SafeDrive (Group 27)

Final Report of Week 3 (02266)

Afaf Amajjan (AA)
Technical University of Denmark
s230920@student.dtu.dk

Leonardo Rodovero (LR)
Technical University of Denmark
s240095@student.dtu.dk

Ömer Coskun (ÖC)
Technical University of Denmark
s230926@student.dtu.dk

Rahima Akhter (RA)
Technical University of Denmark
s225152@student.dtu.dk

Zahedullah Wafa (ZW)
Technical University of Denmark
s224316@student.dtu.dk

Zaid Sheikh (ZS)
Technical University of Denmark
s224309@student.dtu.dk

1 INTRODUCTION (ZS)

Fatigue is among one of the most significant risks for American truck drivers, contributing to the high rate of road accidents [2]. American truck drivers have an limit of driving 8 hours without break, but are then required to take at least 30 minutes break afterward [8]. Prolonged driving hours without any break can result in a fatal crash. A study by NHTSA shows that 91,000 accidents involve fatigue drivers, resulting in approximately 50,000 injuries and nearly 800 deaths [6]. Crashes due to fatigue are more prevalent in the morning where the truck drivers are on their routes, with studies showing that it is 20 times more likely to fall asleep while driving at 6 am, rather than at night [1].

To help prevent road crashes, SafeDrive uses a display app in the truck, integrated with an infrared camera and artificial intelligence to detect signs of driver fatigue, including prolonged eye closure, yawning, and changes in head posture. When drowsiness or fatigue is detected, the system uses light, alarm, and visual alert, depending on the user's personal preferences. Additionally, when signs of extreme fatigue are detected, the system will contact the emergency contact of the truck driver, ensuring their safety and others.

2 RELATED WORK (ZW)

Fatigue is a significant risk for drivers, espdrecially among American truck drivers, where many hours behind the wheel cause a high risk of road accidents. [2]

Both WakeUp and SafeDrive aim to find a solution to this problem by detecting drowsiness and preventing accidents, but differ in approach and target audience. WakeUp, developed by MobiDev, is an iOS app that uses ARKit, TrueDepth camera, and custom algorithms to track head position and eye movement in real-time. It constructs a 3D face model and triggers a sound alert if signs of sleep are detected. WakeUp focuses on rapid development, delivering an MVP in just two months, and caters to general drivers looking for a convenient safety tool. [5]

SafeDrive, on the other hand, is designed specifically for truck drivers, using advanced technologies such as infrared cameras and AI. These tools detect signs of fatigue, including prolonged eye closure, yawning, and changes in head posture. Unlike WakeUp, SafeDrive offers additional safety features, such as contacting an emergency contact if extreme fatigue is detected, adding an extra layer of protection for drivers at risk. Although both solutions aim to reduce drowsy driving incidents, SafeDrive takes a more tailored approach for American truck drivers with its emphasis on AI and emergency response directly installed on the truck's screen, while WakeUp aims for simplicity, access from the user's phone, and rapid deployment for a wider audience.

3 SCOPING (AA)

We aimed to determine the solution and features American truck drivers would need for fatigue detection and assess the clarity, usability and effectiveness of the SafeDrive landing page and prototype. Think-aloud testing, focus groups and workshop sessions used to evaluate user interactions, gather feedback and refine the system.

Findings highlighted the importance of communication of AI features, inutitve navigation and user-tailored settings. While features like fatigue alerts and emergency calls were validated, improvements were suggested for alert types and interface clarity. These insights informed subsequent iterations, refining SafeDrive to better address user needs and safety concerns.

4 ITERATION #1 (ÖC, ZW)

What was validated: The hypothesis was to validate whether SafeDrive as a solution and its features were represented on the landing page and whether the prototype effectively addressed the needs of truck drivers. We especially wanted to evaluate whether the issue of driver fatigue was communicated and if the features that the solutions offer, such as facial recognition and music control, appeared intuitive and relevant. In addition, we focused on ensuring that the market segment was clearly defined and that the design appealed to truck drivers as prospective users.

How we did it: We used a structured **focus group method** with predefined questions under the guidance of a moderator, since participants can uncover user needs rather than initially focus on the interaction styles or usability of a system [7]. The focus group test was conducted in two sessions with three students each, who were from the Technical University of Denmark, and who had a drivers license (between 3-6 years) and had previously experienced fatigue behind the wheel when driving long distances. The test was divided into **three phases** [Section F.1]. First, the participants were presented the **landing page** [Section C.2] for 10-15 seconds and were afterwards asked to share their immediate impressions of the problem being addressed, the product, and the market segment [Section C.3]. Next, the **wireframes of SafeDrive** were reviewed, where the participants discussed the navigation, design, and features of the prototype. A member from the group facilitated the

discussion, ensuring that all participants contributed and the conversation remained focused. At the same time, the other members of the group took notes of the observations and discussion. Finally, participants were encouraged to make concrete **suggestions for improvement**, which were summarized for further iteration [Section F.1].

Outcome of Validation: The focus group test revealed several key insights. The issue of driver fatigue was generally **acknowledged**, but the participants felt that certain parts of the landing page and wireframes were not sufficiently communicated. For example, the role of AI and the term "Safety flash camera" were unclear and led to **misunderstandings**. The participants also discussed the color theme, which was considered too feminine and **less appropriate** for truck drivers as end-users [Section C.2]. In addition, the text made it difficult to understand that the landing page is aimed at truck drivers. Regarding the wireframes, navigation was evaluated as **intuitive and user-friendly**, while the text in the settings was too small to read from a distance. Lastly, the participants suggested more specific information on how music could help drivers stay awake [Section F.1].

Based on the feedback [Section F.1], the text "Truck Drivers:" was highlighted in bold font and the camera was referred to as a "Camera with attentive light" for better **clarification**. Moreover, the color theme was adjusted to bluish shades in order to create a more **neutral and calming atmosphere** for the landing page [Section B.1]. In the wireframes, the text in the settings was made larger for better **readability** and the colors were adjusted to a more masculine color theme, creating **visual consistency**. In general, the test showed that our hypothesis was confirmed as participants could engage in a discussion about the features of the solution and how it relates to the problem of driver fatigue experienced by truck drivers. The participants assessed that SafeDrive has great potential in the market, but they could not evaluate to what extent the solution solves the problem of driver fatigue from a exploration of the wireframes. This supports the point that focus groups can shed light on user needs, but that the results need to be complemented by other methods to validate usability [7]. Therefore, more iterations are needed to ensure that SafeDrive optimally meets the needs and expectations of prospective users, which created the basis for the focus area in the next iteration of the workshop.

5 ITERATION #2 (LR)

What Was Validated: The purpose of the workshop was to ensure that the **landing page** [Section B.1] was laid out in a clear and appealing way and tested our prototype, **SafeDrive**, for functionality and user-friendliness. Moreover, we evaluated whether customers understood the problem and solution of the landing page, whether the prototype [Section C.1] design and functionality met the expectations of potential users and whether key features such as **music and lighting adjustments** and **emergency notifications** were logical and easy to use. Additionally, feedback [Section F.2] highlighted potential safety concerns, such as the light setup might be too bright and distracting for certain users.

How We Did It: We conducted an **interactive workshop**, beginning with a captivating icebreaker where participants shared their driving experiences and ways to stay awake during prolonged drives. Subsequently, the participants evaluated our landing page and prototype [Section A.1, A.2] through a guided workshop, note brainstorming, and scenario-based feedback [Section F.2]. Key questions asked included: *"Is the product clear to the customer?"* and *"Is the landing page appealing to prospective customers?"* Participants then reviewed the **prototype's wireframes** [Section C.1], focusing on minimizing distractions and ensuring the interactions were efficient and intuitive.

