#tractorexperience-dgk

CSC 591, Spring 2018

Stage 3: Choose

Team

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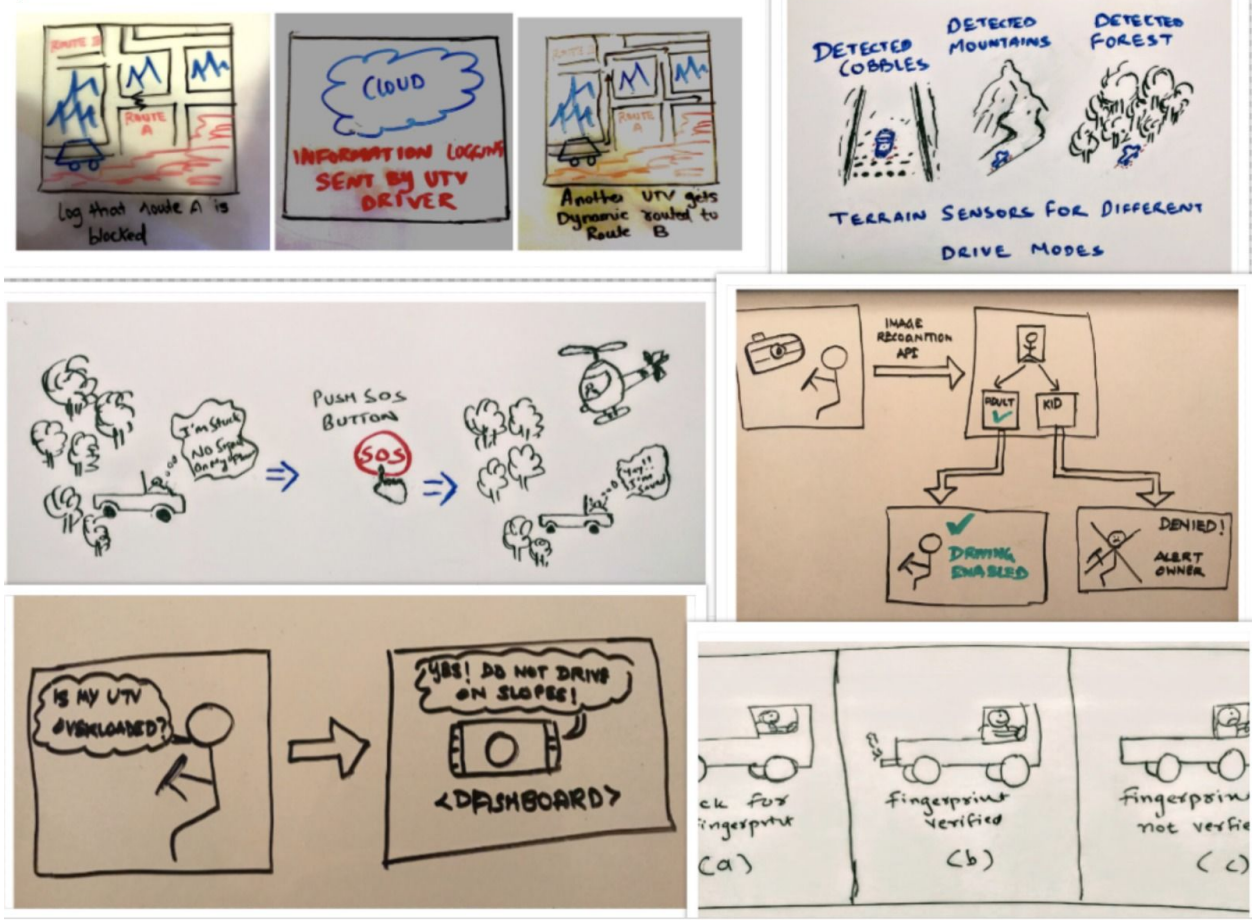
Ragavi Kalaignani	rkalaig
Rutvij Mehta	rmehta4
Vignesh Nandakumar	vnandak
Mitkumar Pandya	mhpandya

