STEER CLEAR

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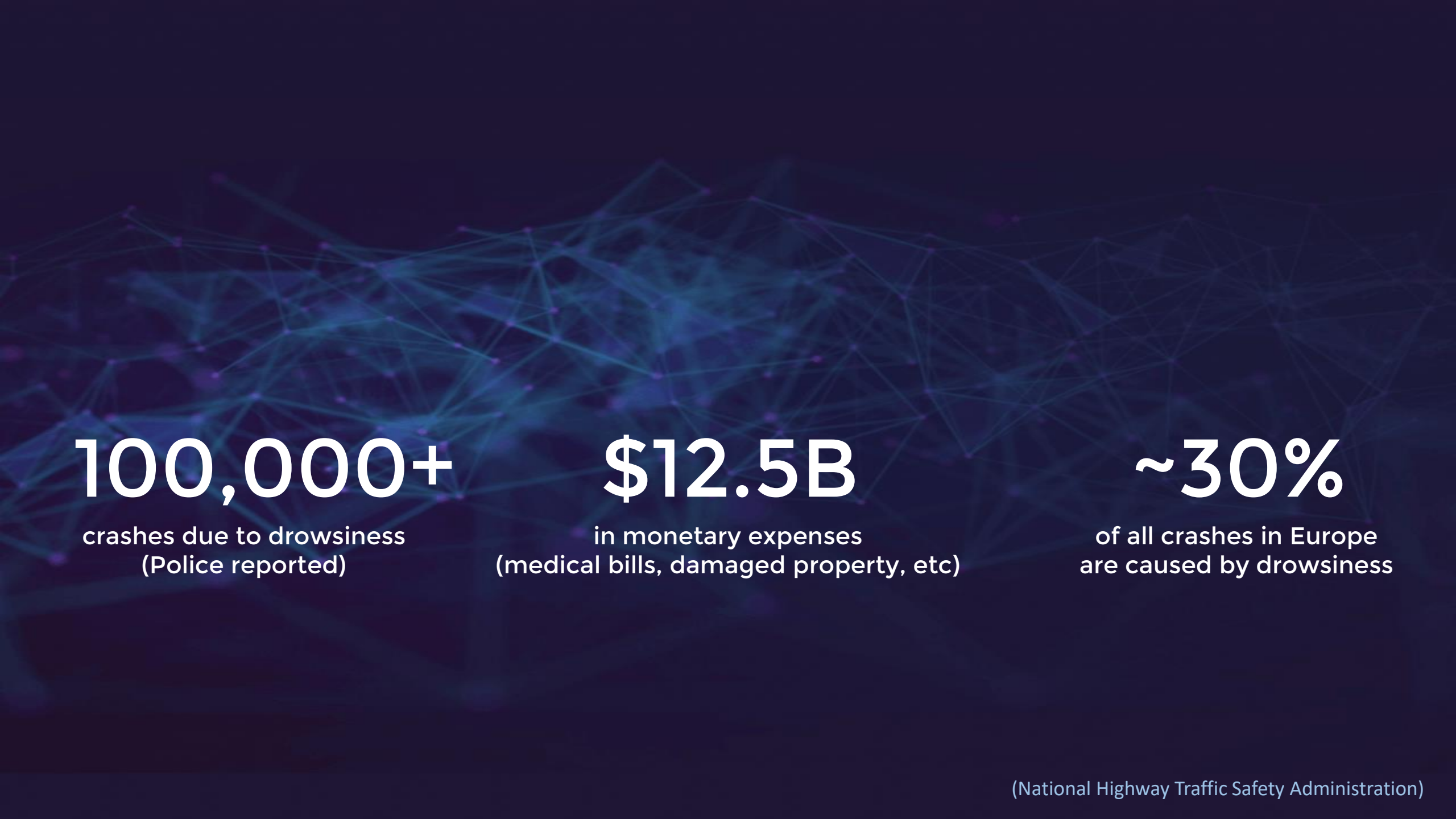
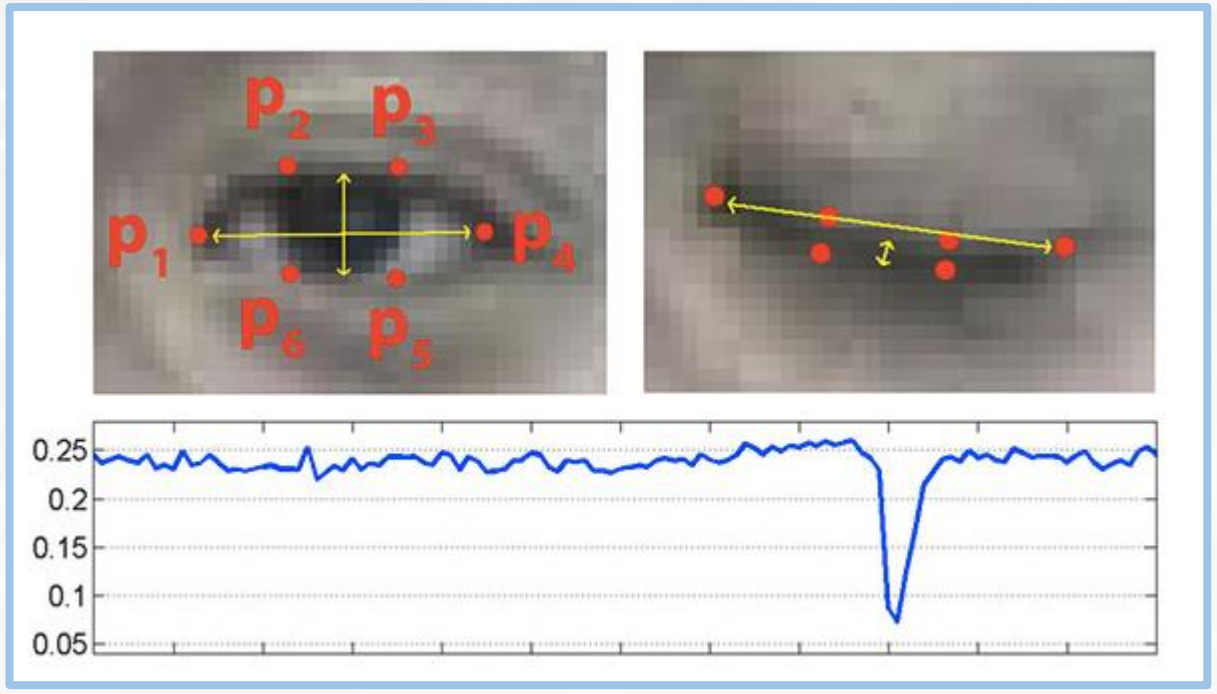

