2024

The way we treat mental health today is like addressing heart issues without an EKG, or diabetes without glucose measurement.

THERE IS NO OBJECTIVE TEST TO MEASURE MENTAL ILLNESS

- Diagnosis takes a long time. **Misdiagnosis rates are high** - up to 90% for some conditions.
- Lack of objective monitoring tools add to **expensive healthcare outcomes** with some conditions costing $ tens of thousands per annum in wasted healthcare spend without alleviating suffering.
- Treatment recommendation is **“more of an art than a science.”** In the era of precision medicine mental health suffers from a lack of technological innovation.

References:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3184591/

SENSEYE'S OBJECTIVE MENTAL HEALTH DIAGNOSTIC

Patient takes 10 minutes of tests

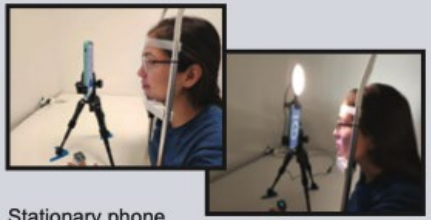
Patient performs 10 minutes of tasks

Senseye's computer vision extracts signals from how the patient's eyes are responding to stimuli and inputs them into our machine learning model

Care providers get simple diagnosis + severity, just like they would with a glucose monitor

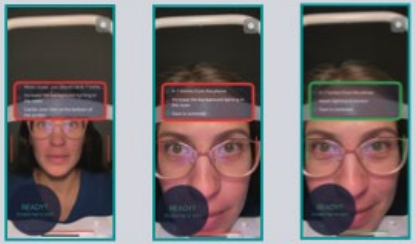
Testing Apparatus

Phone Setup



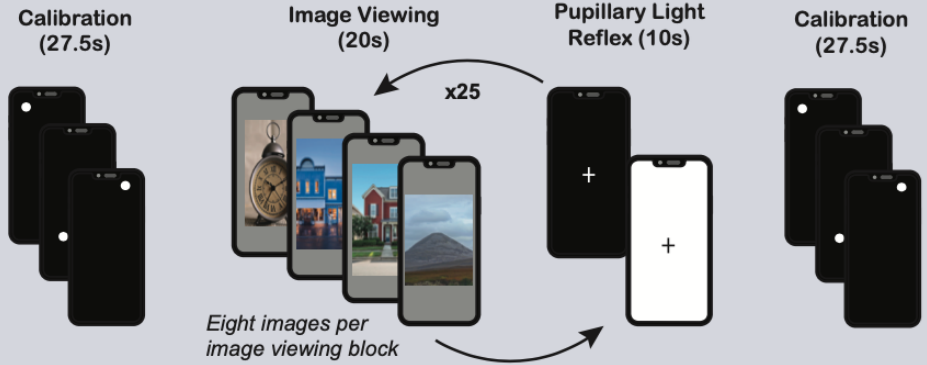
Stationary phone
Stationary participant head (6-7 inches)
Fixed lighting to control luminance

Real-Time feedback



Participant driven adjustment based on three dimensions: ***lighting***, ***distance from phone, face centered***

Tasks, Task Sequence, and Computer Vision



Eight images per image viewing block

Eleven dots presented one at a time

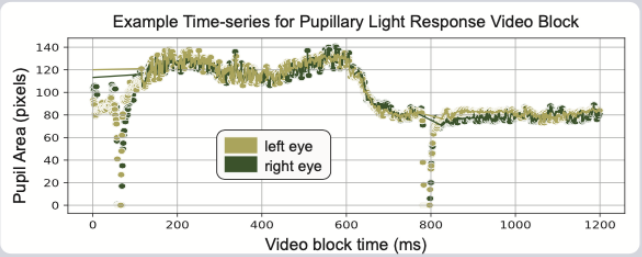
Image categories
Positive, Neutral, Negative, Negative Arousal, Facial Expression