Outcome of Validation: The workshop provided valuable insights that informed our next iteration. For the landing page [Section B.1], participants appreciated the calming colors, clear icons, and problem statement. However, they suggested improvements, including a **larger camera image** and clearer explanations of how features like lighting and music adjustments contribute to safety. For the prototype, participants highlighted challenges with **touch-based interactions**, particularly for fatigued drivers, and recommended alternatives such as voice controls or **steering wheel buttons**. Concerns about **sensitivity of flashing lights** were noted, with suggestions for customizable settings. Feedback [Section F.2] also emphasized the need for a clearer link between **emergency notifications** and the driver's company. Overall, the session validated key aspects of SafeDrive while identifying opportunities to enhance usability and safety features.

6 ITERATION #3 (RA, ZS)

What was validated: The hypothesis was that SafeDrive, could deliver an intuitive user experience while effectively addressing driver fatigue issues. To test this, the usability and functionality of the prototype were evaluated, focusing on core features such as facial recognition setup, adding emergency contacts, fatigue detection by yawning, and navigation to the nearest rest area.
How we did: To evaluate the usability and functionality of our SafeDrive prototype, we conducted a **think-aloud test** using a prototype developed in Figma [Section G]. The test was conducted with five students from the Technical University of Denmark, all of whom hold driving licenses and often undertake long distance drives, closely aligning with our target group. By testing our high-fidelity prototype, we aimed to evaluate the user-friendliness of the system and observe how users interact with it. The process began with careful planning of a set of tasks for the participants to perform, allowing them to share their thoughts and feedback throughout the experience [Section F.3]. To create a more immersive and realistic experience, we built a cardboard simulation of the steering wheel and dashboard of a truck. A laptop running the SafeDrive prototype was placed within this set-up to mimic a driver's perspective. This hands-on setup allowed participants to better visualize and interact with the system in a simulated environment. The participants were first introduced to the concept and purpose of SafeDrive using our landing page [Section B.1] and then asked to perform the tasks that were the following:

- Configure your facial recognition
- Add a new emergency contact
- Start a route and show signs of fatigue (yawning, head posture)
- Navigate to the nearest rest place

The think-aloud test was conducted in the following way [4]:

- The participants shared their thoughts on the user interface and system interactions, providing insight into their expectations and preferences.
- A group member worked as facilitator to guide and encourage verbalization for the participants.
- Another member simulated SafeDrive's flashing light alert system using phone lighting.
- Remaining group members documented and observed the participants interactions with SafeDrive and documented the feedback received.
- After completing the tasks, the participants could freely navigate the system and give general feedback through an open dialogue.

Outcome of validation: After conducting the **think-aloud test**, we considered the feedback collected [Section F.3] which was overall very good, the participants praised the simplicity of the prototype and user friendliness. The test revealed that the users found our color palette appealing and appropriate for the target group. After our prototype was introduced, the participants indicated that they wanted a home page, rather than starting from the maps app. During Task 2, a spelling mistake was found in the prototype, which made the navigation to emergency contact a bit difficult. When the alert was triggered for task 3, the users recommended replacing the music alert with an alarm sound that gradually increases as it would be more effective. We implemented most suggestions, such as adding a home page, renaming the emergency feature and improving the alert system [Section G].
However, some recommendations, such as adding new alert patterns, were deferred to focus on refining the user interface in this iteration, after careful consideration in the group [Section F.3]. Although these feedback weren't included for iteration 3, we can use some of these for future work. Features such as more alert types, gives the users more options and might also decrease truck accidents.

To conclude the iteration, the think-aloud test confirms our hypothesis, as the users found the product effective in getting their attention. This indicates that there is potential in the market for our product. Feedback [Section F.3] from the test has improved our prototype's user interface, and in the future we want to make the navigation more intuitive, making our product meet the users' expectations and enhancing the unique value proposition.

7 DISCUSSION (AA, ÖC)

7.1 Ethical considerations (dark patterns)

In designing our prototype for SaveDrive, one thing we focused on was the **dark patterns** and **ethical issues** that could arise in our solution. Dark patterns refer to the use of design patterns in user interfaces that manipulate users into actions that are not necessarily in the users best interest [3]. During the prototype development process, we identified two relevant forms of dark patterns, nagging and forced action, which made us make some active decisions to minimize their potential impact on the user experience.
Nagging is a strategy in which a system interrupts the user to promote expected functionality through the use of reminders or alerts, which can be disruptive and unwanted [3]. In SafeDrive, this could potentially arise if alerts about driver fatigue and routes to rest places got in the way of the actual driving route and workflow for the truck driver. To address this, we chose to design the system in a way that the user receives a recommendation for the **nearest rest place** and must actively choose to press 'Find' within a few seconds to start the route there [Section A.4]. This solution gives the user flexibility without compromising safety.
Forced action occurs when the user is forced to act to continue using the system [3]. In SafeDrive, this could occur if an emergency call was made to emergency services or the system provider if the user did not respond to the alert in 30 seconds. Although this may be motivated by security concerns, it can be perceived as intrusive, especially if the situation is not serious enough to require external intervention. To address this, we designed the system so that the user can select their emergency contacts in the settings. This ensures a more personalized and controlled approach to handling emergencies. By taking these potential dark patterns into account, we have implemented solutions that balance security and user autonomy. This ensures that SafeDrive maintains user trust and supports user needs without appearing manipulative.

7.2 Light and sound sensitivity

Light and sound sensitivity in the prototype posed potential challenges, including the risk of distracting or overwhelming drivers during fatigue-related alerts. Flashing lights, while effective in grabbing attention, could be too intense in certain conditions, especially during nighttime driving, when drivers are light sensitive or have a condition such as epilepsy. Similarly, sound alerts could become intrusive, particularly if they were too loud or repetitive, potentially startling users rather than aiding them.

To address these concerns, we implemented adjustments after the first iteration [Section 4] that prevent these potential issues. The prototype now allows users to customize light intensity, ensuring that the flashing alerts remain effective without causing discomfort. Similarly, sound alerts were refined by enabling users to adjust volume levels and switch between different alert types, such as alarms or softer tones, based on their preferences [Section C.1]. These modifications strike a balance between maintaining driver safety and avoiding unnecessary disruptions, ensuring the system remains practical and user-friendly.

7.3 Reflections on plan

Reflections: Our team utilized a Gantt chart [E] as advised earlier this week on day 2, ensuring a well-structured approach to tasks such as brainstorming, prototyping, and testing. This tool allowed us to maintain a clear and organized workflow, covering all critical activities. However, we experienced challenges with a lack of feedback from a few of the teaching assistants compared to the feedback given to other groups. Another teaching assistant who

initially was not assigned to us took the extra time to give us feedback on previous assignments at the last day of submission of this report, which limited our ability to make timely adjustments. Overall, our execution remained strong, driven by effective teamwork and a shared commitment to meeting deliverables. SafeDrive reflects significant potential as a possible solution to enhance road safety.

8 CONCLUSION (RA)

The SafeDrive project addresses a critical issue of driver fatigue among truck drivers, leveraging advanced technologies like AI and infrared cameras to enhance road safety. Through three iterations, the project evolved significantly by incorporating user feedback from focus groups, workshops, and think-aloud tests. Each phase of development provided valuable insights into user expectations and interaction patterns, enabling refinements in both functionality and design. Users appreciated the intuitive interface, clear navigation, and the potential of the system to improve safety on the roads. However, improvements were identified, such as integrating voice controls, enhancing customization options, and refining alert mechanisms for better efficiency and user experience. While the results validate the core concept and design approach, further iterations and testing are recommended to optimize usability and ensure seamless integration into the daily workflow of truck drivers. By prioritizing user-centered design and ethical considerations.

9 CONTRIBUTIONS

All group members contributed equally to the project, from developing the artefacts and prototype iterations to presentations and report completion. This collaboration ensured a well-balanced effort to include every group member's perspective in the project.

