

Balance Analysis Web App

Skeleton site, dual CSV upload, and comparative data analysis pipeline

What was built

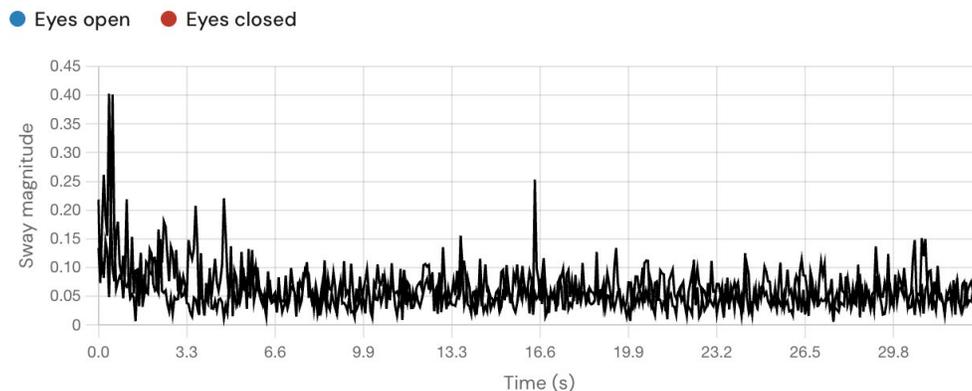
- **Single-file skeleton**
Clean HTML/CSS/JS with Chart.js — nav, hero, upload, learn, about section
- **Dual upload zones**
Separate dropzones for eyes-open (baseline) and eyes-closed (test) CSVs
- **Auto-trim pipeline**
First & last 5 seconds removed to discard phone-handling artifacts
- **CSV parser + preview**
In-browser parsing, tabbed preview with expand-to-fullscreen modal

Analysis features

- **Comparison stats**
Side-by-side metrics: RMS sway, peak, std dev, jerk, path length
- **7 chart types**
Sway overlay, scatter paths, 3-axis, rolling RMS, histogram, delta
- **Romberg quotient**
Closed/open RMS ratio with clinical interpretation
- **Auto-insights**
6 contextual findings + overall stability verdict

Sway magnitude — overlay

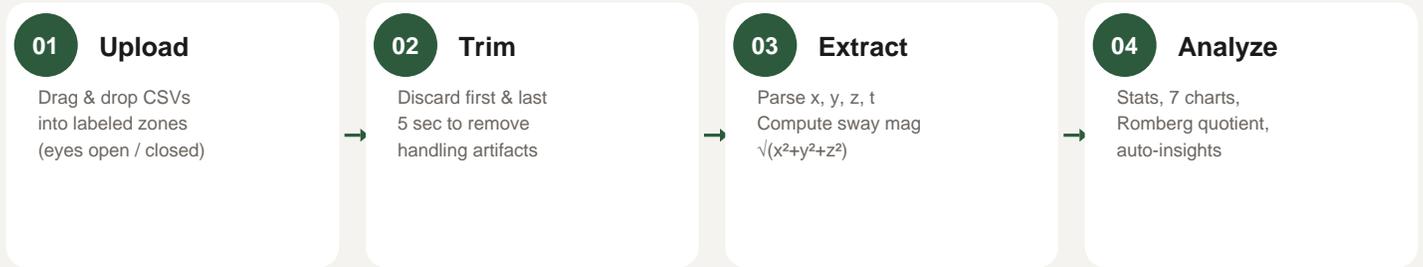
Total sway $\sqrt{(x^2+y^2+z^2)}$ for both conditions on a common time axis (trimmed)



Sway magnitude overlay — eyes open (blue) vs. eyes closed (red) with trimmed accelerometer data

CSV Parsing & Comparative Analysis

From raw Sensor Logger export to automated balance comparison



Computed metrics (per condition)

RMS Sway

Root mean square of sway magnitude

Peak Sway

Max instantaneous sway value

Mean Jerk

Rate of acceleration change (smoothness)

Path Length

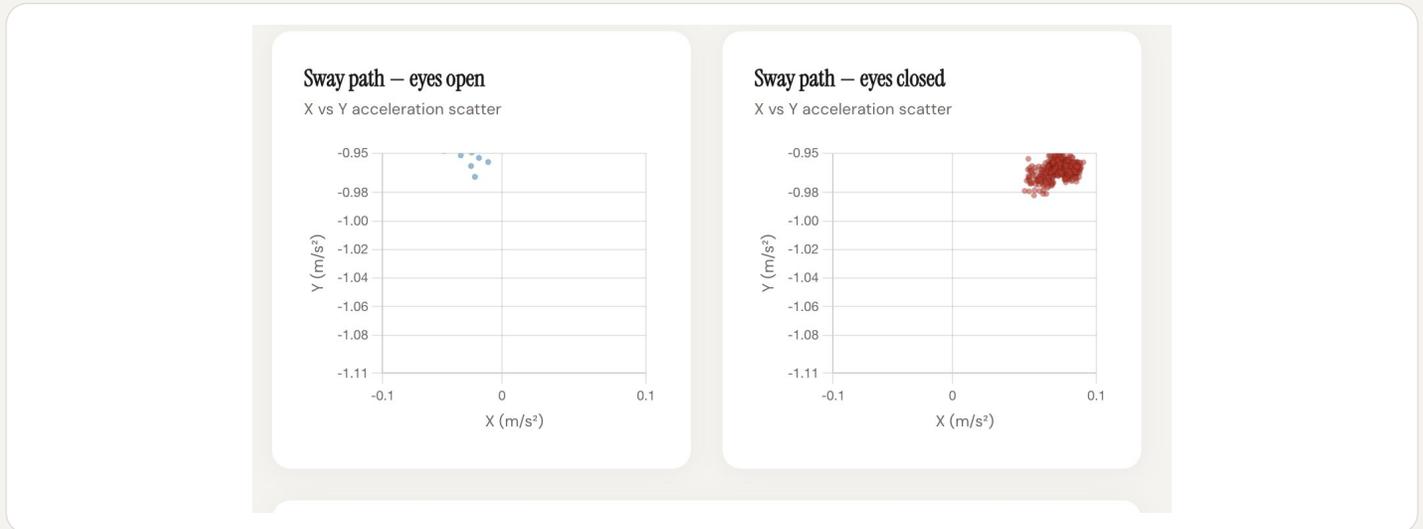
Cumulative XY displacement

Sway Area

$\sigma_x \times \sigma_y$ ellipse proxy (spread)

Romberg Q

Closed/open RMS ratio (key metric)



Sway path scatter — eyes open (left, tight cluster) vs. eyes closed (right, wider spread) with independent axis scaling