A black screen followed by a white screen

Eleven dots presented one at a time

Computer Vision Output

Computer vision model outputs ocular based masks (sclera, iris, pupil) for each face image frame



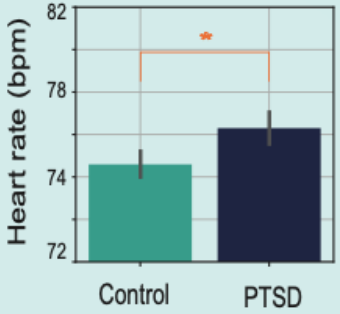
Example output for pupil area for each eye from the computer vision model for an entire video block of **Pupillary Light Reflex** task. *The y-axis is the pupil area value, the x-axis is each frame across the entire video.*

CURRENT MACHINE-LEARNING DATA-SET

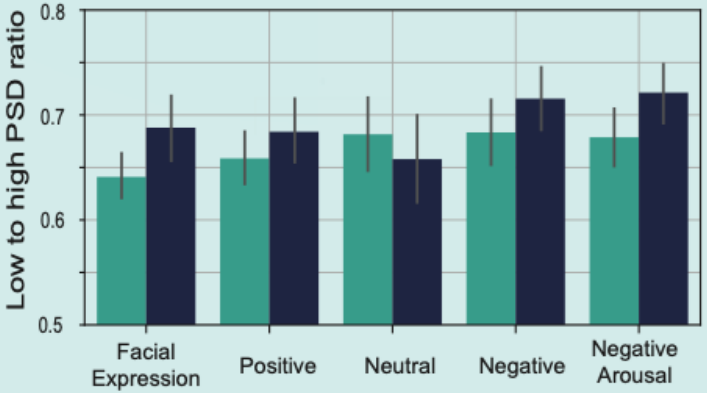
Preliminary Analysis: 81 individuals, 32 PTSD+, 49 controls Trauma/PTSD- collected across 3 sites

Autonomic Metrics

Heart rate was passively recorded throughout the SDT scan. Below are results related to heart rate during the image viewing task. Power Spectral Density (PSD) analysis performed using heart rate photoplethysmogram.



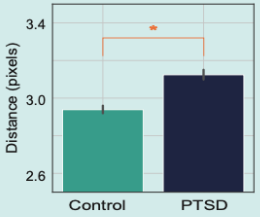
Controls had a significantly lower heart rate ($p<0.05$) and low to high PSD ratio ($p<0.03$) across categories, during affective image viewing.



Gaze Metrics

Image Viewing

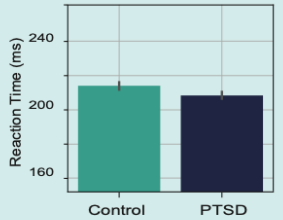
Distance was measured during Image viewing. For each image trial, we took the average distance traveled from the center of the screen.



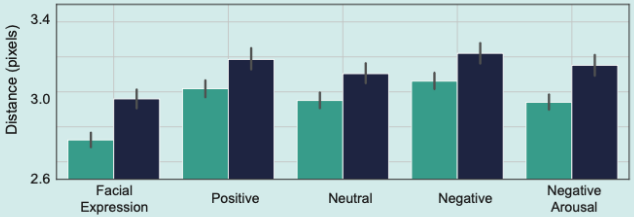
PTSD individuals tended make larger eye movements during image viewing more than control individuals ($p<0.001$).

Calibration

Reaction Time (RT) was measured during Calibration, this is the time it takes to fixate on a new dot on the screen.



Across Calibration blocks, we saw no differences in saccade reaction time between groups.

