Decibel Threshold Event Displayer

BTI3031 Project 1 | Final Presentation

January 8, 2025

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Initial Situation






Project Goals

- Analyze Audio File

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- Summarize findings in a PDF

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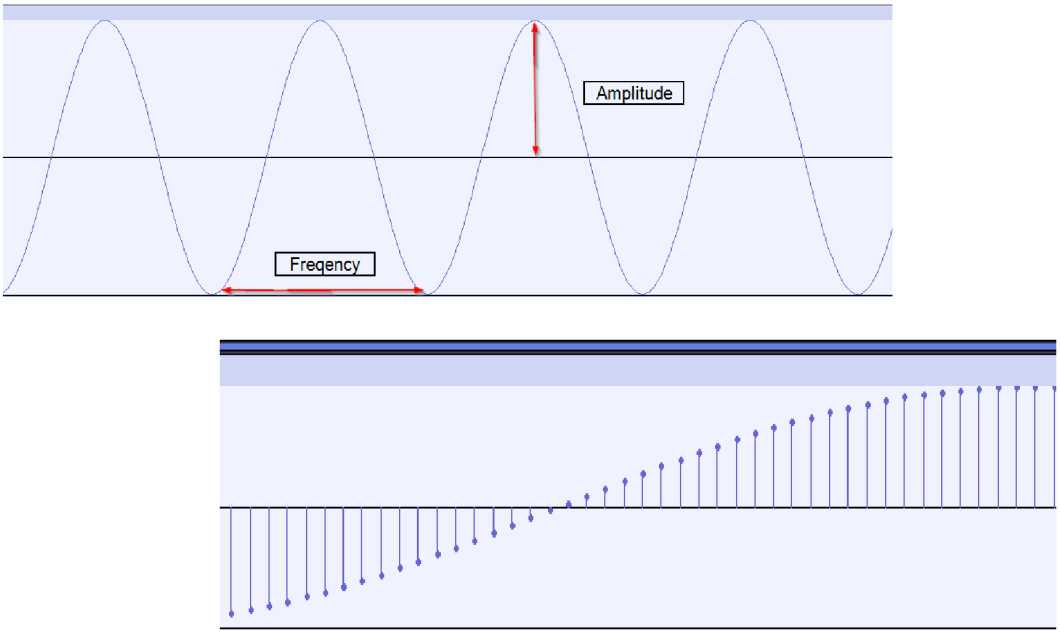
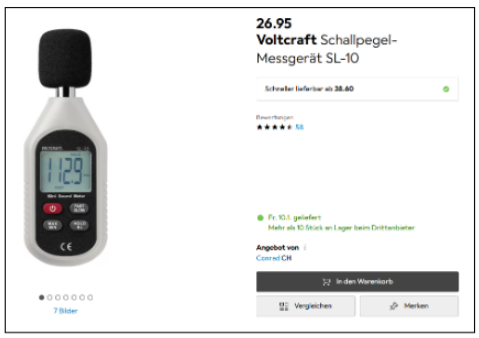
- Easy to use