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A FINAL

A.1 LANDING PAGE

The images used in the landing page below is AI-generated

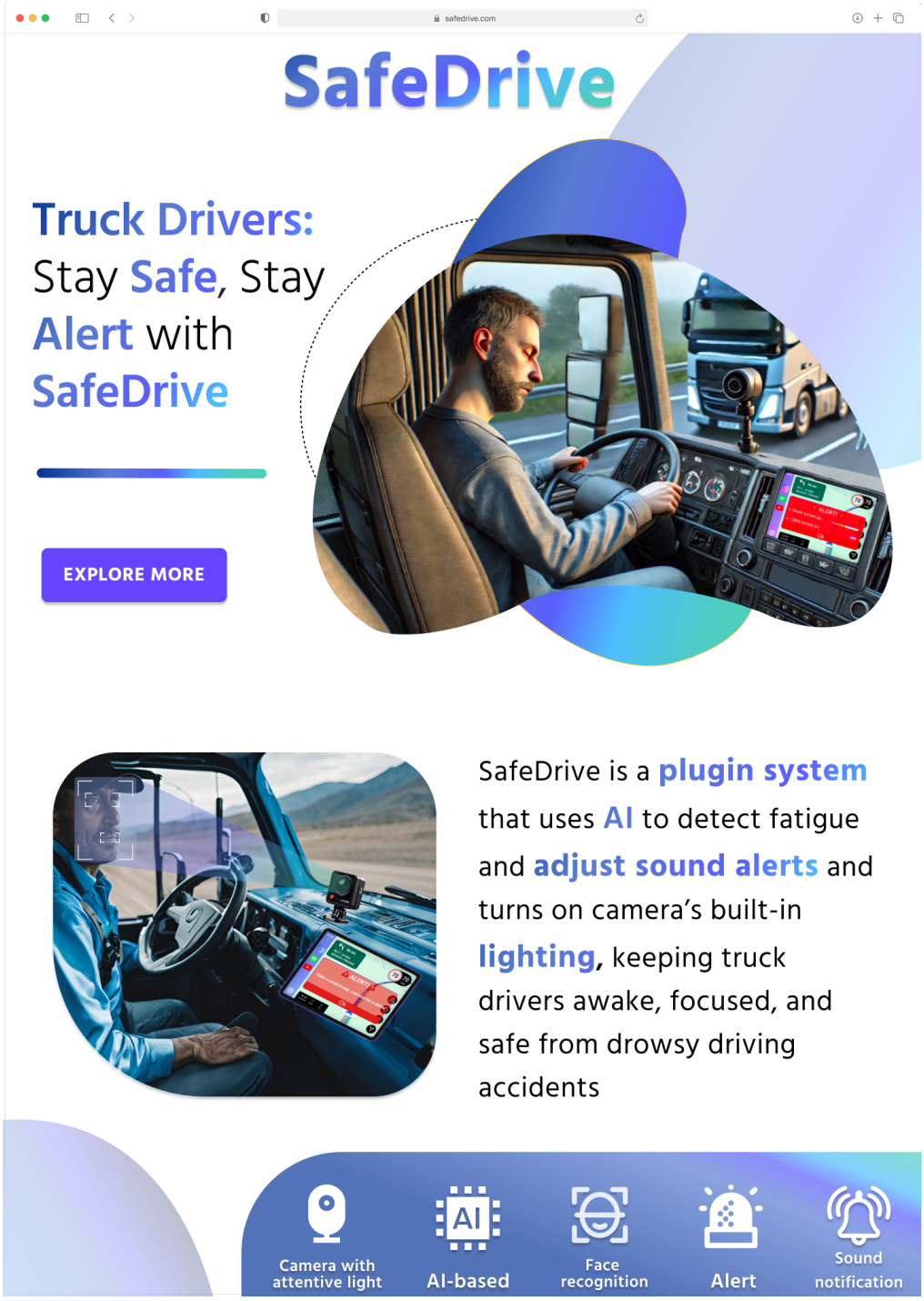

Figure 1: Landing page final

A.2 LEAN CANVAS

PRODUCT | MARKET

1. Problem

1. American truck drivers often work over 6 hours without a break, leading to fatigue and unnoticed microsleeps.
2. Truck drivers often fail to notice the onset of microsleeps, which can lead to accidents.
3. Existing systems lack preventive measures to address this danger.

4. Solutions

Our solution is a plugin system, that is installed on the dashboard. It alerts the user with visual alert as well as a alarm and flash to prevent microsleep.

It also includes a advanced infrared camera to detect signs of fatigue and provides for truck drivers, which is able to detect prolonged eye closure, yawning and head posture changes.

5. Key Metric

List the numbers that tell you how your business is doing

3. Unique Value Prop.

- SafeDrive uses face recognition to detect the user's fatigue by analyzing their eyes, mouth and head posture.
- Alerting users by slowly increasing the chosen sound alarm and the camera's built-in light which the user can adjust their preferences to beforehand.

9. Unfair advantage

What do you have that gives you an unfair advantage?

Something that cannot be copied or bought.

6. Channels

What free and paid channels to your customer are there?

2. Customer segments

40 years old American truck-drivers driving over 6 hours without a break.

7. Cost structure

List out your fixed and variable costs.

8. Revenue streams

Identify your revenue model, and calculate back-of-the-envelope numbers for lifetime value, gross margin, breakeven point, etc.

