#tractorexperience-dgk

CSC 591, Spring 2018

Stage 2: Generate

Team

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Client

David Hedley, Caterpillar UX

Zankruti Desai

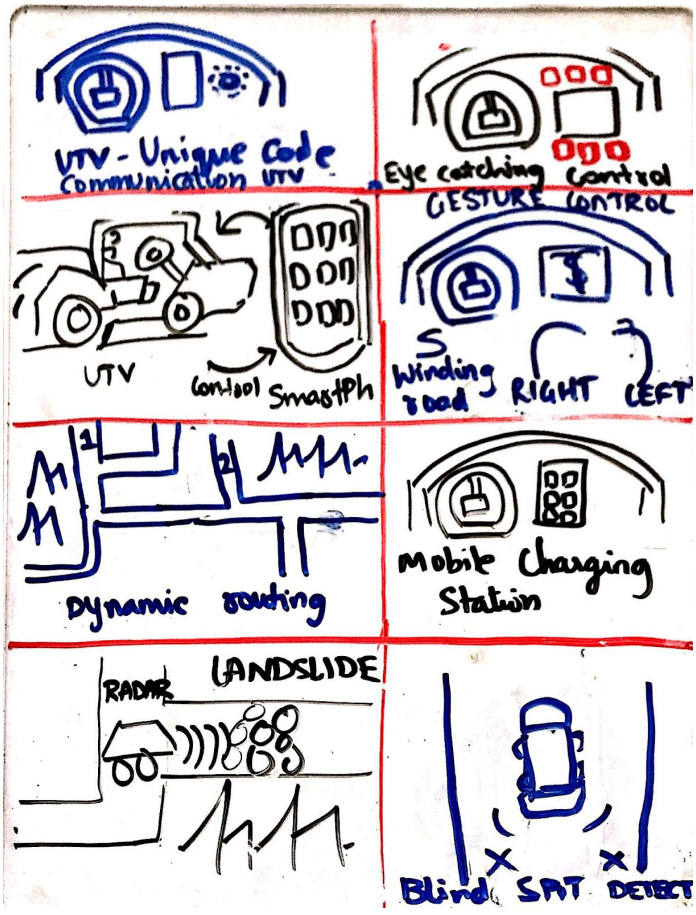
List of ideas:

1. Communication between other UTV. In an area of a large construction site or a forest area where the UTV is used by the rangers we can have an inbuilt communication system installed with the vehicles in the range. The controls can be simple and easy to use and it should not need much technical knowledge to operate.
2. In the modern world everything is possible when you have the smartphone. Say if the UTV vehicle are purchased by a local farmer then the vehicle could have smartphone collaboration for the farmer to update data, search data etc through the vehicle.
3. Dynamic routing. UTV vehicles are almost every time used for same purpose depending on the environment it is used in. We can incorporate mechanism that would learn the route the driver follows everyday and based on the conditions of the route learn the

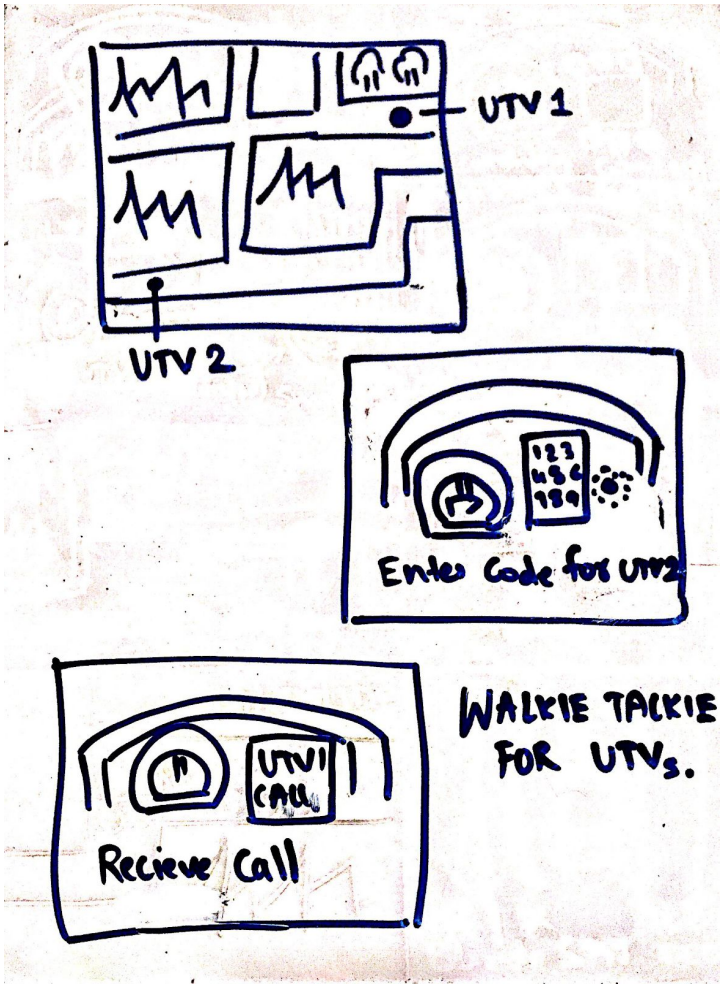
requirements are setting that needs to be adjusted and suggest/change them for user. Also the drivers could maybe add stop points along the way. More like a GPS system but mainly for UTV having certain predefined routes most of time.

4. Middle display with eye catching controls accessible to both passenger and drivers.
5. A mobile charging station that is incorporated into the dashboard to protect it from external weather conditions. It can be modified by providing a bluetooth connection to the car dashboard system. This would help in factors like GPS or phone calls.
6. One technology that I came across is Bendix Commercial vehicle system's wingman fusion product which uses radar and video to monitor the road ahead for obstacles and includes and electronic stability program to protect against rollovers and loss-of-control accidents.
7. We can install blind spot warning devices.
8. Gesture control on the steering wheel. Gesture can be pre set for the vehicle and since they are on the steering wheel it can be easily controlled.

Crazy 8's:



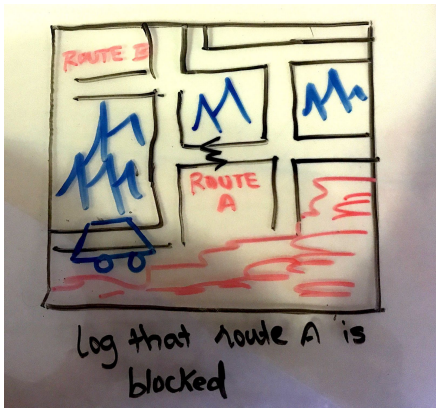
Sketch1:

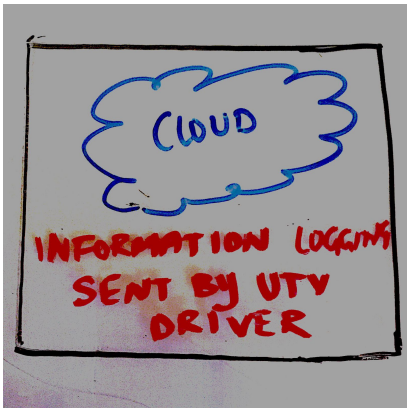


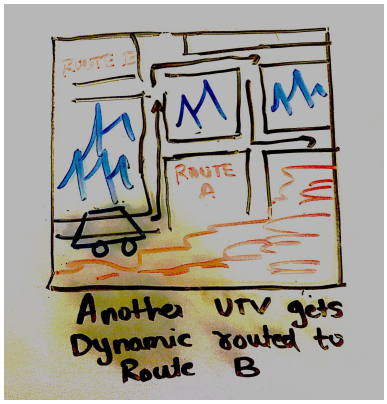
Description:

The above sketch represent idea of communication between two UTVs. The idea was inspired by the fact that in certain construction site or forest areas there could be multiple UTV at work and providing an inbuilt communication system in the UTV would enable a clearer interaction between the drivers. The mechanism would have code for each UTV and the driver needs to only enter the access code for the UTV they are trying to connect. The mechanism could be range bound and hence it cannot connect to UTV post certain ranges.

