

SoundSync

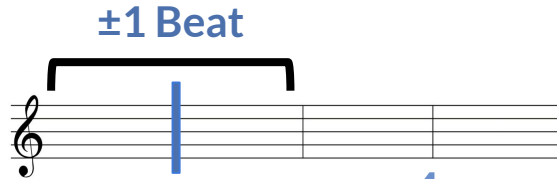


Caleb Lille, Rohan Raavi, Sanjana Shriram

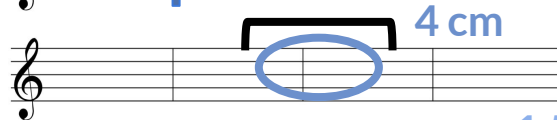


Use Case Requirements (1)

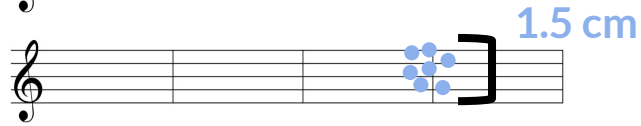
Cursor



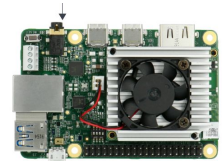
Accuracy



Precision



500ms



Solution Approach

- **Accessibility** focused
- Building communities
- **Inclusive** technology



System Specification (1)

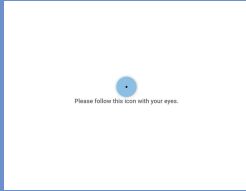
Frontend

Setup

Upload Music

Callibration

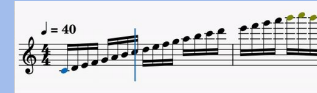
Eye Tracking



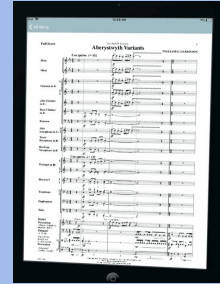
Instrument Selection

Visual

Cursor



Page Flipping



System Specification (2)

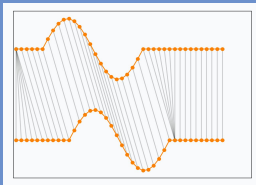
Google Board (Backend)

Audio

MIDI Preprocessing

Tracking & Alignment Algorithm

Dynamic Time Warping



Segmentation

Visual

Logistic Regression Model

Eye Tracking Data Filtering

Stampe Filter

Saccade Detection



Weighted Average Filter

Audio Implementation

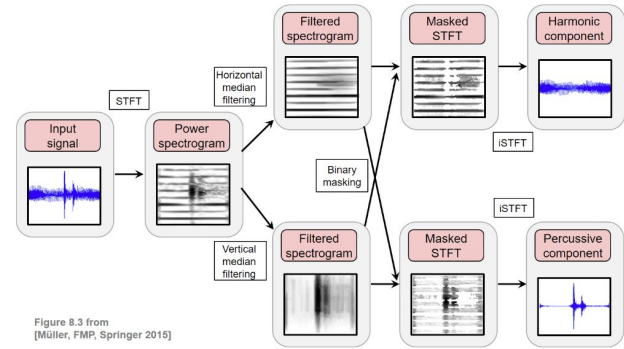
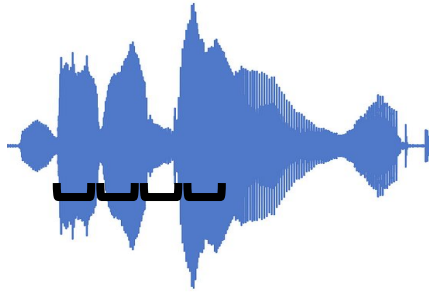
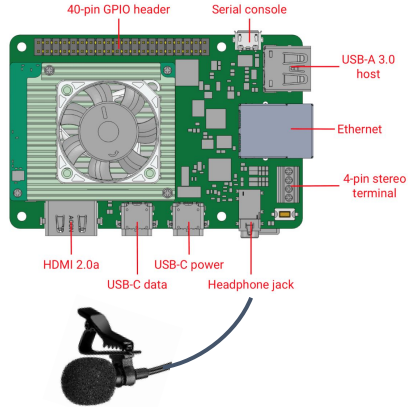
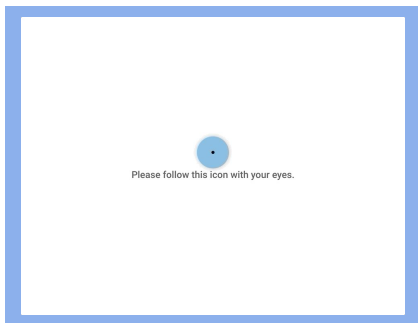


Figure 8.3 from
[Müller, FMP, Springer 2015]

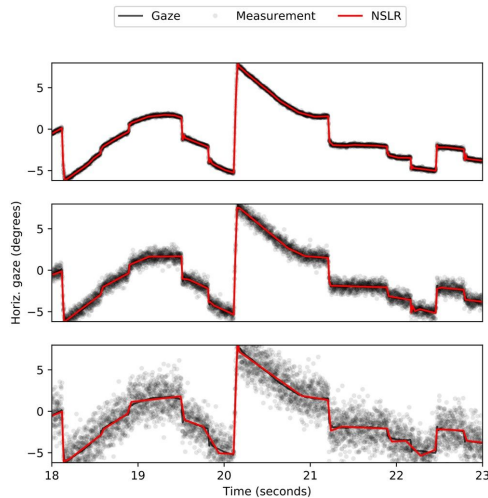
Filters → Chunk/Group sections → Dynamic Time Warping → Adjust Cursor