Figure 2: Lean Canvas final

A.3 USER STORY MAP

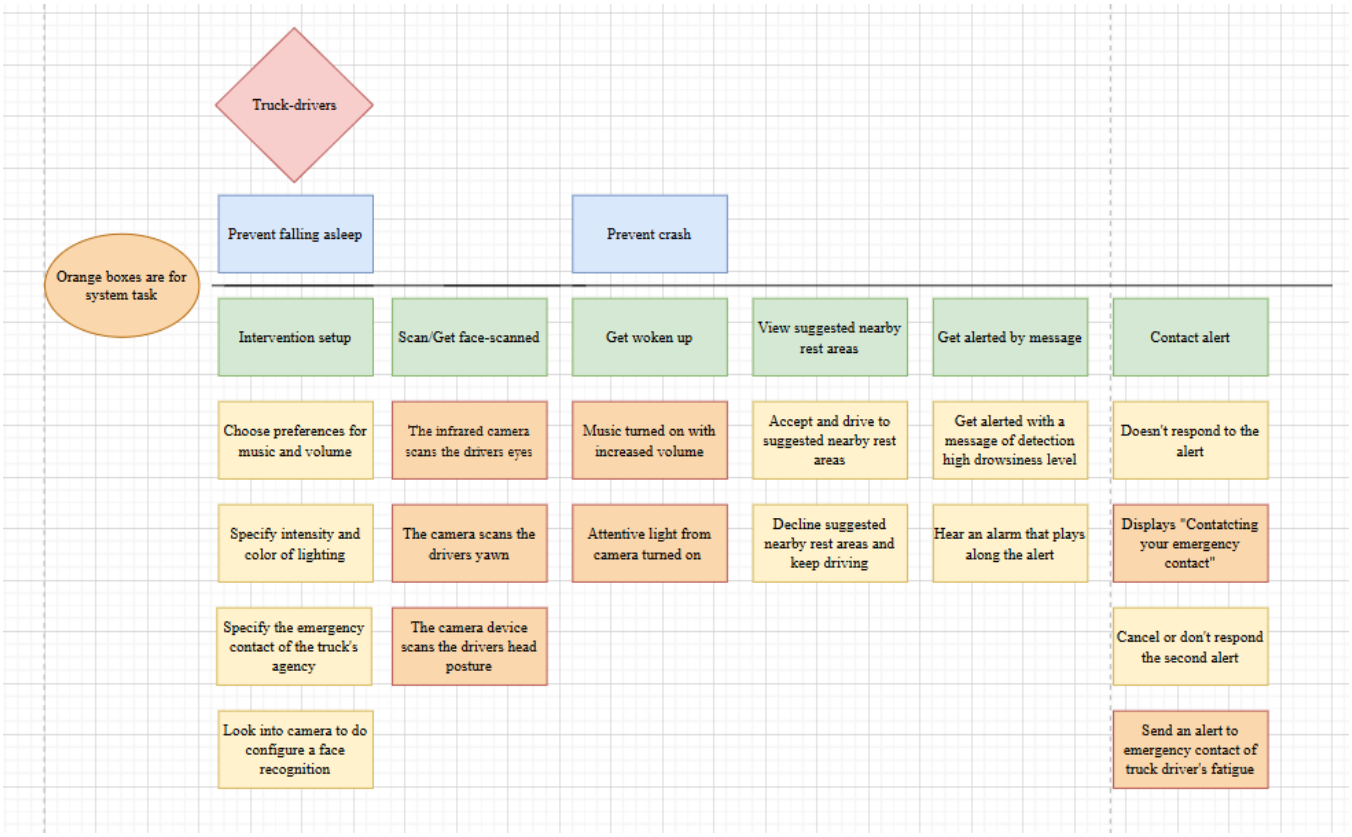

Figure 3: Final USM

A.4 WIREFRAME

You can try our interactive Wireframe main flow LINK.

