GAIZE

Executive Summary

January 2023

Cannabis is being legalized internationally; there are now 39 states plus Washington DC that have legalized it for medical use, and 21 of those have also legalized adult recreational use. This has created the incipient problem of increasing numbers of cannabis impaired drivers operating motor vehicles, and cannabis impaired workers in safety-critical jobs. In fact, there was a 48% increase in weekend nighttime drivers testing positive for THC between 2007 and 2014 according to the 2014 NHTSA Survey of Drivers. Furthermore, nearly 13% of teen drivers said they'd operated a vehicle while impaired on cannabis within the past month according to a study in JAMA. However, there is currently no device that can be used in a roadside or workplace setting to detect active cannabis impairment, much like the breathalyzer for alcohol. Given that cannabis behaves much differently in the body than alcohol, a true breathalyzer for cannabis would be of limited utility. Several of these devices are seeking to come to market, but all are restricted to the detection of use within the last two hours, and are only effective for smoked cannabis.

The alcohol impairment testing paradigm is built on measuring the amount of alcohol in the body to determine impairment. This is rational because alcohol is metabolized and expelled by the body in a highly linear fashion that mirrors the experienced impairment. In essence, breath-alcohol content can be reliably correlated with blood-alcohol content, and also with the experienced impairment. The alcohol breathalyzer is therefore an appropriate and accurate tool. This has led to the 0.08% blood alcohol limit that much of the world, including the entirety of the United States, has adopted. Unfortunately, cannabis doesn't behave the same way that alcohol does when ingested.

Delta-9-Tetrahydrocannabinol (THC), the psychoactive molecule in cannabis, produces impairment in the brain that is not mirrored in testable body fluids, or the breath. Because of this, there has never been a study that has correlated bodily THC measurement with impairment. Simply put, biological THC content shows only that someone has previously used cannabis, not that they are actively impaired, or to what degree they're experiencing impairment. Further confounding the testing of body fluids and breath for THC in order to understand active impairment is the fact that THC is lipophilic, or fat soluble. THC binds to fat in the body and then leaches over time back into the blood stream. This means that in a heavy cannabis user, non-psychoactive THC will be present in the body in testable quantities, even when the individual is not impaired.

Gaize is approaching the impairment problem differently. Rather than attempt to measure bodily THC content, we're determining actual experienced impairment in real-time, though measuring involuntary micromovements of the eye. This is the basis of the existing Drug Recognition Expert Eye tests, which have been repeatedly validated as reliable measurements of impairment on many substances, including alcohol and cannabis. With existing scientific validation that certain abnormal eye movement characteristics are reliable indicators of real-time impairment, we have automated

these tests using a virtual reality headset. Through the use of embedded eye tracking sensors, Gaize monitors the behavior of the eyes throughout the tests. The product records eye movement data, pupil size, and accelerometer and gyroscope data 90 times per second throughout the testing process. This creates a large amount of extremely high-resolution data, which is then analyzed by statistical and machine learning models which have been trained using known impaired and known sober individuals. These models quickly and accurately identify the micromovements of the eye that are indicative of impairment and report that to the test administrator. This methodology is significantly more accurate than human drug recognition experts.

The Gaize headset is completely portable and controlled by mobile application (available for both iOS and Android). Using the headset and the companion mobile application, law enforcement and commercial customers are able to quickly and objectively determine impairment from cannabis, as well as the eye movement characteristics associated with impairment on other substances. The vision for Gaize is to train the models on additional substances over time, creating the first generalized, non-invasive impairment detection platform. The device requires virtually no special training to operate, and the results are presented in a simple, easy to understand format. Importantly, this approach provides data persistence to justify decisions where currently, there is none. It removes human error and subjectivity from the equation, which is extremely important for test accuracy and success in prosecution.

During testing, Gaize also records eye movement video. This can be extremely valuable if an employee pursues legal action as a result of the tests. This video can be evaluated by expert witnesses to validate the determination of impairment with the video viewable by judges and juries.

Gaize is priced extremely affordably depending on how many units you need. There are no hidden fees to use the product – no per-user fees, no per-test fees, and no hardware or setup fees. Gaize customers get the world's most advanced impairment detection product, backed by US-based support and digital training.

Learn more or sign up to get Gaize for your organization by visiting:

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