Sketch2:







Description:

The above sketch introduces the concept of dynamic routing. There would be a central database logging system which is accessible to any drives that buys the UTV vehicle. If the driver things the route is not safe to drive he can update into the logging system through dashboard by selecting the cause of unsafe route. The system will log into the system and the next driver who passes through the area can simply lookup at the system to see if the route he wishes to take is safe under current conditions. The system needs active involvement from the driver but takes on major issue by current scenarios prior to the start of the journey.

Sagar Gupta

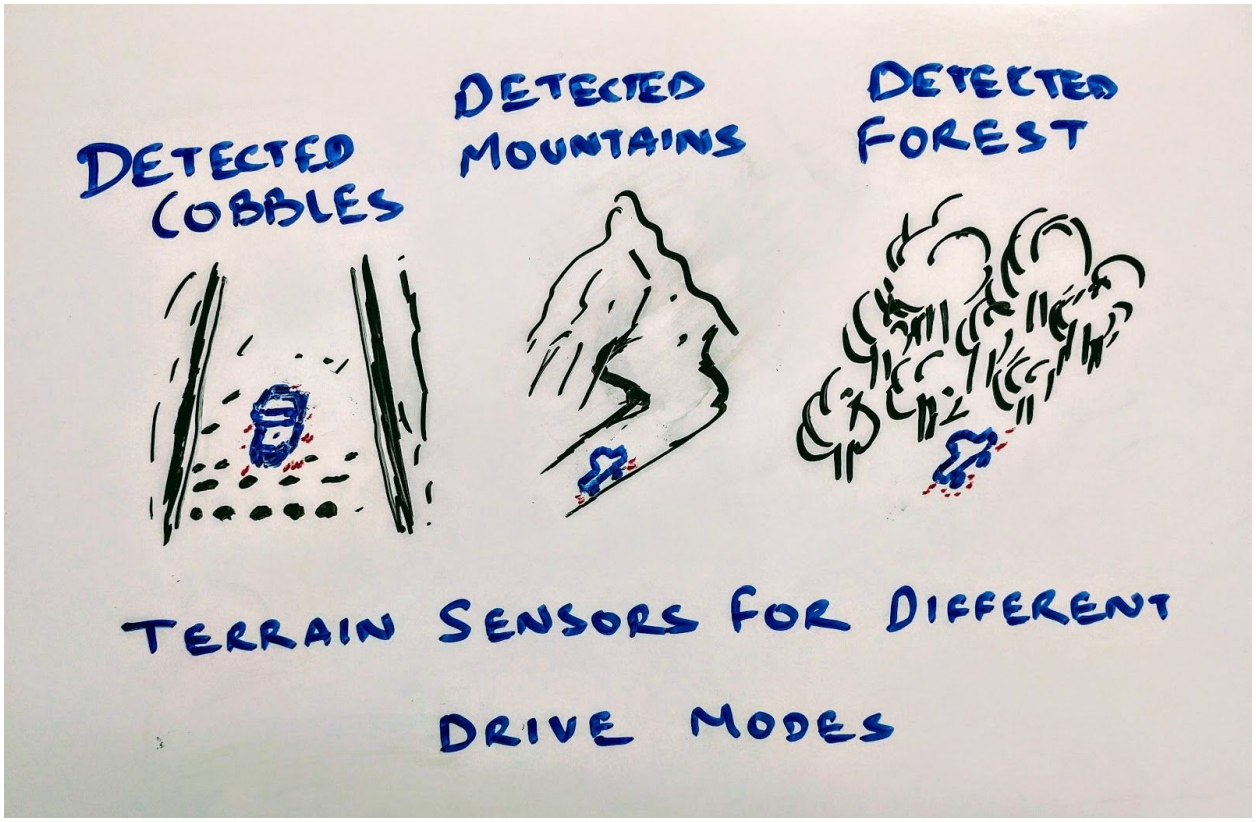
Ideas:

1. Closed cabin with automatic climate control - Driver will have to work in different types of weather conditions. There should be closed cabin option available for the vehicle.
2. Different drive modes for different terrain. This will include traction control and stability systems. For this we need to install terrain sensors in order to detect the terrain if driver chooses automatic mode.
3. Automatic gear with paddle shifters. Currently, the vehicle supports stick shift and it will be easier to use automatic gear shifts and paddle shifts as when driving in uneven terrain the driver doesn't have to go through hassle of shifting stick gears.
4. Head up display as current dashboard is in the middle and it will help driver better judge the vehicle conditions while driving. This feature can be included in the closed cabin version of the vehicle.
5. Installing GPS based system in the vehicle. We can install an SOS button based on this system in order to save the driver in case of an emergency situation. This system can also be used to find vehicle and also for navigation.

6. Steering mounted control for convenience. These controls can be for variety of features from audio controls, phone receiving or calling, drive mode controls.
7. Airbags which can help driver in the event for toppling of vehicle for extra cushion. ABS and EBD for safety while braking.
8. Radar based system which will help in conditions like surrounding predictions, road predictions, parking assistance, etc.
9. Having access over the vehicle using a mobile app will help in tracking the vehicle location, sending alerts like speed limit reached or when is vehicle started.

CRAZY 8s

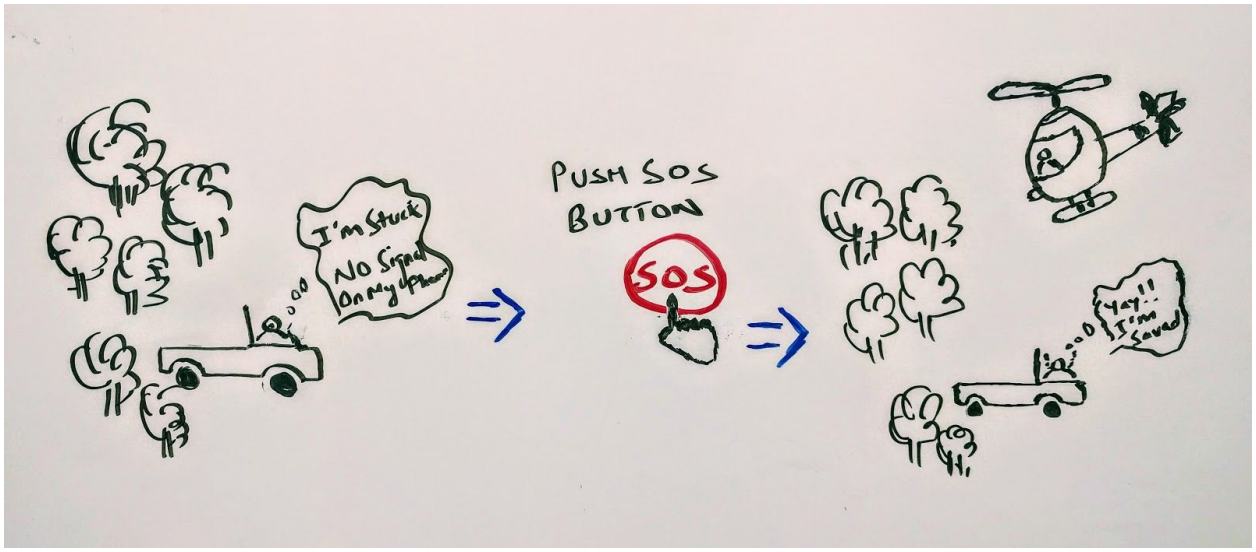
SKETCH



Description:

The above sketches describes some of the different driving conditions which a driver can encounter. For driving in different terrains the driver can use this system to select a drive mode from different modes available which will optimize performance on different types of surfaces. With the help of terrain sensors the driver can also choose automatic drive mode which will adjust the vehicle as per the terrain in terms of grip, inclination, max speed, engine rpm and torque, traction control and stability.

STORYBOARD



Description:

The above sketch describes a condition when a driver is in emergency situation where he is in an isolated place. When a driver will not have access to telephonic signals and help is needed in a remote location, then SOS button installed in the vehicle can be used to send distress signal via satellites to concerned authorities. This will help save the driver as this kind of scenario is possible while working in remote locations.

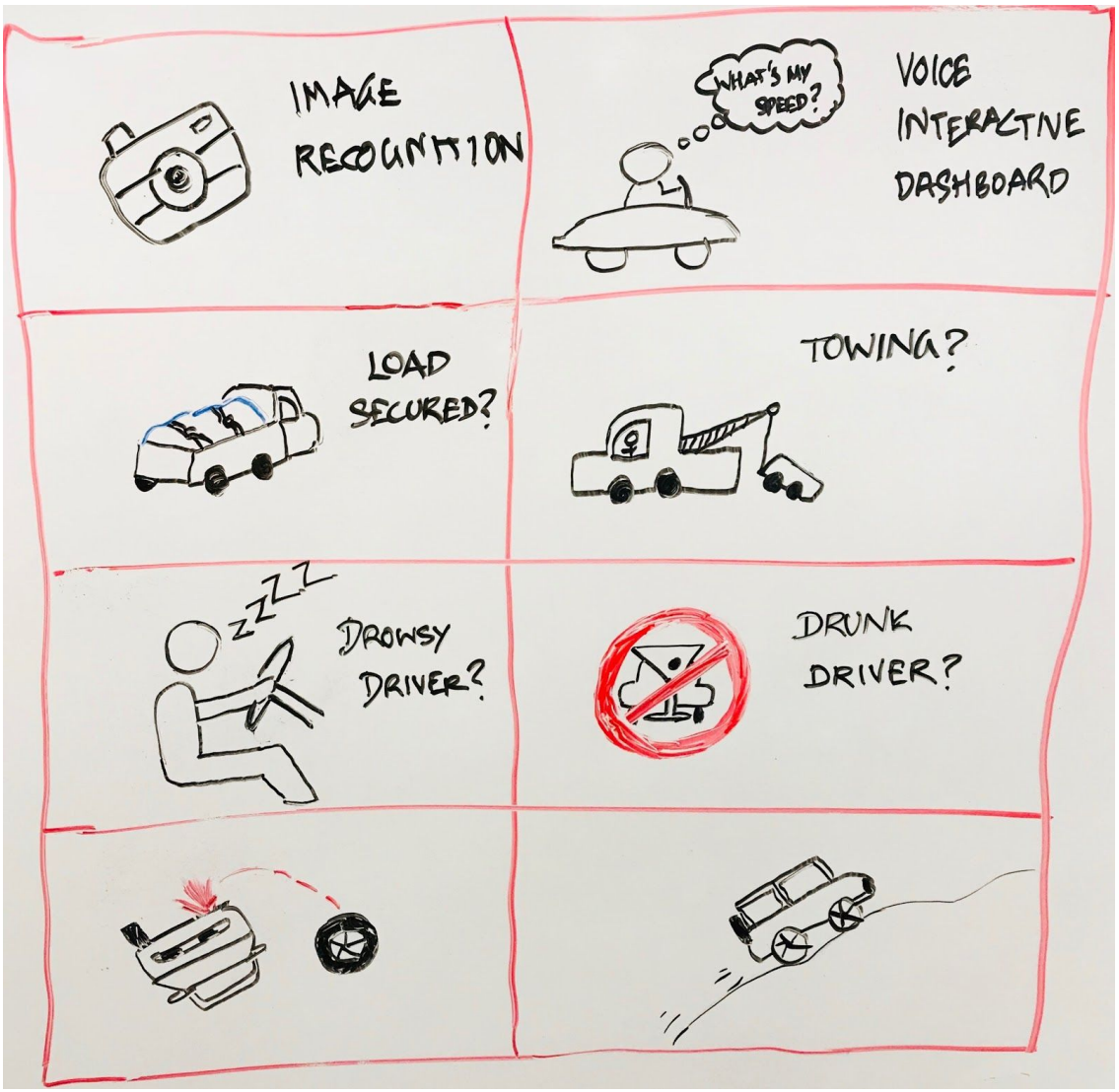
Ragavi Kalaignani

Ideas

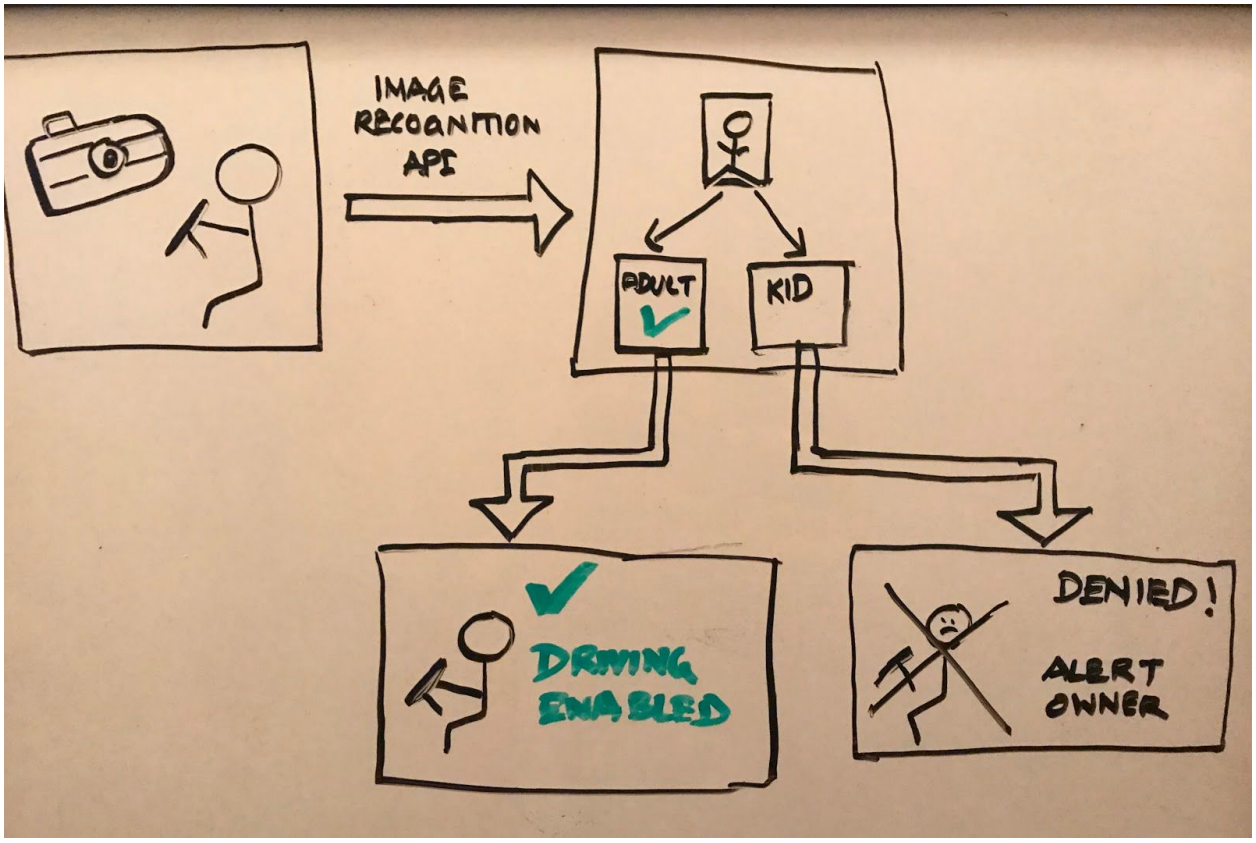
1. Image Recognition
   A camera can be installed to capture a photo of the driver when the vehicle is started. The photo can be analyzed for the following purposes:
   a. Detecting driver age and alerting the vehicle owner in case of an underage driver.
   b. Face recognition to check if the person is an authorized driver.
2. Voice Interactive Dashboard:
