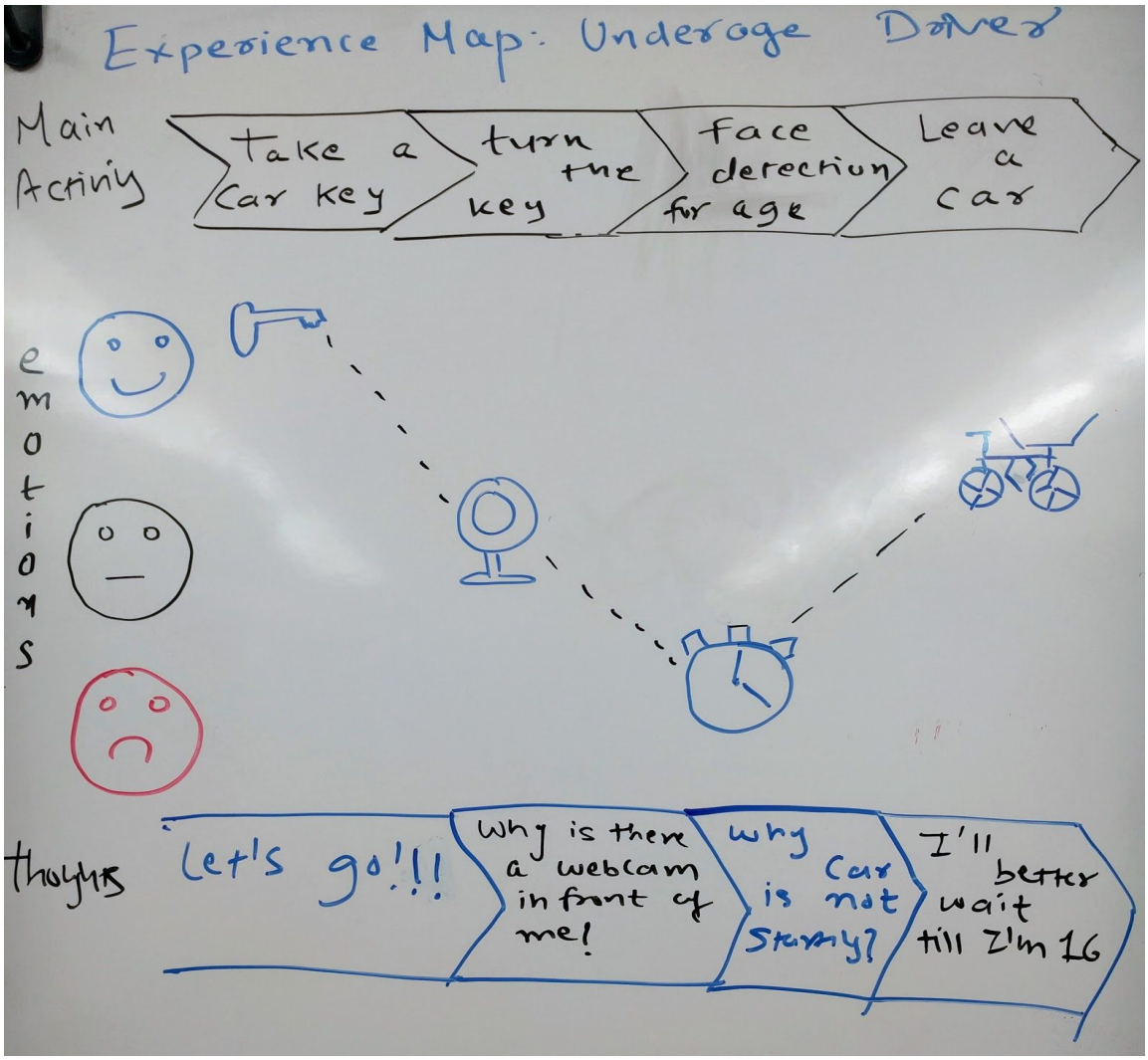
idea

1) Inclination Sensor
2) eye-catching dashboard
3) Seatbelt indicator
4) Screen Readability (Kindle like) (front lit e-paper disp)

Experience Map



Expert Notes

We kicked off the project by meeting with our client David Hedley. David introduced us to the different Caterpillar products and explained the functionality of UTV in detail. These were our most important takeaways from the kickoff:

- 4 cornerstones: convenience, safety, commercial viability, comfort.
- Our main focus - Safety.

Prof. Watson gave us a head start by suggesting below points:

- How can you achieve the best degree of safety in this class of vehicles?
- Which safety measures are essential to achieve an increase in the overall user experience.

Problems/Opportunities

1) Improve Safety
    - Can we solve blind spot problem?
    - Can we solve underage driving?
    - Can we handle difficult terrains?
    - Can we handle dynamic routes in forest and farmland?
    - Can we detect obstacles on the route?

2) Improve Communication
    - Can we improve communication between nearby vehicles
    - Can we modify dashboard to support messaging or phone calls?

Potential Solutions

- Inter Vehicle Communication system.
- Install messaging system in the dashboard or phone connection compatibility.
- Capturing image of the driver with a camera and performing face detection to allow/prevent the engine to start.
- Sensors to detect vehicle inclination, payload of cargo, towing.
- Radar detection for obstacles on the route.

The primary focus that formed the basis of the research is how can we improve safety. We considered use cases where the UTV is in high demand and focused what

technologies can be implemented to ensure safety that improve user experience. Majority of the research involved establishing the causes and then think about low level possible solution which we can explore in the next stages.

Target

As per the current research the target includes:

1. Farmers - Farmlands, fields
2. Construction sites
3. Private utility vehicles

References

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