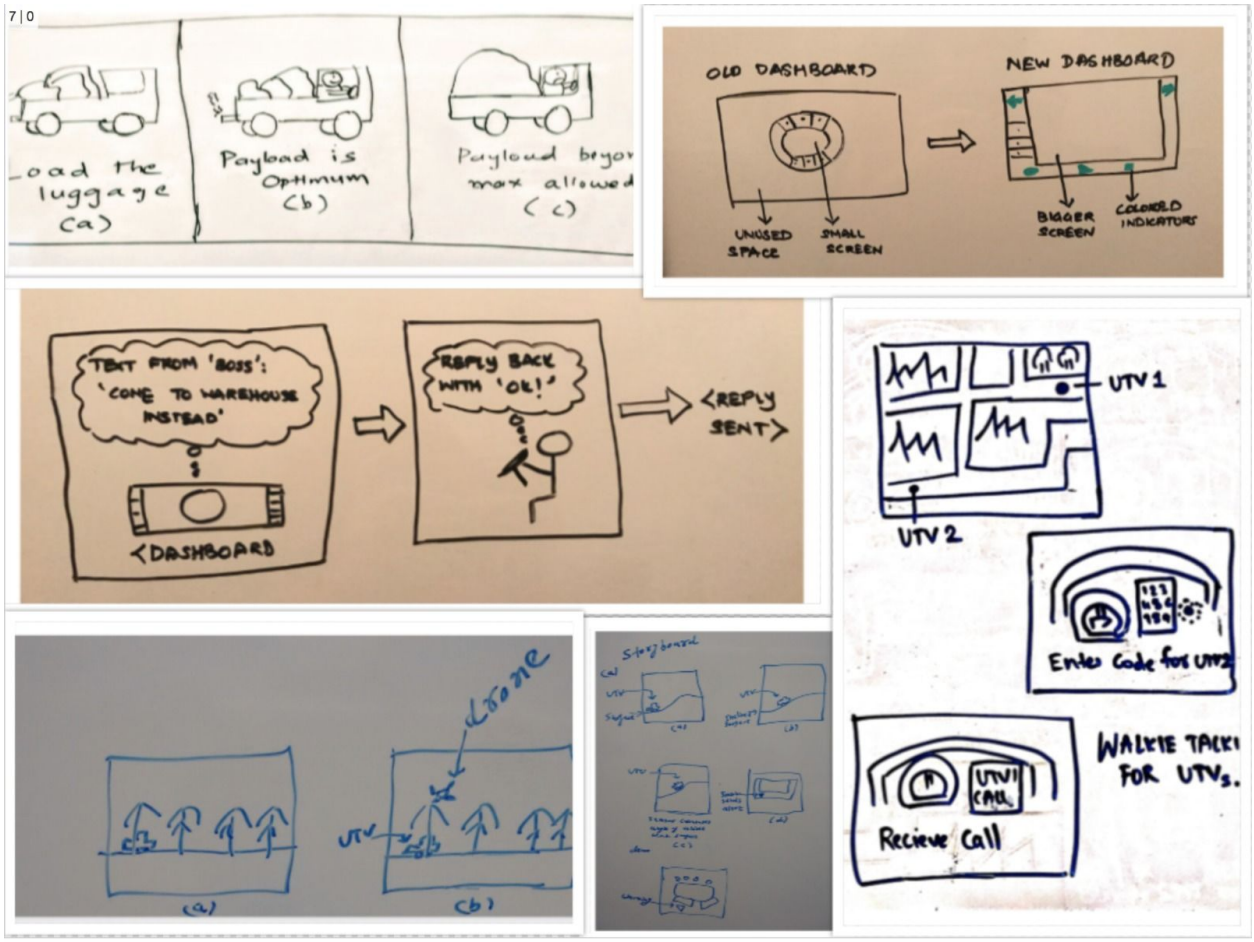
Client

David Hedley, Caterpillar UX

Displays


ROUTE A
Log that route A is blocked
CLOUD
INFORMATION LOGGING
SENT BY UTV DRIVER
Another UTV gets Dynamic routed to Route B
DETECTED COBBLES
DETECTED MOUNTAINS
DETECTED FOREST
TERRAIN SENSORS FOR DIFFERENT DRIVE MODES
I'm Stuck
NO Signal
PUSH SOS BUTTON
SOS
IMAGE RECOGNITION API
ADULT
KID
DRIVING ENABLED
DENIED!
ALERT OWNER
IS MY UTV OVERLOADED?
YES! DO NOT DRIVE ON SLOPES!
<DASHBOARD>
(a)
fingerprint verified
(b)
(c)

Ideas (1)



Ideas (2)

Votes

Zankruti (zndesai)

I voted for inter-UTV communication, drunk driver recognition and usage of drones. I consider the ideas to be primarily focused on ensuring the safety of the driver while using latest technology which enables better user experience.