   As constantly looking at the dashboard can be distracting, a voice interactive dashboard can be provided. The driver can speak out commands like “What is my current speed?”, “Is my vehicle overloaded?”. The response will also be spoken out to the driver.
3. Using sensors to detect it the rear cargo load is secured with straps so it doesn’t move around causing the vehicle to topple.
4. Using sensors to detect if the vehicle is towing anything, and alerting driver if they’re driving on inclined slopes.

5. Driver Drowsiness Detection:
   There are several ways to detect driver drowsiness:
   a. Steering pattern monitoring
   b. Driver eye/face monitoring: Requires a camera watching the driver's face.
   c. Physiological measurement: Requires body sensors for measure parameters like brain activity, heart rate, skin conductance, muscle activity.
6. Driver alcohol detection system.
7. Detect if vehicle is in danger of toppling and speak out emergency measures.
8. Controls to increase traction to avoid slipping on inclined surfaces.

Crazy 8s



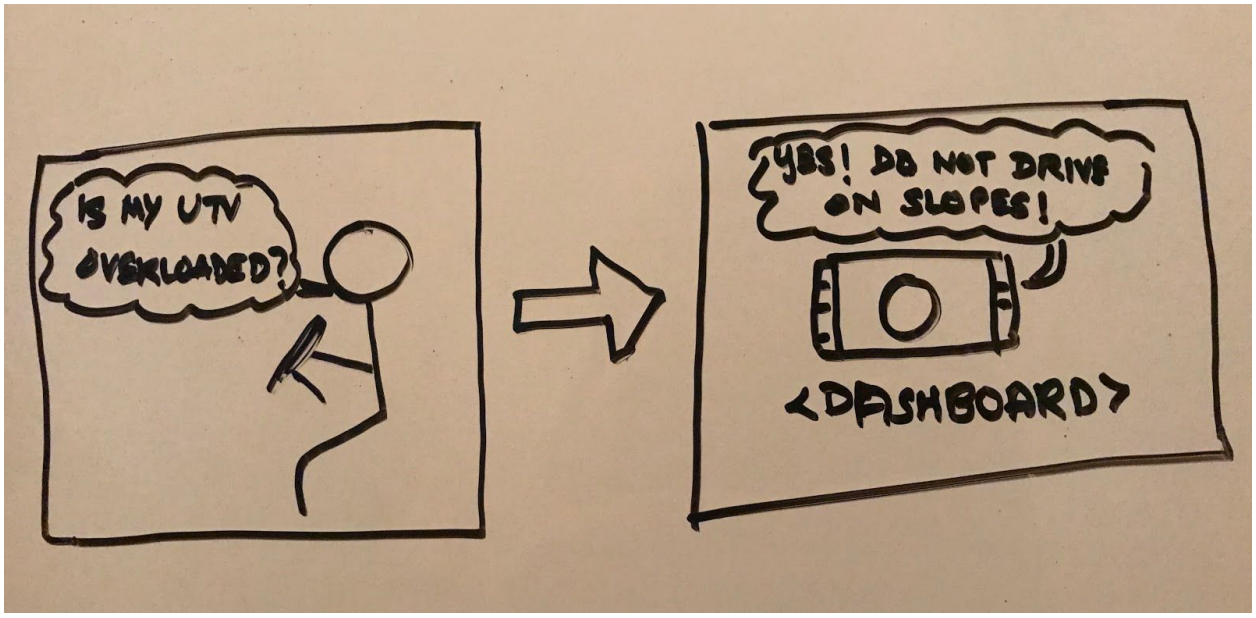
Sketch 1: Image Recognition



Description

The camera system installed in the vehicle is used to ensure that underage drivers cannot drive the vehicle. This is achieved by capturing a photo of the driver once he gets into the vehicle and tries to start it. This image is sent to an image recognition API which detects the driver's age. Once the the age is determined, the engine is allowed to power on only if the driver is an adult who is of legal driving age.