Visual Implementation

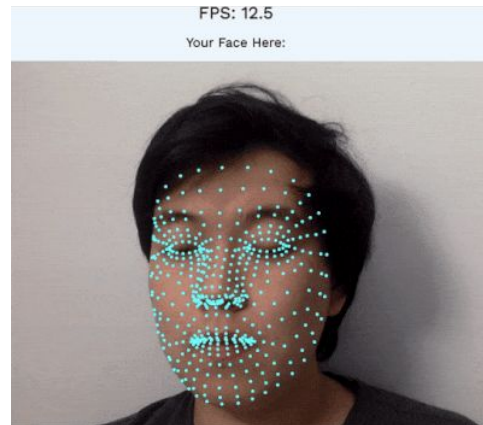
Tobii Eye Tracker 5



Calibration



Denoising



Head Tracking

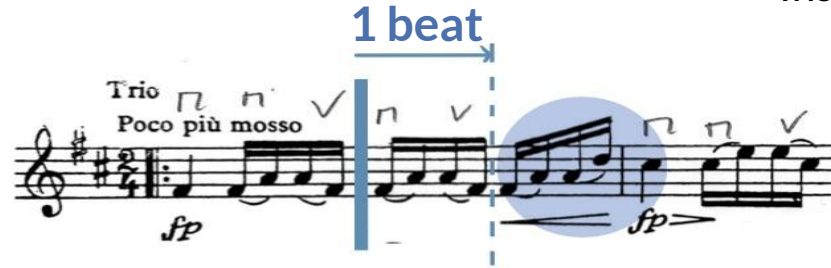
Webpage Implementation



Upload
Music



Select
Instrument



Display Cursor and Sheet Music

Testing and Verification

Eye-Tracker Accuracy
& Precision

1 Bar

Applying filters to ↑
precision

Audio Noise
Sensitivity

> 25 dB

Signal-to-noise ratio is
below a threshold

Page Flip Success
Rate

95%

Multiple users, pieces,
tempos

Testing and Verification

Processing Delay

500 ms

Time difference between input and output is within a beat

Audio Robustness

≤ 1 Beat

Segments with one wrong note are still aligned within 1 beat

Minimum Visual Model Improvement

+5%

Progressive eye tracking and head tracking

Tasks & Gantt Chart

Rohan

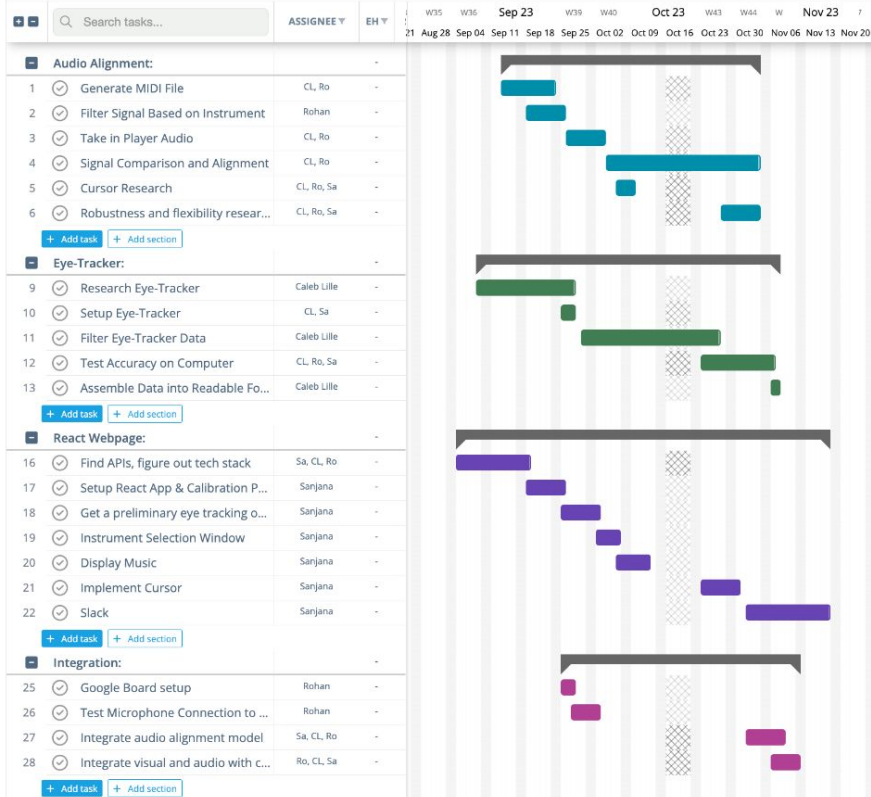
Audio Alignment Model,
Instrument Frequency
Calibration

Sanjana

Webpage Development,
Eye-Tracker ML Model

Caleb

Data-Point Filtering,
Music Processing, Audio
Alignment



MVP Block Diagram