Sagar (sgupta31)

I voted for facial recognition, way / route warnings, speech to text dashboard, terrain sensor and infrared sensor. All of the aforementioned ideas seemed possible in terms of implementation and they deals with safety, convenience and better experience for driver

Mitkumar (mhpandya)

I voted for Terrain sensor, Text2Speech, and Infrared sensor since these are related to user's safety while inside UTV.

Ragavi (rkalaig)

I voted for the following ideas: voice interactive dashboard, biometric verification, driver image recognition and usage of drones. These ideas seemed to make use of the latest technology to address the problems of safety and communication.

Rutvij (rmehta4)

I voted for Text2Speech,Terrain Sensor and biometric verification they cover both technology and safety issues.

Vignesh (vnandak)

I went with the age detection using webcams and the voice enabled texting assistant as I felt these 2 features would be a gamechanger in the current day UTV market.

Critique

Zankruti (zndesai)

The initial idea that were put forward were 1. Integration of multiple ideas to design a common system where different use cases act as input. 2. Drunk driver and age detection through image recognition. On further discussion with client, the final idea that emerged was through merging of individual ideas to provide solution for better safety. By merging the ideas we were able to create a standardized system of input and output for the user assistance and tackles safety and communication concerns through a common system. Ideas of messaging, text2Speech, Terrain control and infrared detection were some use cases that were considered for input to the system. The output would be different based on the input feed. For better user experience, a common system proved to showcase many benefits.

Sagar (sgupta31)

During our meeting with the client and the professor, we presented all of our ideas in which there were discussions whether a particular idea is user experience related or not. Each ideas were thoroughly analyzed in UX perspective, ease of implementation and commercial viability. After carefully considering all the ideas the client and professor suggested that if we combine ideas then we would be having a better result for improving the UTV. Some good ideas I liked were implementing the facial recognition feature to recognize driver’s behaviour, recognizing the

route conditions for the way ahead, sending text messages through voice is also a good user experience use case. We narrowed down to two implementations by combining few ideas for each which was a great way to choose. After further discussion we decided to choose the idea where we would be using text to speech, identifying the way for driver, detecting surrounding obstacles, sensing terrain and discovering other nearby vehicles.

Mitkumar (mhpandya)

Many of the ideas presented by the team were in accordance with the client's requirements and after discussions with the professor and the client the team has decided to combine multiple ideas. After the further discussion it was clear that multiple ideas combined can make a better application which can be integrated in the CAT UTVs to improve the user experience. I really liked the idea of terrain based features to automate the smart handling of driving the UTV and integration of infrared sensors to identify pedestrians or animals. Furthermore the text to speech and vice-versa can be put into dashboard to help driver stay hands free while driving.

Ragavi (rkalaig)

After the discussion with our client David and professor Watson, we merged our ideas into two major ideas: (1) a combination of inter-UTV communication, voice interactive dashboard, infrared detection and terrain based detection (2) image recognition of the driver for age detection, driver recognition, alcohol detection, emotion detection or alertness detection. The second idea seems more interesting to me. However, image recognition for alcohol, alertness or emotion may not always be accurate for everyone and could vary greatly based on age, gender or race. The client also pointed out that preventing underage people from driving is extreme and may not be feasible in certain states. Based on this feedback we decided to go ahead with the first idea.

Rutvij (rmehta4)

We presented many ideas to professor Watson and David and after the discussion we merged them into two ideas : A) Machine Learning based image recognition service for age detection of drivers to prevent minors from using the vehicle. David was also interested in incorporating other behavioural aspects and come with the entire new detection process.However, As professor Watson suggested,because of the time constraints it was not feasible to have an in-depth analysis of the suggested idea. B) An eclectic mix of ideas grouped together that helps in safety feature of UTV.Ideas we zeroed in on were inter-UTV communication, Text-to-Speech system , infrared and terrain based sensor detection.