Sketch 2: Voice Interactive Dashboard



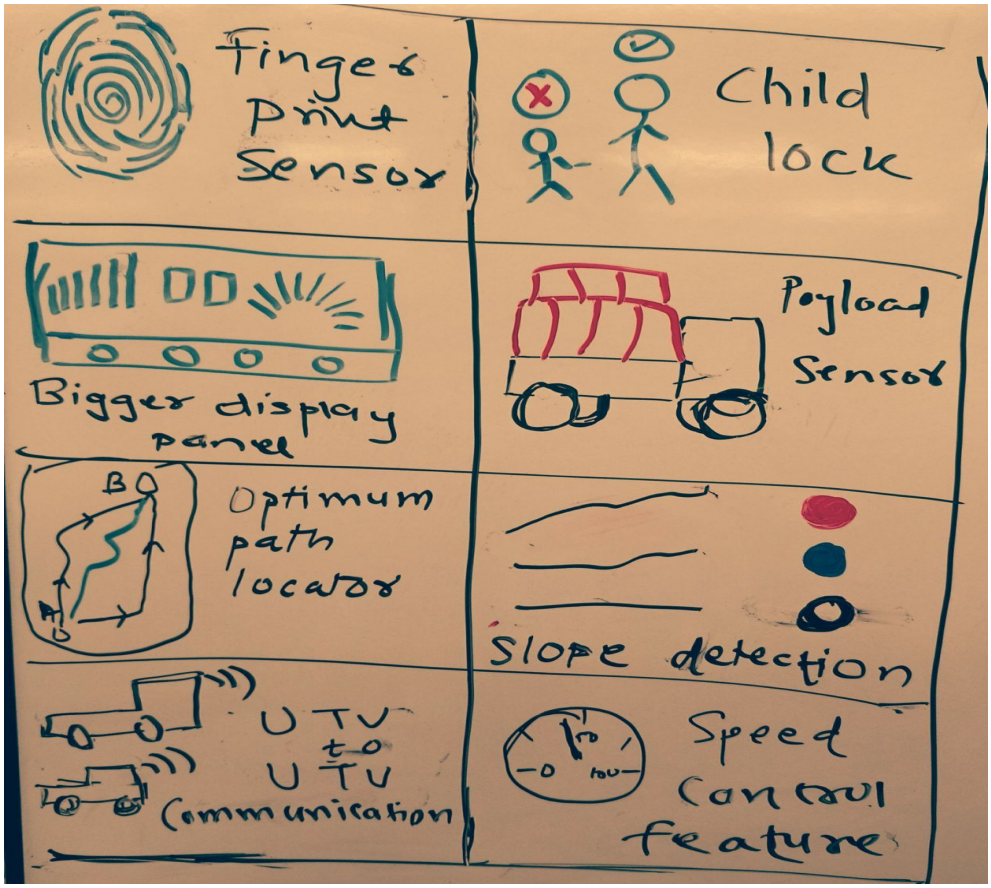
Description
The voice interactive system can help the user communicate with the dashboard. The driver is enabled to clarify certain doubts regarding the vehicle's payload, current driving condtions with a single voice command and with no interruption to his driving. This way safety can be achieved and also drivers are able to save time on such tasks.

Rutvij Mehta

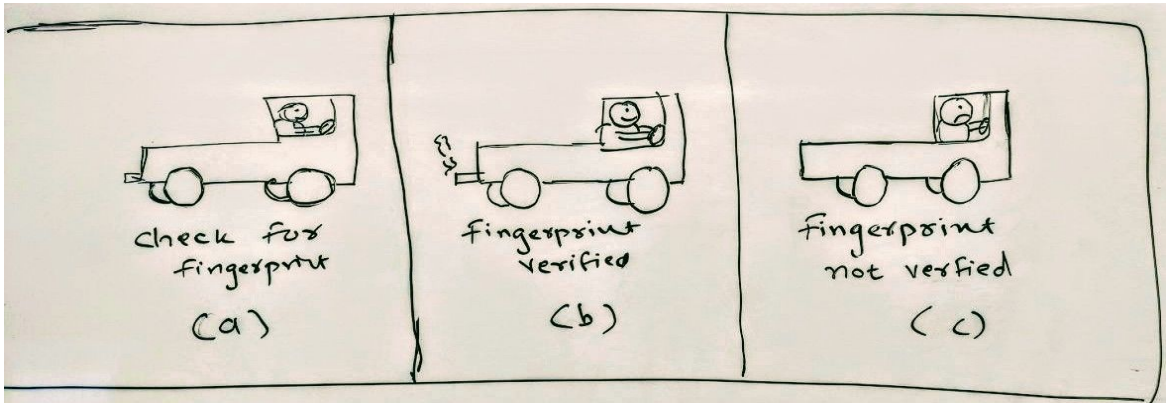
Ideas

1. Bigger and intuitive display panel along with an alert dashboard panel
2. UTV to UTV communication link
3. Slope detection alert on dashboard
4. Payload sensor to prevent the engine to start if load is beyond the optimum capacity
5. Fingerprint verification of a driver to prevent an unauthorized use of a vehicle
6. Child lock mechanism to prevent children from accidentally turning on the vehicle
7. Optimum path locator between a source and a destination based on the current situation of terrain
8. Speed control feature to prevent driver from overspeeding and risk of toppling

Crazy 8s



Sketch 1

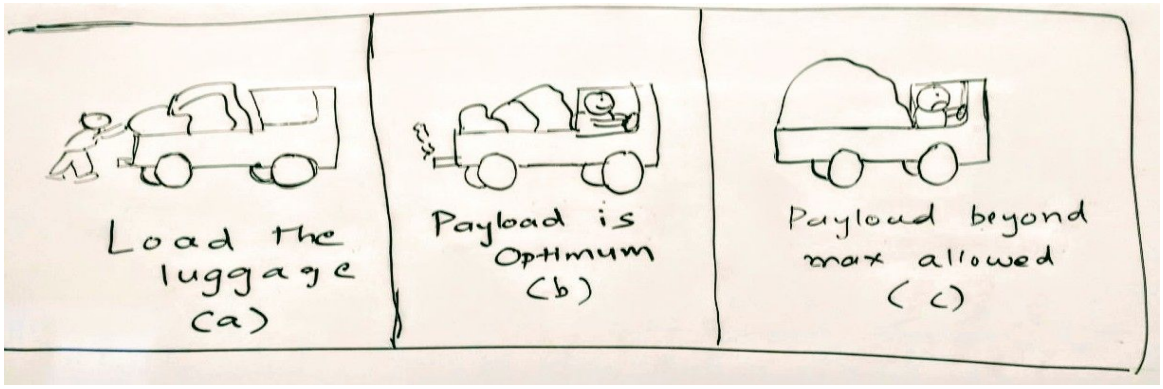


Description :

The fingerprint verification system can prevent unauthorized users from using the UTV vehicle.Therefore,when a user tries to start a vehicle , he/she would have to go through a

fingerprint verification first.If the user is authorized then only then engine will start otherwise car will not start.

