Driver Drowsiness Detection

We are going to use a camera to detect the eyes of the driver. If the eyes are closed for more than 10 seconds, we would alert the driver, because he is falling asleep.

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Context of use: Education
Level of education: Bachelor

Impact on society

What impact is expected from your technology?

This category is only partial filled.

What is exactly the problem? Is it really a problem? Are you sure?

The problem is the risk of accidents caused by fatigued or drowsy drivers. In addition, they pose a significant risk to road safety. Furthermore, the severity of this problem has been backed by extensive research and real-world data.

Are you sure that this technology is solving the RIGHT problem?

Yes, the software would alert drivers when they are falling asleep, which would prevent road accidents.

How is this technology going to solve the problem?

The sofware makes sure the driver is awake.

What negative effects do you expect from this technology?

This question has not been answered yet.

In what way is this technology contributing to a world you want to live in?

It makes the roads safer.

Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.

We would like to enhance the accuracy and reliabillity, limit the bias in data, make our privacy and data protection more robust, and improve the transparency and explainability of the technology by providing detailed explanations.

Hateful and criminal actors

What can bad actors do with your technology?

This category is only partial filled.

In which way can the technology be used to break the law or avoid the consequences of breaking the law?

In some instances, individuals could attempt to deceive or manipulate the system to avoid detection or bypass safety measures. For example, someone might try to artificially simulate alertness to evade alerts or engage in dangerous behavior while relying on the system's false sense of security.

Can fakers, thieves or scammers abuse the technology?

People with self driving vehicles can try and fake being awake.

Can the technology be used against certain (ethnic) groups or (social) classes?

This question has not been answered yet.

In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.

This question has not been answered yet.

How could bad actors use this technology to subvert or attack the truth?

This question has not been answered yet.

Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.

We would like to enhance the security of the system; implement strict data protection measures like data encryption; ensure users are informed about the collection of their data; regular system audits; monitor technology usage for unethical behaviour.

Privacy

Are you considering the privacy & personal data of the users of your technology?

Does the technology register personal data? If yes, what personal data?

The technology analyzes facial expressions, eye movement, or changes in facial patterns to detect signs of drowsiness.

Do you think the technology invades the privacy of the stakeholders? If yes, in what way?

No

Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?

No

Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.

No

In which way can you imagine a future impact of the collection of personal data?

If we collected the data, we would be able have a video of everything the driver is doing even when he is not driving.

Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.

We would like to collect and retain only the necessary data for drowsiness detection; implementing robust security measures for data storage, transmission, and processing; adhering to relevant privacy laws and regulations

Human values

How does the technology affect your human values?

This category is only partial filled.

How is the identity of the (intended) users affected by the technology?

The identity of the intended users is typically not directly affected by driver drowsiness detection technology. The technology is primarily designed to monitor and assess the level of drowsiness or fatigue of drivers, without specifically identifying individual users.

How does the technology influence the users' autonomy?

This question has not been answered yet.

What is the effect of the technology on the health and/or well-being of users?

It can save their lives if they fall asleep.

Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

Addressing biases in the technology to ensure fair and equitable treatment across different demographics, considering factors such as gender, age, ethnicity, and disability; providing clear explanations on how drowsiness is detected; provide users with control by letting them customize for example sensitivity of detection

Stakeholders

Have you considered all stakeholders?

This category is only partial filled.

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.

Name of the stakeholder
Drivers

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Transport companies

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Technology Developers

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Insurance Companies

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Regulatory Authorities

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
General Public

How is this stakeholder affected?
-

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?
-

Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.
We are going to actively seek and incorporate user feedback and incorporate their perspectives to ensure the technology meets their needs.

Data

Is data in your technology properly used?

This category is only partial filled.

Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?

Bias in data; Data accuracy and reliability; Privacy and data protection

How does the technology organize continuous improvement when it comes to the use of data?

We are going to collect more images of eyes (open and closed) but in different lightning conditions and different angles.

How will the technology keep the insights that it identifies with data sustainable over time?

This question has not been answered yet.

In what way do you consider the fact that data is collected from the users?

This question has not been answered yet.

Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.

Ensuring that the data used for training the technology is obtained ethically and in compliance with privacy regulations;Conducting rigorous bias assessments of the training data to identify and mitigate any biases that may impact the accuracy and fairness of the technology;Implementing robust data security measures to protect the collected data from unauthorized access, breaches, or misuse.

Inclusivity

Is your technology fair for everyone?

This category is only partial filled.

Will everyone have access to the technology?

No, only people who want to ensure they don't fall asleep during driving or their employees don't fall asleep driving a truck for example.

Does this technology have a built-in bias?

The software is biased at better classifying at certain angles.

Does this technology make automatic decisions and how do you account for them?

This question has not been answered yet.

Is everyone benefitting from the technology or only a a small group? Do you see this as a problem? Why/why not?

Everyone who is using the technology is minimasing the risk of falling asleel while driving.

Does the team that creates the technology represent the diversity of our society?

This question has not been answered yet.

Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

Designing user interfaces and features that are accessible to individuals with disabilities or specific needs; Incorporating multilingual support in the technology to cater to users from diverse linguistic backgrounds; Taking into account cultural differences and sensitivities in the design and deployment of the technology; ensuring that the technology's algorithms and models are trained on diverse datasets.

Transparency

Are you transparent about how your technology works?

This category is only partial filled.

Is it explained to the users/stakeholders how the technology works and how the business model works?

We are going to provide comprehensive training programs for drivers and relevant stakeholders to ensure they understand how the system operates, its limitations, and the appropriate response to alerts

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?

Yes, the alarm sounds when the driver has closed his eyes for more than 5 seconds.

Is it possible to file a complaint or ask questions/get answers about this technology?

This question has not been answered yet.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?

This question has not been answered yet.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.

Providing clear and comprehensive documentation that explains how the technology works, including the underlying algorithms, data sources, and processing techniques; Presenting transparent explanations of the technology's functionality and purpose to users in a user-friendly manner; Developing a transparent and easily accessible privacy policy that outlines how user data is collected, used, stored, and shared.

Sustainability

Is your technology environmentally sustainable?

This category is only partial filled.

In what way is the direct and indirect energy use of this technology taken into account?

We are taking energy consumption into accout. We are optimizing our alogorithms and software to minimize computational demands.

Do you think alternative materials could have been considered in the technology?

This question has not been answered yet.

Do you think the lifespan of the technology is realistic?

This question has not been answered yet.

What is the hidden impact of the technology in the whole chain?

This question has not been answered yet.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

Implement efficient algorithms and optimize the software to reduce the overall energy footprint without compromising performance; Ensure the use of sustainable and environmentally friendly materials in the production of hardware components; Collaborate with hardware manufacturers to develop energy-efficient sensors and components specifically designed for driver drowsiness detection

Future

Did you consider future impact?

This category is only partial filled.

What could possibly happen with this technology in the future?
In the future, we could enhance accuracy, include personalization and adaptation, we could integrate it into autonomous vehicles.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.
This question has not been answered yet.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.
This question has not been answered yet.

Would you like to live in one of this scenario's? Why? Why not?
This question has not been answered yet.

What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?
This question has not been answered yet.

Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.
Engage with relevant stakeholders such as automotive manufacturers, regulatory bodies, road safety organizations, and user advocacy groups to gather diverse perspectives and insights; Collect feedback from users and stakeholders to identify areas for improvement and implement necessary updates and refinements.