

Pupil Core



Open source eye tracking platform.

The core research building block.

Open and accessible.

Pupil Core is an eye tracking platform that is comprised of an open source software suite and a wearable eye tracking headset. Pupil Core is more than just a product, it is an open platform used by a global community of researchers. Venture into new areas of inquiry.



Pupil Capture



Pupil Player

Record

Connect your Pupil Core headset to a desktop or laptop. View and record real-time gaze and pupil data. Interface with other devices with our network based API.

Play

Drag and drop your recordings into Pupil Player. Build rich visualizations of gaze on first-person video. Enrich your data with analysis plugins. Export raw data and enriched data for further analysis.



Adapt

Pupil Core is used for a diverse range of research purposes. The headset is modular, durable, and lightweight.

Add eye tracking to your research. Use Pupil core for gaze estimation, pupillometry, and egocentric vision research.

Adapt our hardware to suit your needs. Build novel prototypes.

Binocular - Our most versatile eye tracking headset. Get robust binocular pupil data, gaze data, and first person field of view video.

Extend

A lot of work went into making our software modular and accessible.

If you're a user, you don't have to write a single line of code. Just use our software like any other app.

If you're a developer, you can use our network based API to connect to other devices and computers. Easily add your custom features by writing a plugin in Python. Load plugins at runtime in the app. Want to do even more? You can! Check out the source code on github.

[See API Docs](#)

Community

Pupil Core is more than just a product, it is an open platform used by a global community of researchers.

Check out papers that use Pupil Core. Chat with community members and Pupil Labs developers.

[Chat with the Pupil community and Pupil Labs team on Discord.](#)

[Read papers published by academics and researchers working with Pupil.](#)

[Take a look at Pupil community projects.](#)

Technical Specs & Performance

Gaze Accuracy

Accuracy

0.60°

Precision

0.02

Pupil Tracking

Dark pupil with 3D model

Pupil Parameters

2D position

3D eye model parameters

Gaze Parameters

2D Gaze

Normalized 2D gaze position

3D Gaze

3D gaze rays + 3D gaze point through binocular vergence

Pupil Diameter

Relative size in eye camera pixels.

Absolute size in mm through 3D eye model

Calibration

5 point calibration. Multiple calibration methods available. See [documentation](#)

Sampling Frequency

Eye Camera

200Hz @ 192x192px

World Camera

30Hz@1080p

60Hz@720p

120Hz@480p

Latency

Camera Latency

8.5ms

Processing Latency

Depending on CPU

typically > 3ms

Slippage Compensation

Yes, through 3D eye model

Recording

Pupil and gaze and user data

Raw eye and world video

Connectivity

Pupil Core headsets connect via USB to your laptop or desktop computer running Pupil Core software. Pupil Capture desktop app enables data capture, recording, and real-time data relay via WiFi or LAN. Please see [network API documentation](#) for more info.

Physical Properties

Material

PA12 Nylon

Weight

22.75g

Scene Camera FOV

Wide Angle Lens (Default)

1080p: 139°x83°

720p: 99°x53°

480p: 100°x74°

Narrow Angle Lens

1080p: 88°x54°

720p: 63°x37°

480p: 42°x32°

Sample Recording

[Download sample recording](#)

Desktop Software

Pupil Capture: real time application

Pupil Player: post-hoc visualization and analysis. [Download latest desktop software](#)

What's in the box

Pupil Core Headset

USB-C to USB-A cable

Eye camera arm extenders

Silicone nose pads to accommodate a variety of wearers

Additional world camera lenses

(depending on configuration)

Minimum Requirements

CPU

Intel i5 or greater

RAM

8GB or more