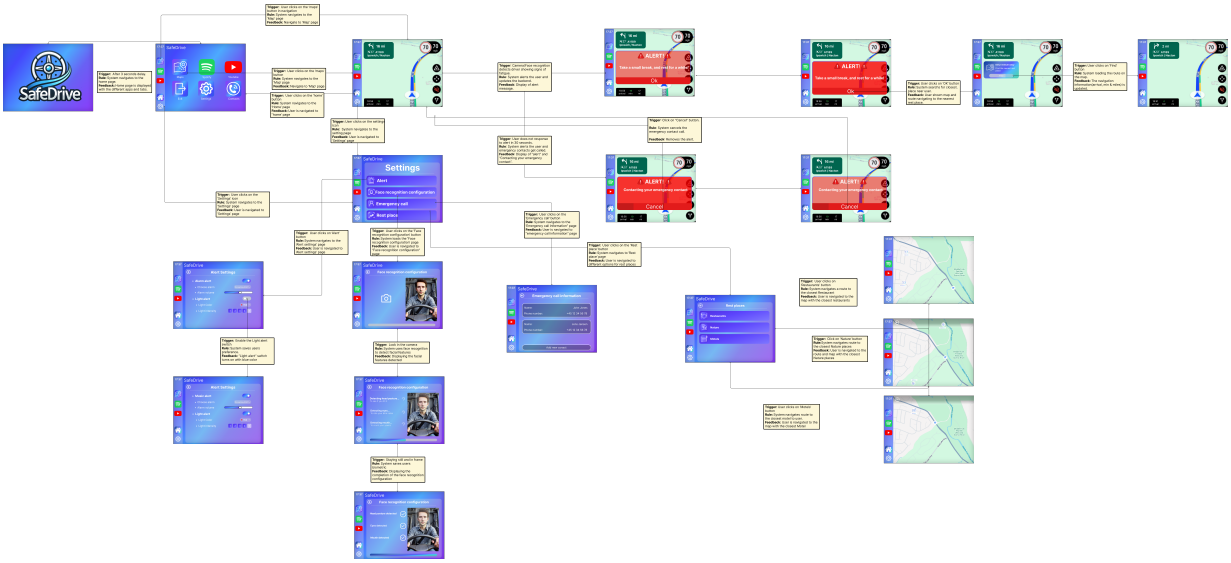

Figure 4: Final Wireframe from iteration 3

B ITERATIONS

B.1 LANDING PAGE #2

The image below is AI-generated

Figure 5: Landing page #2

B.2 LEAN CANVAS #2

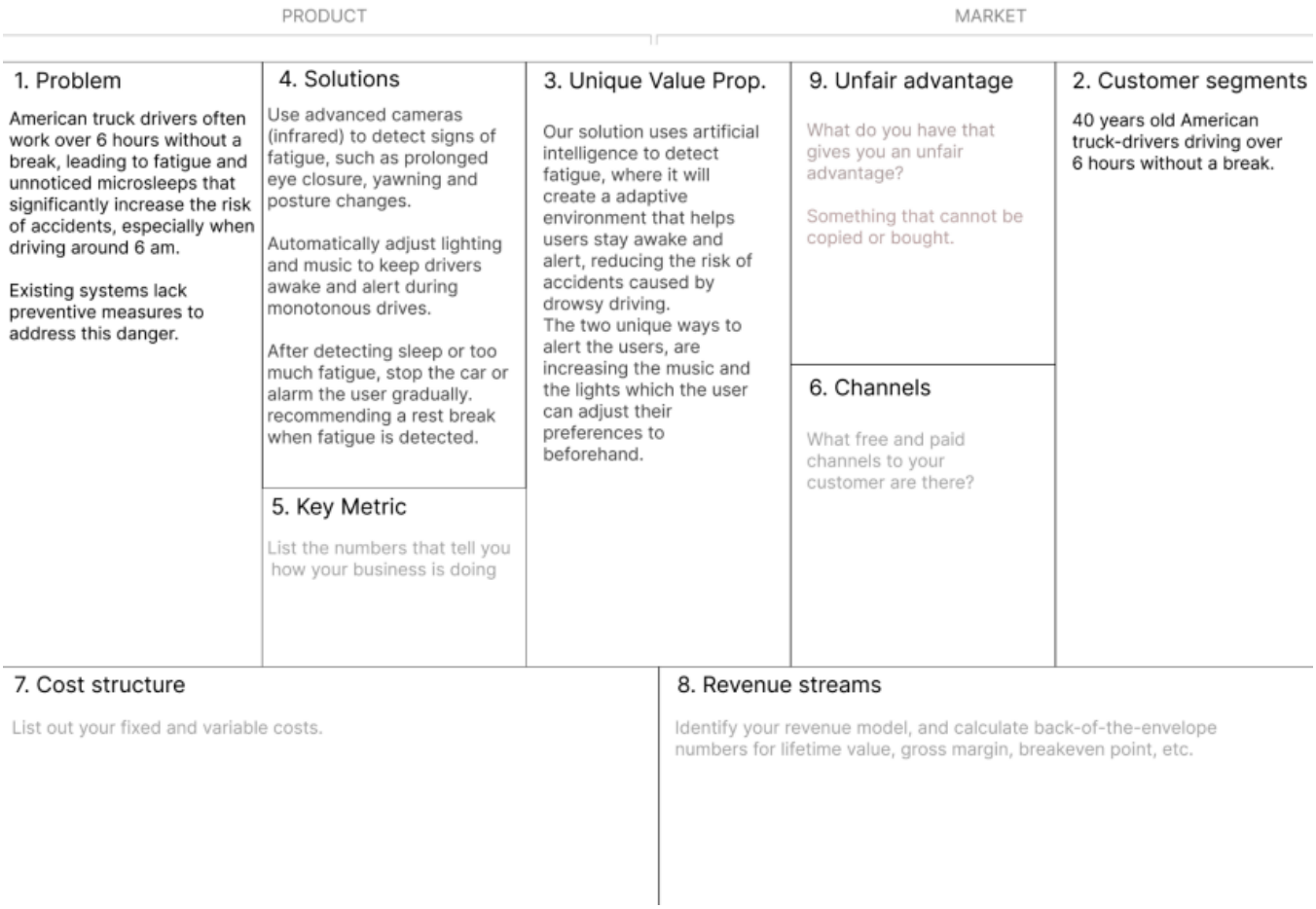

Figure 6: Lean canvas #2

C USER STORY MAP #2

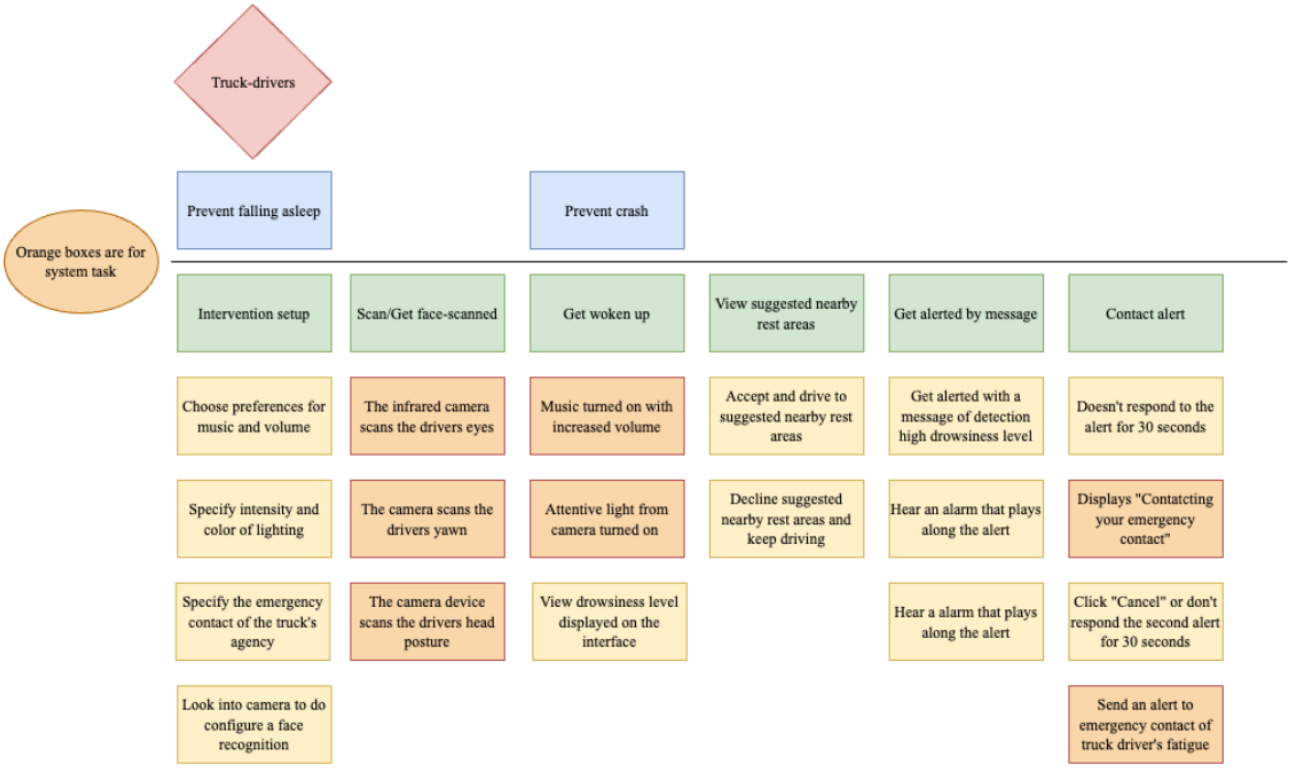

Figure 7: USM #2

C.1 WIREFRAME #2

You can try our interactive Wireframe main flow LINK.

