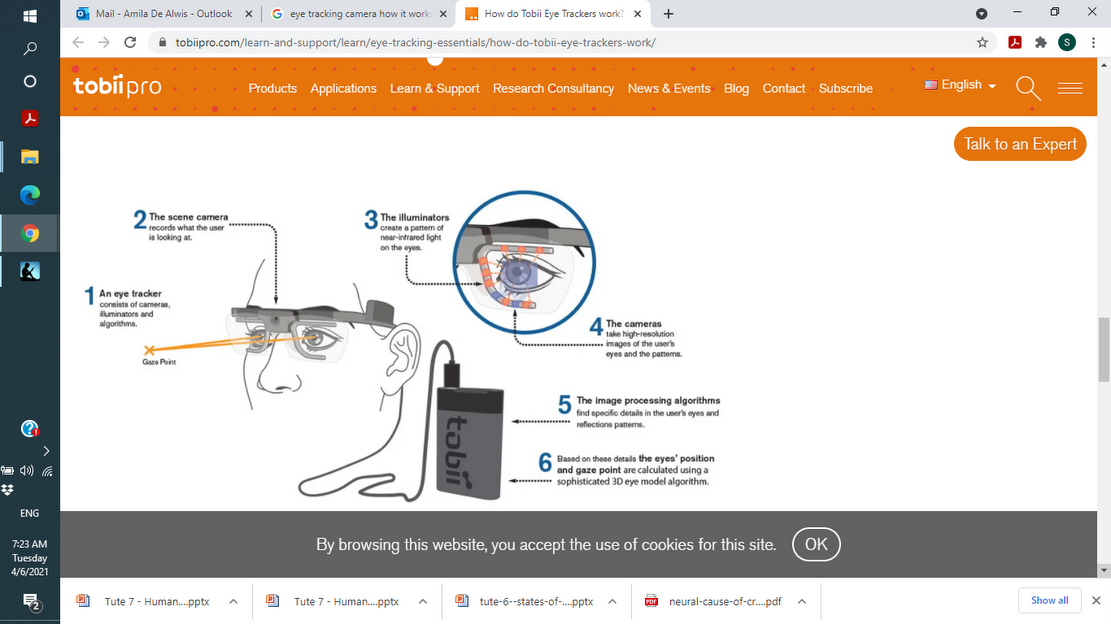
Documents

1). TOBBI EYE TRACKING This shows IR illuminators (no 3 on the diagram)and a camera, my first question to the hardware team is do we need illuminators, as the screen being looked at will provide a light source, will this be enough? If TOBII are using it, it should be safe, but is it necessary? Specially as our users will be potential using the device for a prolonged time. Also as we are deciding not to go into eye tracking right now, will picking up blinks and lid positions be possible with lower light levels than needed to pick up eye tracking?



2) **Near‐Infrared Exposure and Cataracts….. this is going to be a common concern, which is why if we could avoid using IR illuminators if possible**

The most common eye disease associated with near-infrared radiation is cataracts. Prolonged exposure to IR radiation causes a gradual but irreversible opacity of the lens. Other forms of damage to the eye from IR exposure include scotoma, which is a loss of vision due to the damage to the retina. Even low-level IR absorption can cause symptoms such as redness of the eye, swelling, or hemorrhaging. Cataracts caused by near‐infrared radiation have been noted historically in glassblowers and furnace workers. Radiation between 800 and 1,200 nm is most likely responsible for temperature increases in the lens itself because of its spectral‐absorption characteristics. Visible wavelengths may also contribute to the problem, since the heat absorbed by the iris could result in heat transfer to the lens.

https://ehs.lbl.gov/resource/documents/radiation-protection/non-ionizing-radiation/light-and-infrared-radiation/

3) **At the same time nearIR light is being researched for treating certain eye conditions, but still in initial stages, but here the IR light used is in very specific and controlled conditions**

)..https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7738953/ NEAR IR THERAPY FOR EYE DISEASE

NIR light has been shown to significantly increase cytochrome oxidase and superoxide dismutase activities which suggests its role in inducing metabolic and antioxidant beneficial effects. Furthermore, NIR light may also boost cerebral blood flow and cognitive functions in humans without adverse effects

BLINK DETECTION also users IR projection and detection

4) <https://www.ijstr.org/final-print/dec2015/A-Microcontroller-Based-Car-safety-System-Implementing-Drowsiness-Detection-And-Vehicle-vehicle-Distance-Detection-In-Parallel.pdf>

A Microcontroller Based Car-Safety System:

Implementing Drowsiness Detection And VehicleVehicle Distance Detection In Parallel.

Pragyaditya Das., S. Pragadeesh

Abstract: Accidents due to drowsiness can be controlled and prevented with the help of eye blink sensor using IR rays. It consists of IR transmitter and an IR receiver. The transmitter transmits IR rays into the eye. If the eye is shut, then the output is high. If the eye is open, then the output is low. This output is interfaced with an alarm inside and outside the vehicle. This module can be connected to the braking system of the vehicle and can be used to reduce the speed of the vehicle. The alarm inside the vehicle will go on for a period of time until the driver is back to his senses. If the driver is unable to take control of the vehicle after that stipulated amount of time, then the alarm outside the vehicle will go on to warn and tell others to help the driver.