Sketch2



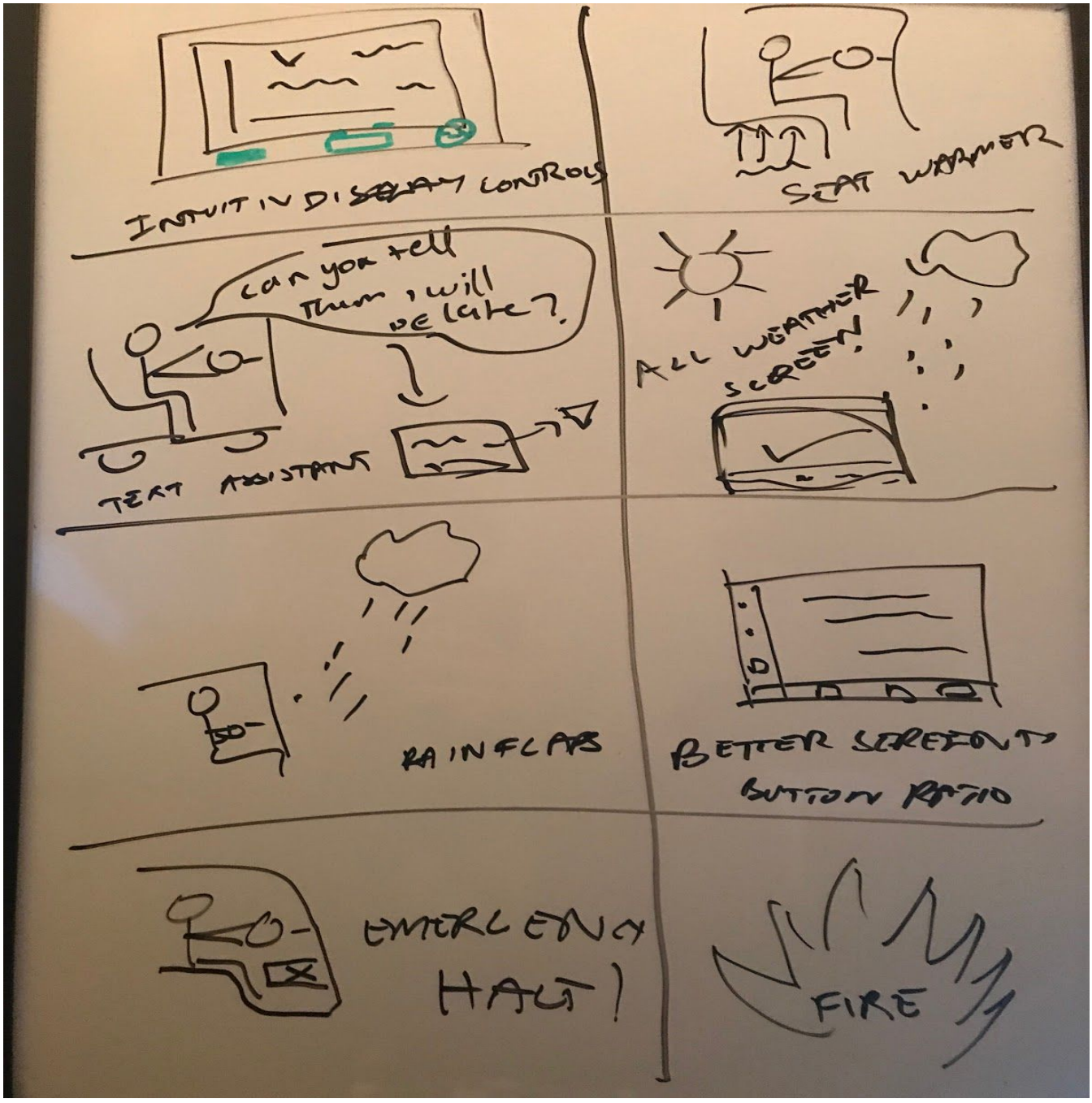
Description :
UTV vehicles have a higher risk of toppling in uneven terrain and hilly areas.Since the additional payload plays a significant part in overall dynamics of the vehicle,Payload sensor will detect the optimum payload limit and will not let user start the engine if the added payload is more than maximum permissible limit.

Vignesh Nandakumar

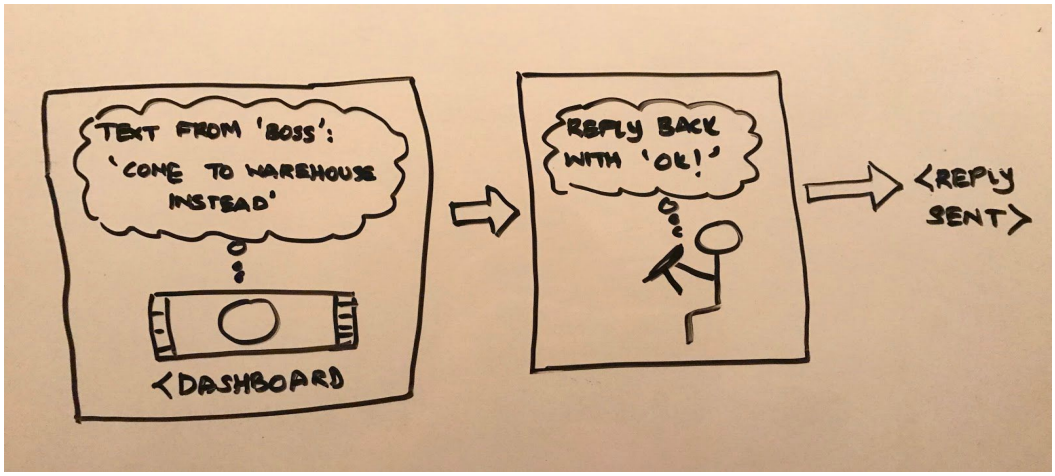
Ideas

1. Rain flaps to prevent driver from getting drenched or while driving through water-logged areas.
2. Front-lit screen dashboard to be water-resistant and handle surrounding brightness conditions.
3. Seat warmers for harsh climatic conditions.
4. Emergency stop mechanism to bring vehicle to complete halt in case of danger (like a treadmill).
5. Intuitive Dashboard with colored indicators.
6. Better Screen to button Ratio on the Dashboard.
7. Text messaging assistant on the Dashboard that enables drivers to send and receive messages through voice commands.
8. Dashboard with option to guide user in case of accidents or mishap.

Crazy 8s


INTUITIV DISPLAY CONTROLS
SEAT WARMER
can you tell them I will be late?
TEXT ASSISTANT
ALL WEATHER SCREEN
RAINFLAPS
BETTER SCREEN TO BUTTON RATIO
EMERGENCY HALT
FIRE

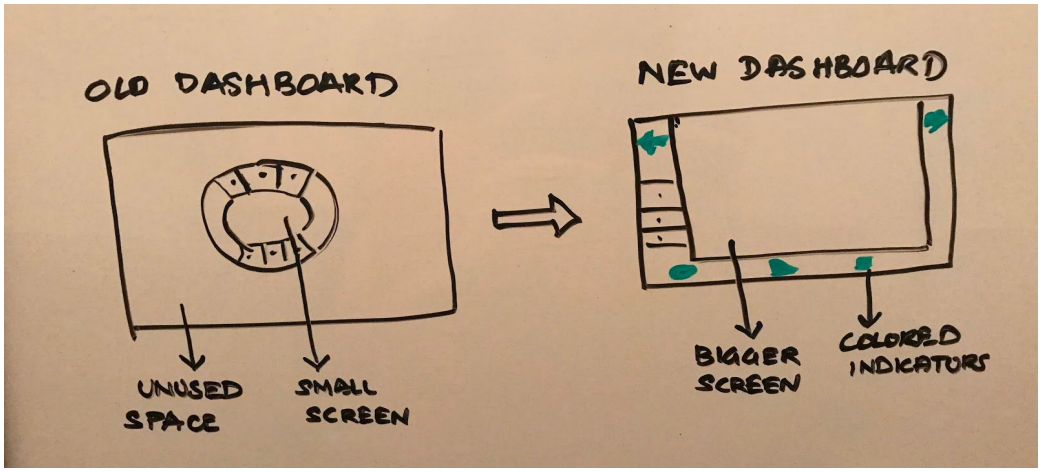
Sketch 1



Description

The text messaging assistant built into the dashboard is used to communicate with other staff on the area with minimal effort. We all know texting during driving can be dangerous. With this system installed, the user can send and receive text messages through a single voice command to the dashboard.