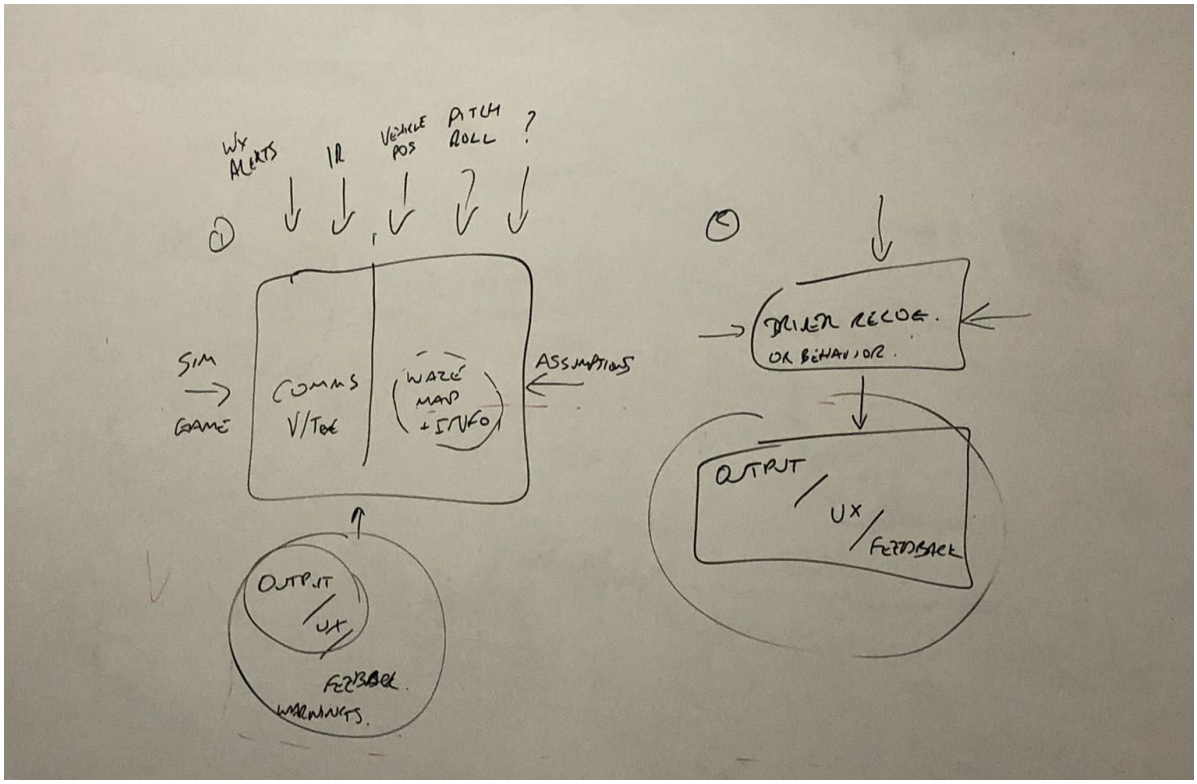
Vignesh (vnandak)

Upon presenting a number of ideas to Dr.Watson and David, we had an interesting brainstorming session and converged on a couple of ideas. We felt that an Image recognition

combined with the power of Machine Learning could be used to solve a lot of problems especially related to drunk drivers and underage drivers. We all agreed that improvements in the technology and safety areas of the vehicle would be potentially useful. After combining ideas that made better sense when put together rather than as standalone ideas, we reached a consensus. We decided that image recognition for driver detection, a texting assistant operating on voice and a terrain sensor would be the best possible fit at the moment.