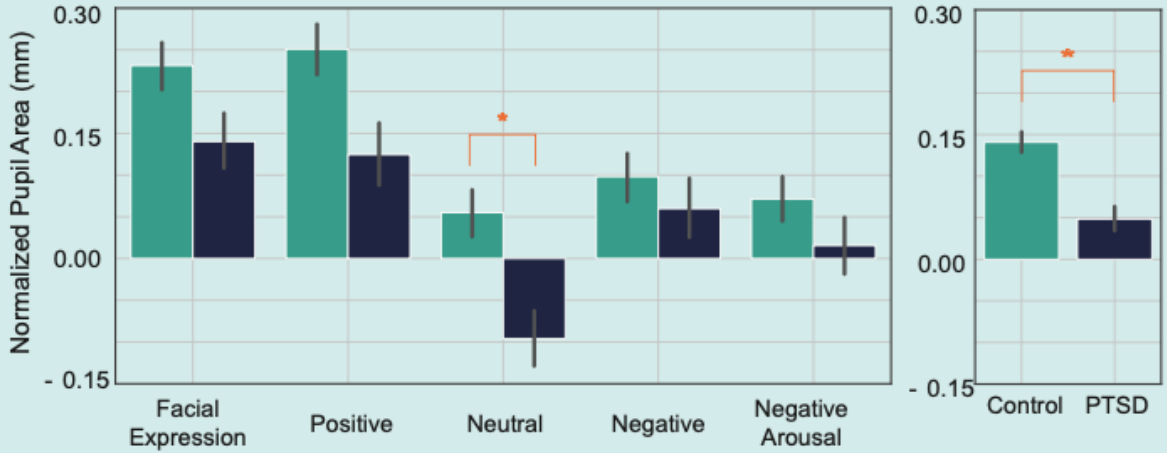


While we observed a main effect of diagnosis ($p<0.001$), but the interaction between diagnosis and image category was not significant.

CURRENT MACHINE-LEARNING DATA-SET

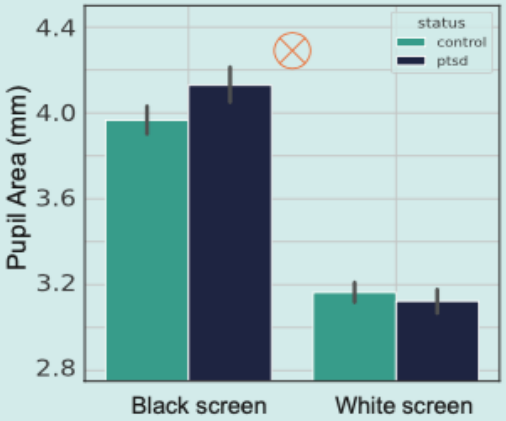
Pupil Area Metrics

Image Viewing



Participants with PTSD show less pupil area change during affective image viewing (p< 0.001; right sided plot above).

Pupillary Light Reflex



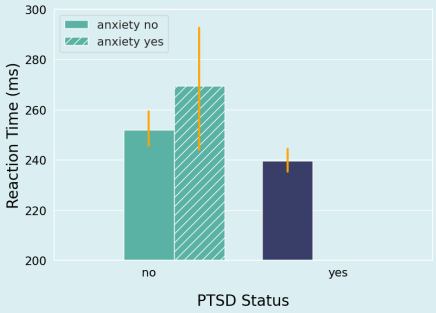
Participants with PTSD show greater pupil constriction during the pupillary light reflex task (p<0.01) (symbol denotes interaction).

MENTAL HEALTH CONDITIONS

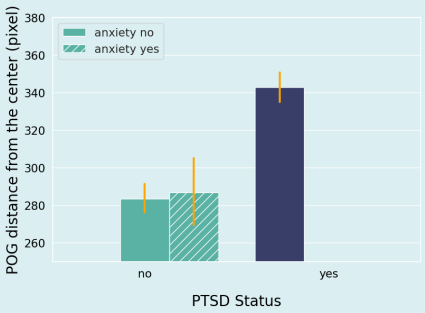
Our technology can already test for 3 mental health conditions, with 3+ in the pipeline.