Sketch 2



Description

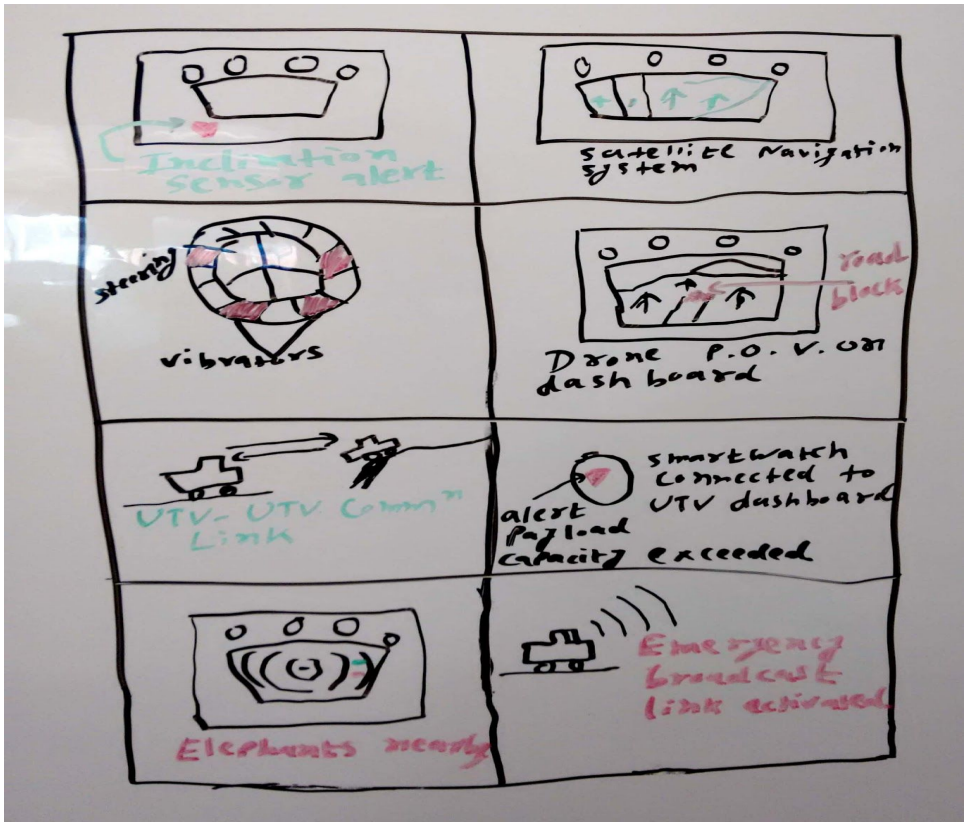
The user can view things with ease if the dashboard has a much larger screen. With a larger screen area and a smaller button area, this can be achieved. Also, indicative signals on the dashboard can notify user of battery level, tyre pressure etc. thereby letting the driver be prepared in advance.

Mitkumar Pandya

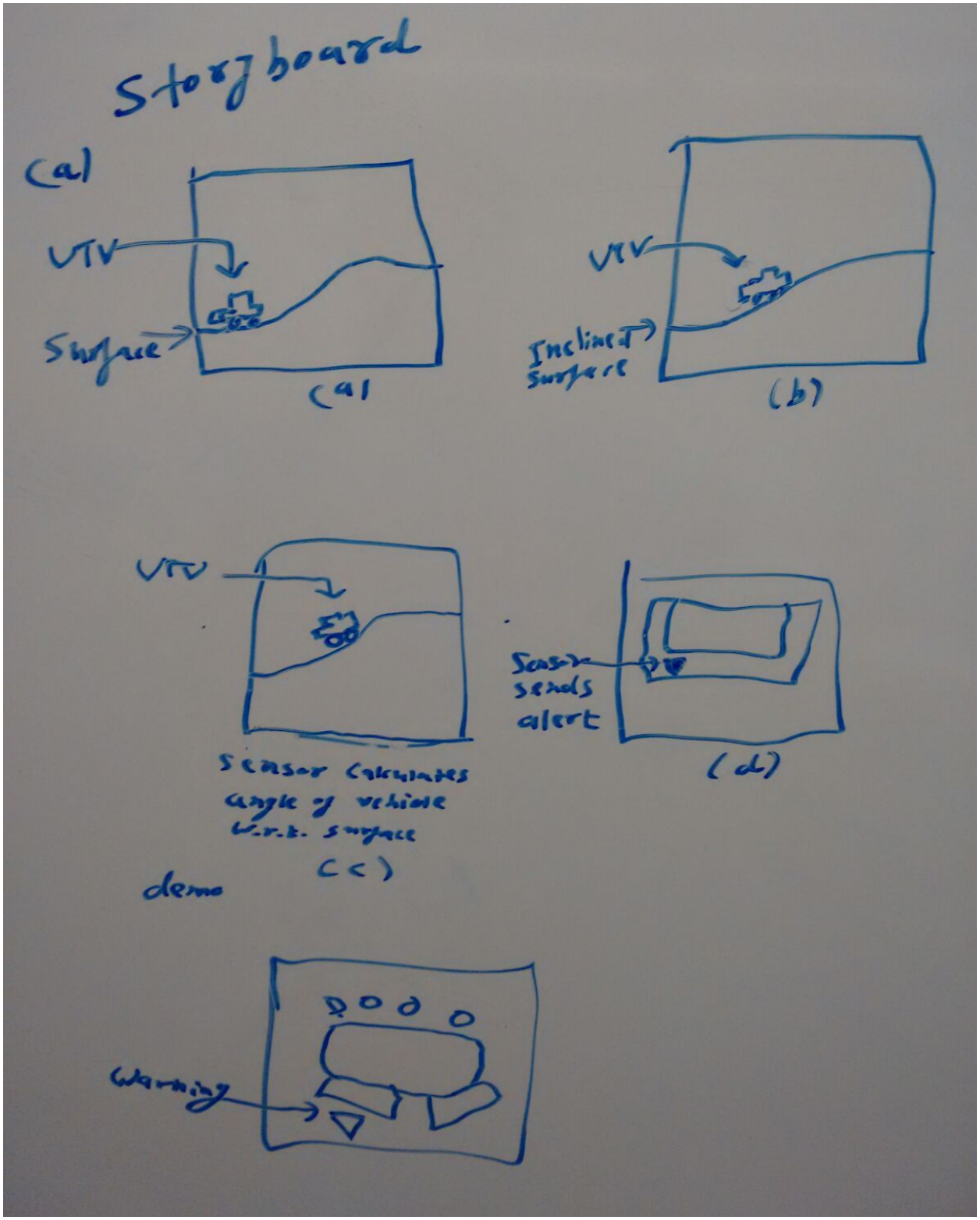
Ideas:

1. UTV can be equipped with an inclination sensor which monitors the angle at which UTV is moving and may indicate a warning alert if the angle is increased to a threshold capacity warning the driver of possible toppling of the vehicle.
2. UTV dashboard equipped with Satellite Navigation system for the areas where mobile telecommunication signals are hard to receive.
3. Vibration equipped steering that can alert driver of possible collision through exterior image recognition and also can alert driver if the driver is sleepy through facial recognition.
4. Drone equipped UTV with dashboard connected to drone camera to show the views in forest and mountain areas which driver can not see directly. This helps driver in finding ways when GPS is not working.
5. Inbuilt vehicle communication system to provide communication with nearby vehicles.
6. Smartwatch integration with UTV dashboard to receive alerts on the watch. This can also be used to monitor vehicle health from nearby range when driver is not in the UTV.
7. Pedestrian or Animal infrared sensors which can alert the driver of nearby dangerous animals in the forests.
8. GPS based S.O.S. service in isolated areas used in case of emergency.