100,000+
crashes due to drowsiness
(Police reported)
$12.5B
in monetary expenses
(medical bills, damaged property, etc)
~30%
of all crashes in Europe
are caused by drowsiness
(National Highway Traffic Safety Administration)

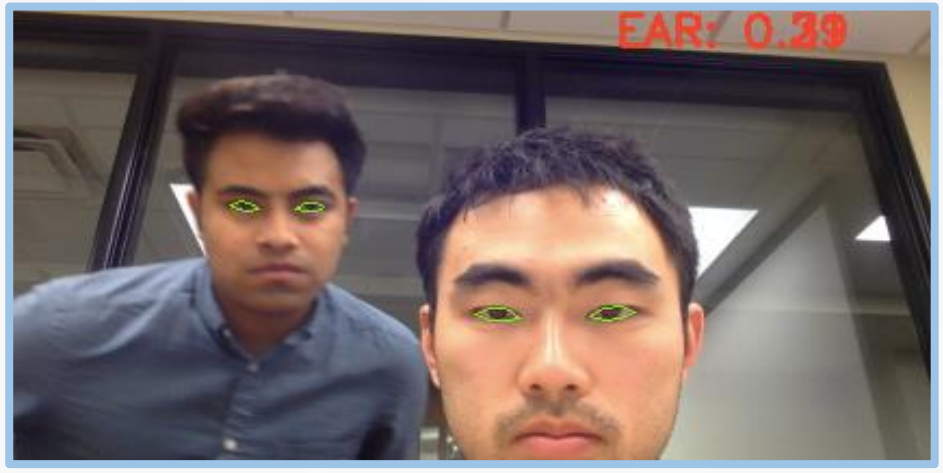
WHAT IS STEER CLEAR?

- Computer vision monitors eye movement, and Eye Aspect Ratio (E.A.R) metrics determine when the eyes are blinking.
- Calculate the gradient of the E.A.R over time, allowing us to detect when a person's blinking pattern slows down , which indicates drowsiness.
- When drowsiness is detected, the driver is alerted by a combination of audio and tactile alerts.

EYE ASPECT RATIO (EAR)



$$\text{EAR} = \frac{\|p_2 - p_6\| + \|p_3 - p_5\|}{2\|p_1 - p_4\|}$$



- Based on the paper (Soukupová and Čech's 2016 paper, *Real-Time Eye Blink Detection using Facial Landmarks*), we learned the ability to detect eye blinks by calculating the EAR changes over time.

FUTURE APPLICATIONS

- With the drowsiness detection of Steer Clear, there are infinite possibilities for further integration into the ever-growing Internet of Things. Thus allowing more drivers to remain alert and attentive using technologies that are readily available

- One use case that we explored was the generation of curated music playlists based on the driver's detected mood. Using machine learning and the Microsoft Emotion API, a person's facial expressions could be used to detect their mood which could then help decide which songs to add to queue. The driver's changes in drowsiness can then be used as a reward factor to apply reinforcement learning to optimally choose songs that rejuvenate the driver.