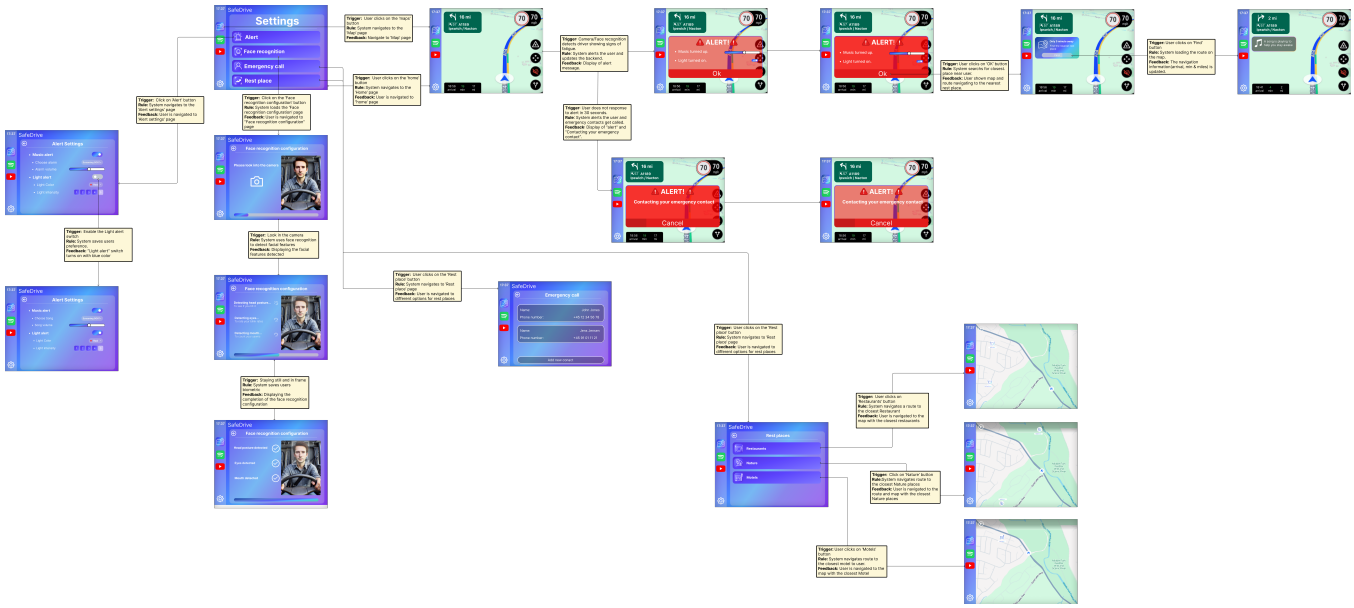

Figure 8: Wireframe from iteration 2

C.2 LANDING PAGE #1

The image below is AI-generated

Figure 9: Landing page #1

C.3 LEAN CANVAS #1

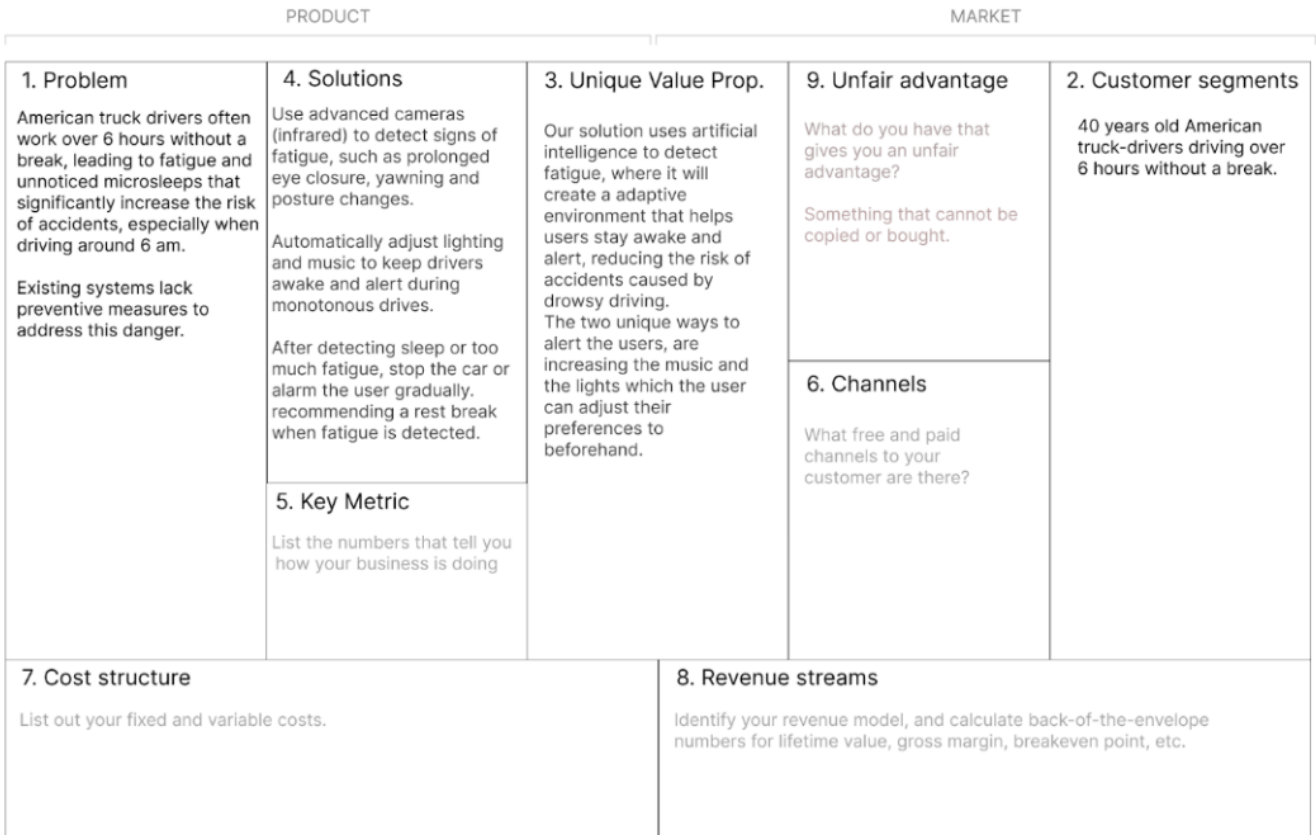

Figure 10: Lean Canvas #1

D USER STORY MAP #1

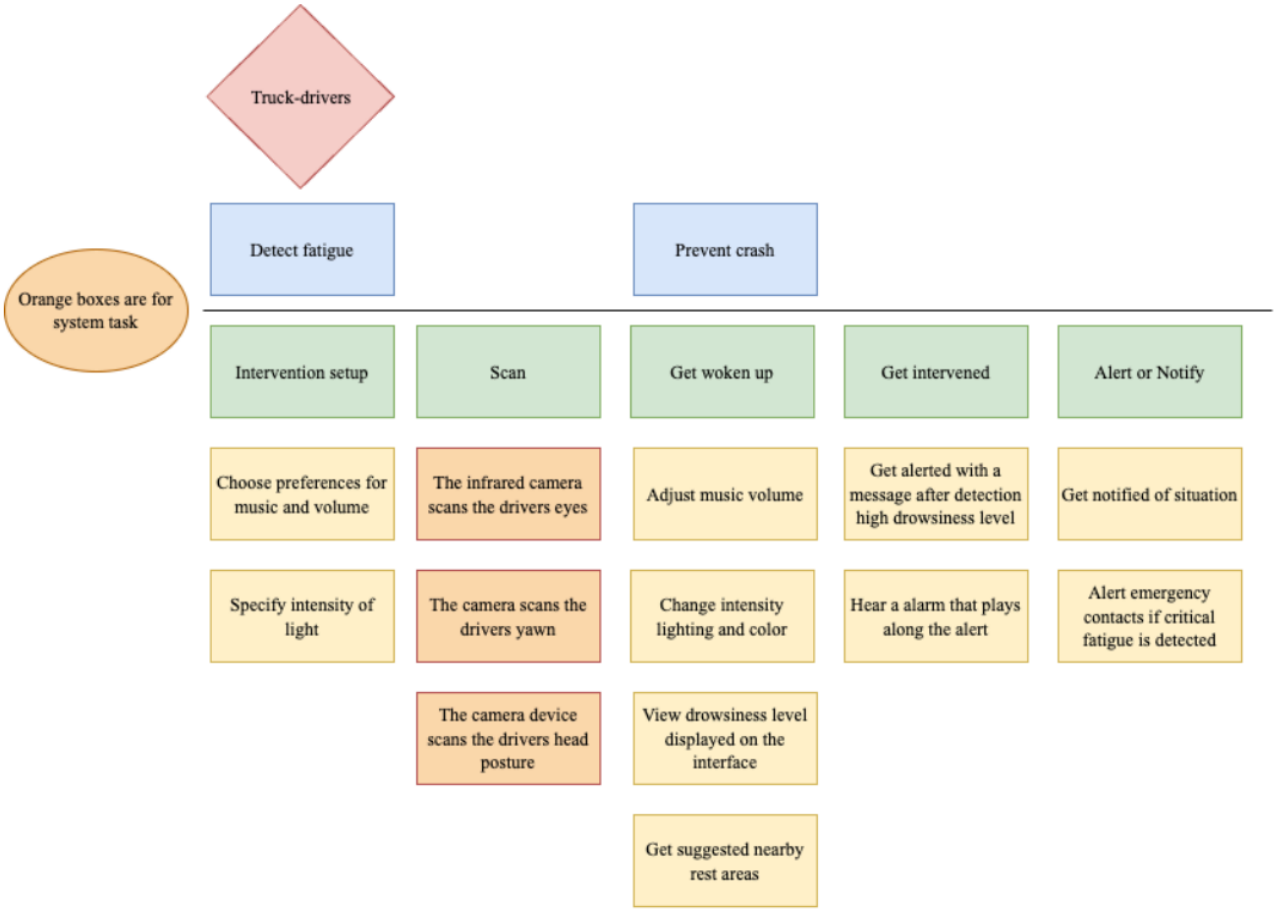

Figure 11: USM #1

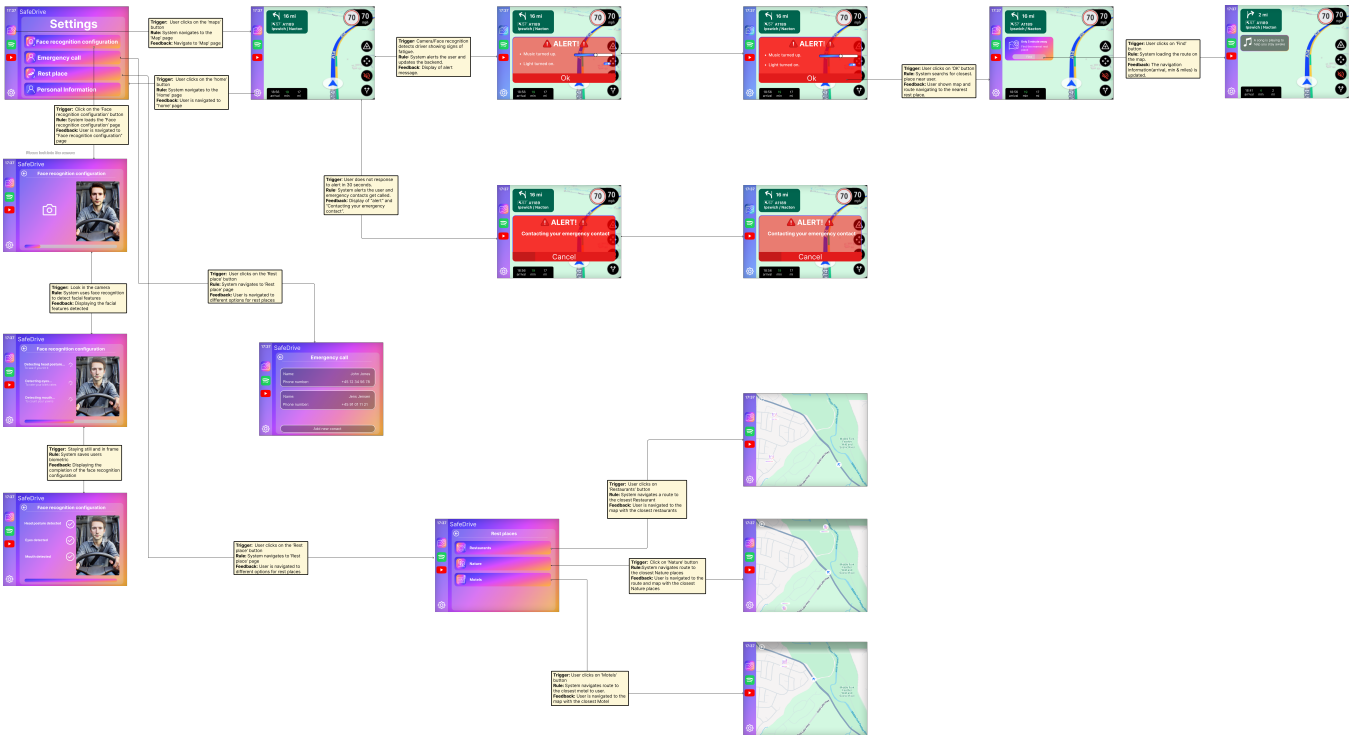

Figure 12: Wireframe from iteration 1

D.1 WIREFRAME #1

You can try our interactive Wireframe main flow LINK.

E GANTT CHART

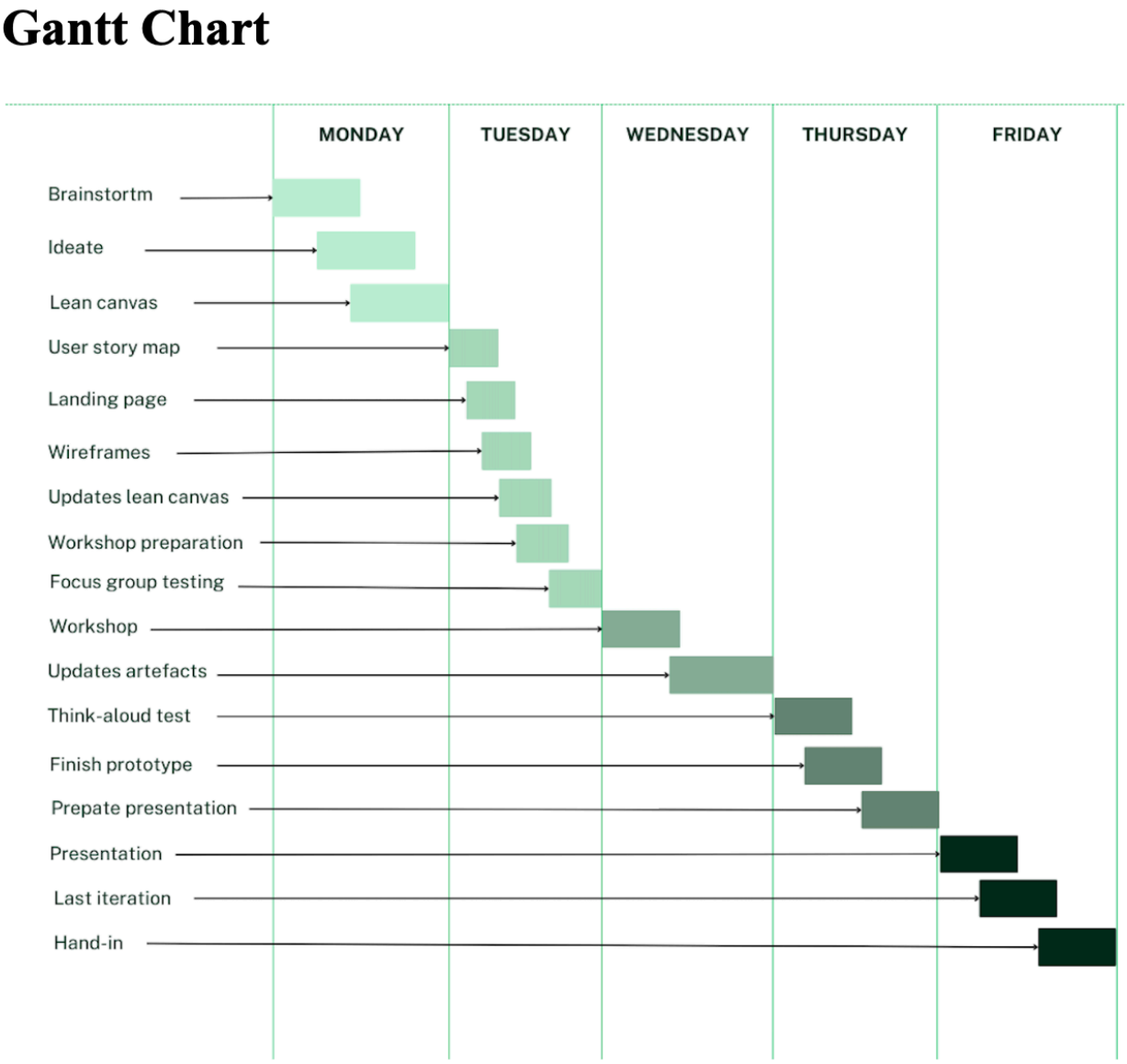

Figure 13: Gantt chart

F APPENDIX E: VALIDATIONS

F.1 Validation Documentation for Iteration #1

What did we test: We tested the initial landing page and prototype of SafeDrive, a system designed to prevent fatigue and accidents among truck drivers. The purpose was to assess whether SafeDrive as a solution and its features were represented on the landing page and whether the prototype effectively addressed the needs of truck drivers.

How did we test it: We used focus groups as a method. We tested with six students from the Technical University of Denmark in total, all of whom have driving licenses with 3-6 years of experience and have previously experienced fatigue while driving. The focus groups were conducted two times with three students in each session, as seen in Figure 1.

The test started with short introductory questions, in which participants were asked about their driving experiences and methods of dealing with fatigue during longer trips. From this point on, the test was divided into three phases:

(1) Participants were presented with the landing page for 10-15 seconds and asked to share their impressions of the problem, the market segment, and the product to engage in a discussion.
(2) Afterwards, participants were allowed to explore wireframes so that they could comment on navigation, design, and suggestions for improvements.
(3) After the test, we summarized their suggestions and discussed further improvements to the product.

The following were the introductory questions:

(1) How long have you had your drivers license?
(2) Have you commuted more than four hours by car and what are your experiences?
(3) Have you ever felt sleepy or fatigue while driving?
(4) How do you control drowsiness while driving?

Questions included in the discussion round for the landing page:

(1) What problem is solved by observing the landing page?
(2) Who is our market segment?
(3) What do you think the product is?
(4) What do you like about the landing page and is there anything unclear?

Questions included in the discussion round for the wireframes:

(1) Was it easy to navigate through the wireframes of the prototype?
(2) Is the feature of face recognition easy to locate and perform?
(3) What are your thoughts about the interface and design?
(4) Do you think our solution is effective?

Questions included in the discussion round for the summarization of suggested improvements:

(1) Are there any changes that you would like to implement on the landing page?
(2) Are there any features missing, or is there any feature you would like to implement?