Crazy 8's:

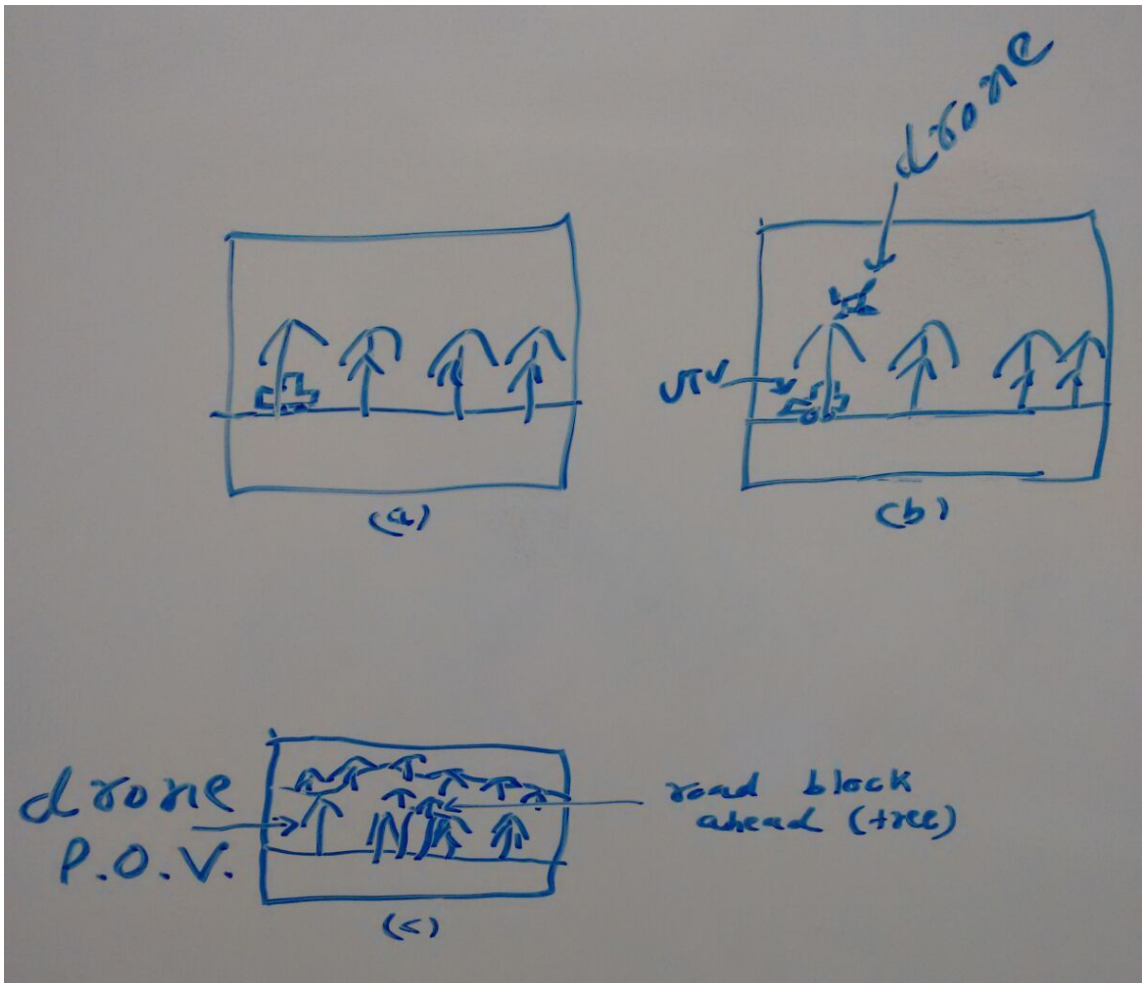


Sketch 1:

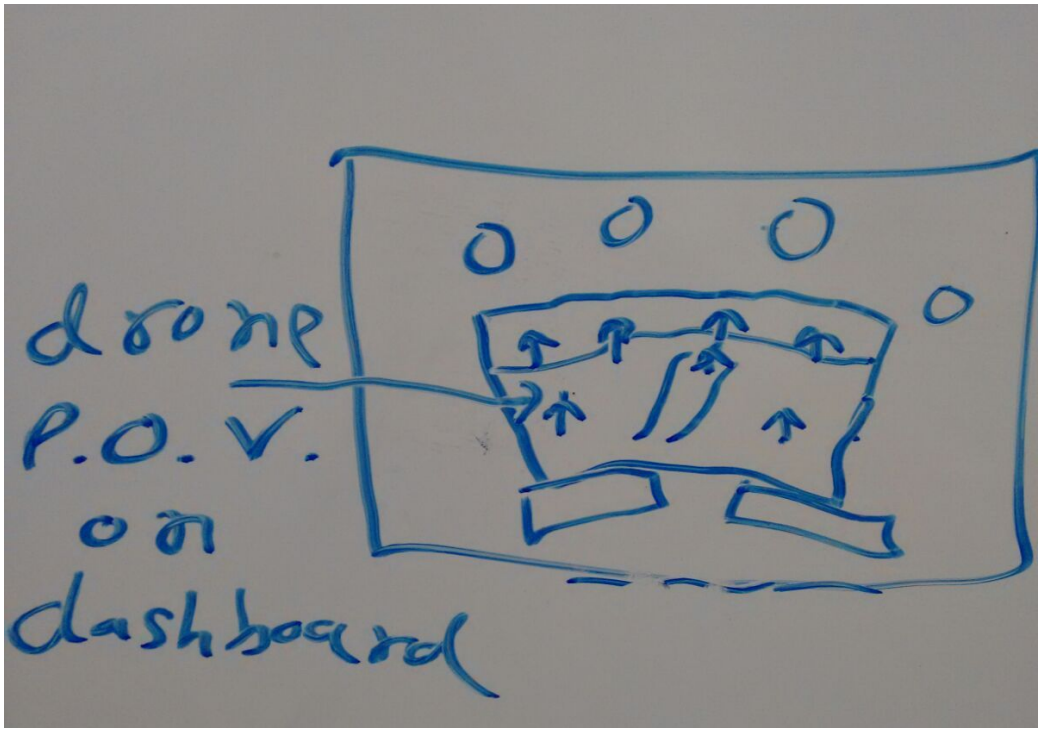

Storyboard
(a)
VTV
Surface
(a)
VTV
Inclined Surface
(b)
VTV
Sensor calculates angle of vehicle w.r.t. surface
(c)
Sensor sends alert
(d)
demo
Warning

Description : UTV has been equipped with an inclination sensor which monitors the angle at which UTV is moving as shown in figure a,b and c. At image c sensor initiates an alert of overinclinated slope and indicates a warning as shown in image d and demo.

Sketch 2:



Demo:



Description:

Drone equipped UTV with dashboard connected to drone camera to show the views in forest and mountain areas which driver can not see directly as shown in a and b. This helps driver in finding ways when GPS is not working as shown in image c and demo.