CURRENT

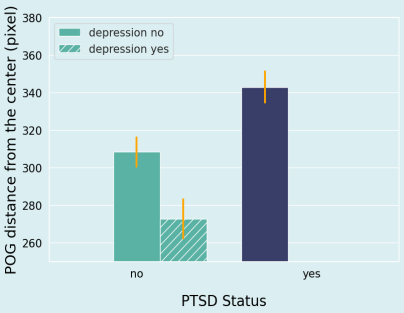
PTSD



Anxiety



Depression



Diagnosis + Severity Tracking

FUTURE

We have evidence that this technology will work with other mental health diseases including:

ADHD
Bipolar
Schizophrenia
TBI

Treatment Efficacy + Treatment Response

LEADERSHIP TEAM In Office, Austin, Texas

DAVID ZAKARIAIE

CEO & Founder

David is the CEO and Founder of Senseye.

In 2012, Google selected him as one of 100 Google Glass Pioneers. He is also the recipient of an Office of Naval Research Award for research in DNA Computing. When not in the lab, he is an Instructor Pilot & Check Airman in the Civil Air Patrol.

KATHLEEN BAUMANN

SVP Product

Kathleen Bauman is joining Senseye as the Senior Vice President of Product. Prior to joining, Kathleen was the Vice President of Product at Pear Therapeutics leading their portfolio of prescription digital therapeutics. She has over twenty years experience in the software industry with the majority of that time spent working on software as a medical device (SaMD) products, as regulated by the FDA.

BRAD STRASSER

VP Regulatory and Clinical Affairs

Brad joined Senseye in May 2022 and brings over 16 years experience working in the medical device industry. He has served in clinical, quality, and regulatory affairs capacities at both large corporations and small startups, helping secure Class I, Class II, and Class III device clearances and approvals through FDA, EU Notified Bodies, and other regulatory agencies around the world. In his spare time,

SIMON WOODS

President & COO

Simon joined Senseye in 2020. He is seasoned technology executive, with 25 years operating in high growth software businesses. His 5 successful enterprise & SaaS software exits include a $1bn sale to ION Group. Prior to Senseye he was the CEO of Riskpulse/Everstream, a successful turnaround that included the sale of the business to DHL & Columbia Capital. He leads operations, corporate development and go-to market strategy & sales.

DAVID DURRANT

Head of Engineering

David is a seasoned software development veteran with over 30 years of expertise across diverse industries, including telecommunications, fintech, commodity trading, and risk management. Previously, David was SVP of Software Development at ION where he lead a team of over 200 engineers. David is passionate about leveraging current and emerging technologies to automate established processes.

CAITLIN LIMONCIELLO, PHD

Director of Research

Caitlin earned her doctorate studying visual short-term memory and applying predictive models to the understanding of these memory processes. She then went on to a postdoctoral fellowship to study the neural mechanisms of 3D vision. She has 17 years of experience in human subjects experimental research and statistical analysis.

MEDICAL ADVISORS

CHARLES NEMEROFF, MD, PHD

Chairperson

Professor and Chair Dept. of Psychiatry at the Mulva Clinic & Director Dell Medical School, UT Austin.

BARBARA ROTHBAUM, PHD, ABPP

Specialist in PTSD focusing on the practical application of Senseye's technology.

KERRY J.RESSLER. MD,PHD

Chief scientific officer and James and Patricia Poitras Chair in Psychiatry at McLean Hospital and professor in psychiatry at Harvard Medical School.

STEVEN BERKOWITZ, MD

Leading researcher & practitioner in child & family trauma interventions.

GTM ADVISORS

VARUN CHOUDHARY MD, MA, DFAPA

Board-Certified Forensic Psychiatrist and the former Chief Medical Officer of Talkspace.

MICHAEL GORTON

Teladoc founding CEO who pioneered an industry-changing health care model.

MAJOR GENERAL ELDER GRANGER, MD

Former Deputy Director and Program Executive Officer of the TRICARE Management Activity.

VICE ADMIRAL TIMOTHY SYZMANSKI

Retired United States Navy vice admiral, last served as deputy commander of US Special Operations Command.

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THANK YOU!