EYEternal Specification

**My Invention**: “EYEternal,” a novel application that allows screen-users to maintain a normal eye blinking rate (15 to 20 times per minute) by analyzing user’s eye blinking frequency with extra features such as vision testing and synchronized eye training.

**The Scenario (identified problem):** In this world of technology, more than 89 percent of households own a computer or laptop and more than 97 percent individuals own a smartphones in United States [1]. People frequently facing screens often experience extreme fatigue on their eyes. Although many laptop-users do not notice it, the fatigue on their eyes is caused by a decrease in blinking frequency, evidenced by a research that “looking at digital screens can decreases the eye's blink rate by 66% from an average of 18 blinks a minute, with a higher rate of incomplete blinks which are less functional” [2]. Although it seems very trivial, blinking of eyes plays a huge role in keeping our eyes “healthy by keeping them oxygenated and moist, and clearing out debris” [3]. Therefore, it is evident that keeping our eyes blink in a normal rate,15 to 20 times per minute, even when viewing screen is crucial in maintaining a healthy eye [3]. Especially in this COVID-19 era, where many students and workers have to look at screens for more than 10 hours a day for distance learning/work, the problem regarding reduced eye-blinking rate can be a serious problem to their eye health.

**The Proposed Product**: A novel synchronized laptop/computer-based desktop application that continuously analyzes eye blinking and gives automatic, instantaneous decrease in screen brightness, which causes user to automatically blink his/her eye (corneal reflex).
By giving these instantaneous reactions, users will be able to automatically maintain normal range of blinking rates and maintain healthy eye.

**Drawing Explanation:** Number corresponds to the number in the drawing.
1. EYEternal uses computer vision, controlled by OpenCV.
2. The logo of EYEternal: infinity symbol to symbolize both eternal eye health and glasses.
3. Incorporate an Eye Aspect Ratio to detect eye blinking rates.
4. Normal range of eye blinking rate is around 15 to 20 blinking per minute.
5. Changes the screen brightness to give corneal (blink) reflex. 0.1 second because the reflex typically occurs at a rapid rate of 0.1 seconds

**Works Cited:**


1. Pew Research Center. (2021, April 7). Mobile Fact Sheet. Pew Research Center: Internet, Science & Tech. https://www.pewresearch.org/internet/fact-sheet/mobile/

2. University of Iowa Hospitals & Clinics. (2015, September). Computer vision syndrome. https://uihc.org/health-topics/computer-vision-syndrome

3. Hersh, E. (2020, September 24). How Many Times Do You Blink in a Day? Healthline. https://www.healthline.com/health/how-many-times-do-you-blink-a-day