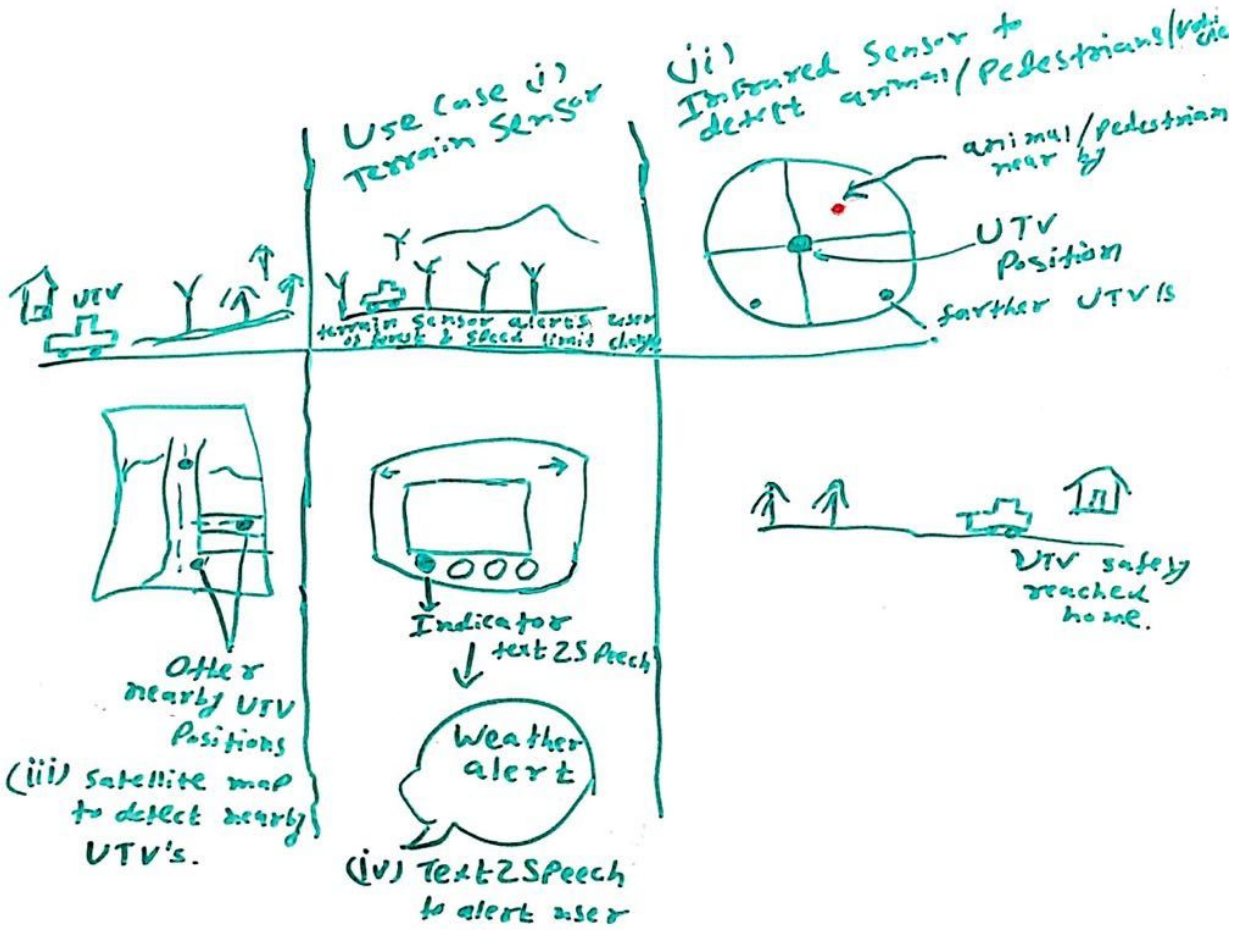
Merge or Not

The selected ideas were all interrelated and combining them would make the application complete. So after discussion with the Professor and Client we decided to merge the ideas with top votes, as shown below. The first merged idea on the left, involving the use cases of inter-UTV communication, voice interactive dashboard, infrared sensing and terrain detection, is chosen for prototyping.



Merged Ideas

Storyboard


Use case (i)
Terrain Sensor
(ii)
Infrared Sensor to
detect animal/Pedestrians/Vehi
animal/pedestrian
near by
UTV
Position
farther UTV is
UTV
terrain sensor alerts user
of road & speed limit chang
UTV safely
reached
home.
Indicator
text 2 Speech
Weather
alert
Other
nearby UTV
Positions
(iii) Satellite map
to detect nearby
UTV's.
(iv) Text2Speech
to alert user