Results regarding the landing page Participants' observations on the landing page showed that the issue of driver fatigue was clear to participants, but some of the functions illustrated with icons were not clear. Some of the participants found the role of AI and the indication of safety flash cameras unclear and there was doubt as to whether the market segment was primarily truck drivers or their employers/companies. The colors of the landing page were discussed and the participants commented on it as a feminine color, and not necessarily some colors that would be associated with a truck driver. In addition, the text made it difficult to understand that the landing page is aimed at truck drivers. Suggestions for improvement therefore included higher contrast in the text and the inclusion of other images if possible that clearly illustrate the product.

Results regarding the prototype During the exploration of the wireframes, the participants discussed that the design was user-friendly and easy to navigate. However, the color scheme of the interface was again criticized as too feminine, as the same colors from the landing page were incorporated into the wireframes. Features such as music controls and their role in the product could be a bit clearer, as they suggested more specific information about music genres that could help keep the driver awake, which should be validated in research papers, instead of the driver picking the songs. Facial recognition was rated as logically placed in the settings, but the text in the settings was rated as too small. They couldn't evaluate to what extent the solution solves the problem from the wireframes and recommended that

Figure 14: Focus group session

the prototype gets physically tested to asses its real effectiveness and ease of use. In general, the test showed that the solution has strong potential, but that the clarity around functions, market segment, and design can be improved to ensure that the product meets the users needs and expectations optimally.

F.2 Validation Documentation for Iteration #2

The validation session consisted of interactive activities and discussions with participants to assess the landing page clarity and prototype usability. Below are the key outcomes:

Icebreaking Activity: Participants shared their driving habits:

- Driving experience: 6-10 years.
- Staying awake strategies: Listening to music/radio, eating snacks, getting fresh air, and taking breaks.

Landing Page Feedback:

- Positives: Clear visuals, calming colors, and balanced layout. Keywords and icons effectively communicated the purpose.
- Improvements: Larger camera image for clarity, clearer connection between features (e.g., lighting/music) and safety. Highlight real-world research backing these features. Adjust button placement and background colors for better visibility.
- Concerns: Safety risks from flashing lights for photosensitive users. Customization options were suggested for sensitive settings.

Prototype Feedback:

- Positives: Clear purpose for truck drivers and intuitive design elements.
- Improvements: Reduce touch-based interactions by incorporating voice controls or steering wheel buttons. Simplify options to avoid user confusion or prolonged screen focus while driving.
- Concerns: Clarify emergency contact actions and better integrate them with company protocols.

Validation Outcomes

The feedback emphasized:

- A need for personalized settings for light and music interventions.
- Improved user interaction through voice controls or alternative input methods.
- Greater clarity in explaining how the product aids driver safety.

The session validated DriveSafes core approach while identifying areas for refinement.

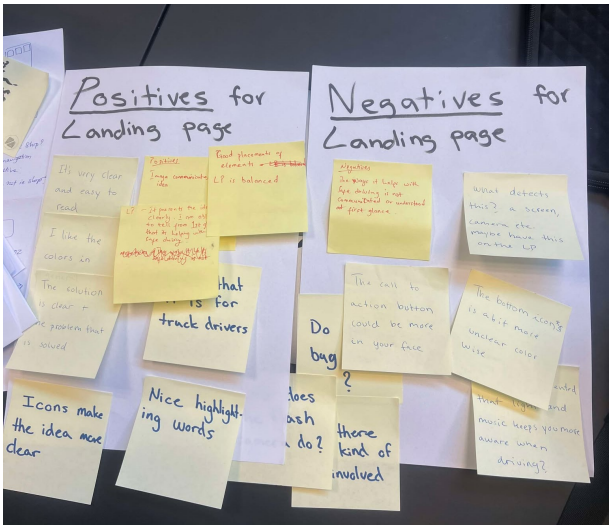

Figure 15: Caption for the first picture.

Figure 16: Caption for the second picture.

Figure 17: A comparison of two images displayed side by side.

F.3 Validation Documentation for Iteration #3

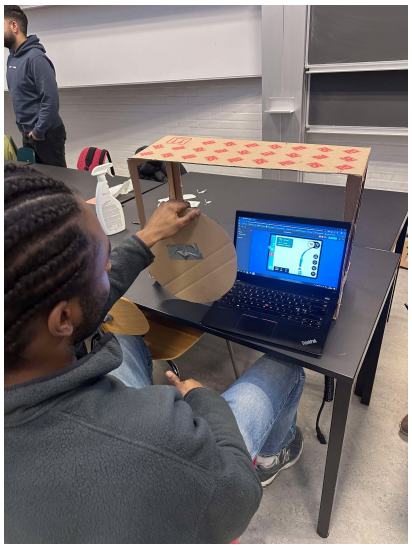

Figure 18: A participant performing the think-aloud test

What did we test: We tested the usability and functionality of the SafeDrive prototype in a simulated environment to validate whether SafeDrive delivers an intuitive and user-friendly experience.

How did we test it: We used a think-aloud test as the method. The test was conducted with five students from the Technical University of Denmark, all of whom hold driving licenses and have experience with long-distance driving. These participants closely represent the target group as they frequently encounter fatigue while driving and desire personalized features to address these challenges.

The test was carried out using a high-fidelity prototype developed in Figma, integrated into a cardboard simulation of a trucks dashboard and steering wheel for a more realistic experience. Three tasks were prepared for the think-aloud test to evaluate SafeDrive user interface and functionality that reflect the most interaction prospective users will have with the system. The following is a detailed description of each task and their rationale for being used in the test:

(1) Configure you facial recognition
   - This task involved the initial setup of the facial recognition system.
   - It evaluates the systems ability to guide users through a critical safety feature and ensures the setup process is intuitive and accessible.

(2) Add a new emergency contact
   - This task required participants to navigate to the emergency contact settings and add a new contact.
   - The task tests the clarity and usability of the interface when handling safety-critical features.

(3) Start a route and show signs of fatigue (yawning, head posture)
   - Participants mimicked signs of fatigue, such as yawning or tilting their head, to bring a realistic experience.
   - A manual demonstration was conducted where an alert sound played from the system, and a flashing light was shown to participants to provide a realistic sense of how the system functions.

(4) Navigate to a rest area
   - After mimicking signs of fatigue, map shows participant the nearest resting area in the system, allowing the participant to press a button indicating they are awake before the system proceeds to call emergency contacts.
   - This task gives the feel of the real-time functionality of the system and shows that the process is seamless and distraction-free for users while driving.

Throughout the process a facilitator guided the session, encouraging participants to verbalize their thoughts, while other team members documented their interactions and feedback. After completing the tasks, participants had the opportunity to navigate the prototype freely and provide additional feedback through an open discussion.

From the think-aloud test of SafeDrive, we gained significant insights and the following are the documented observations on each task that the participants performed:

(1) Configure facial recognition
   - Participants found the facial recognition setup simple and intuitive, with clear instructions provided during the process.

(2) Add a new emergency contact
   - The feature was found to be useful but required clearer labeling. A spelling error in the instructions was found.
   - Participants appreciated the ease of input once the correct section was located.

(3) Start a route and show signs of fatigue (yawning, head posture)
   - Participants were impressed with the work system, especially the option to personalizing light intensity and sound.
   - Participants recommended replacing the music alert triggered during fatigue detection with a more attention-grabbing alarm sound.

(4) Navigate to a rest area
   - Navigation to the nearest rest area in the map was seamless and intuitive.
   - Some participants expressed that starting directly on the map interface felt abrupt and suggested adding a homepage or dashboard to improve the user journey.

(5) Additional Feedback
   - Participant appreciated the personalized settings for light and music interventions.
   - One participant mentioned to choose alert sound rather than music as some research shows drivers often feel more sleepy when they play soft music
   - Another participant referred to call emergency contact after three times alert sound (as earlier we thought of calling emergency contact after 5 times alert)

G LINK PROTOTYPE

Here the link of the executable prototype