Audio Files



Measuring the Sound Level

DecibelX for IOS



Sound level measuring device from Galaxus

Requirements

- Take .wav file, threshold and additional reference values as input

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- Platform independent

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Technology evaluation

Technology	Total score
Kotlin minimal	74
Kotlin bundled	56
Web SwiftLaTeX	82

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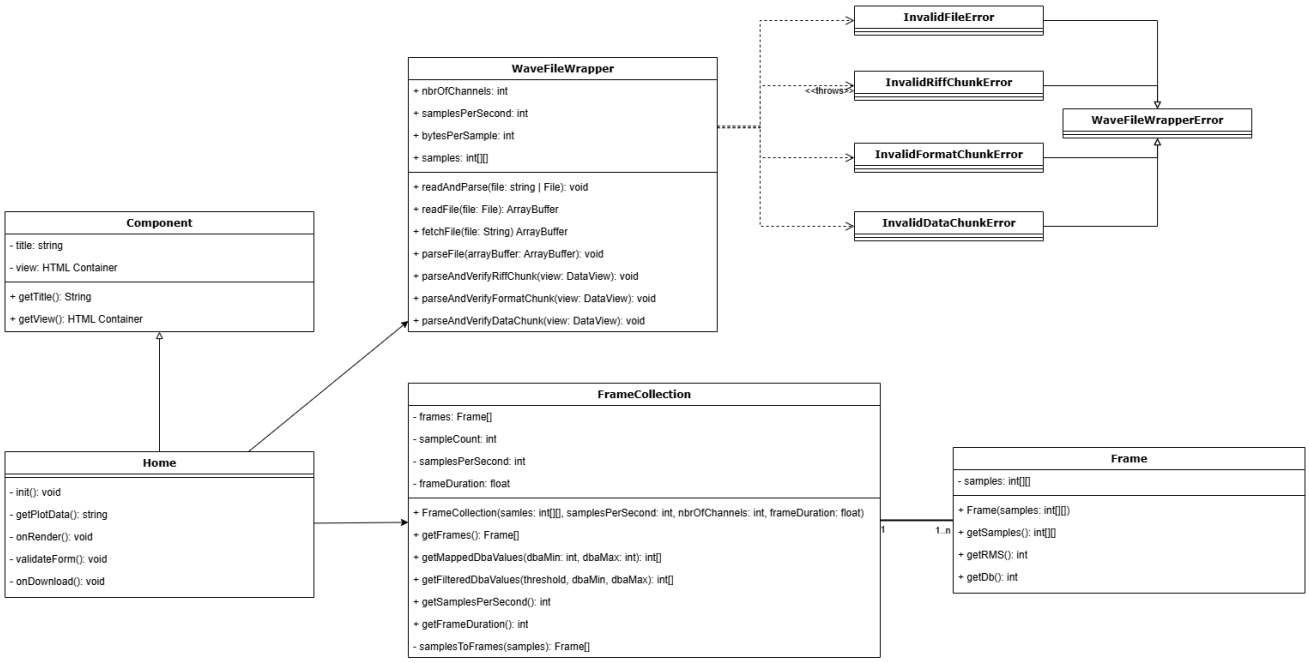
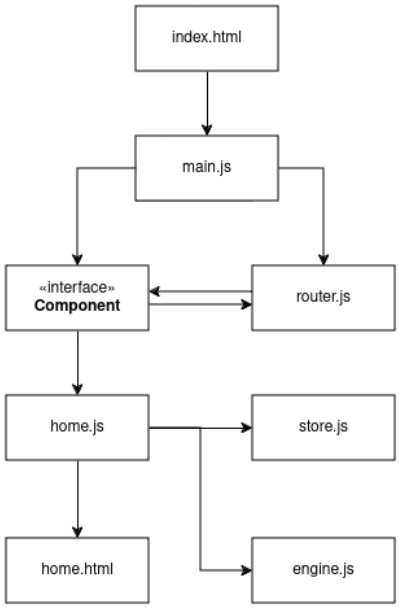
Architecture - Class Diagram



Architecture - SPA Techstack

- Vanilla JS SPA Framework (Web Programming Module)
- Bootstrap CSS Framework
- SwiftLaTeX in Browser WASM LaTeX rendering Library

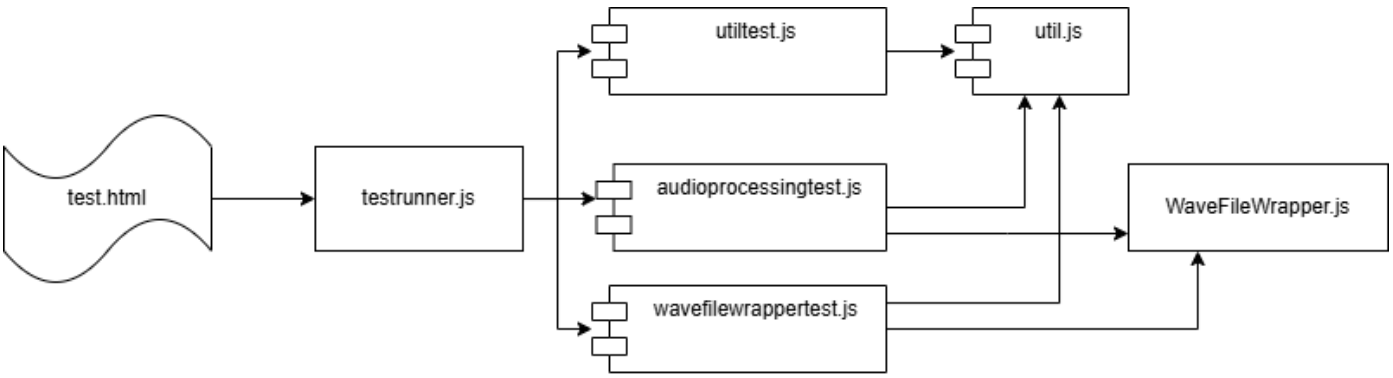


Processes

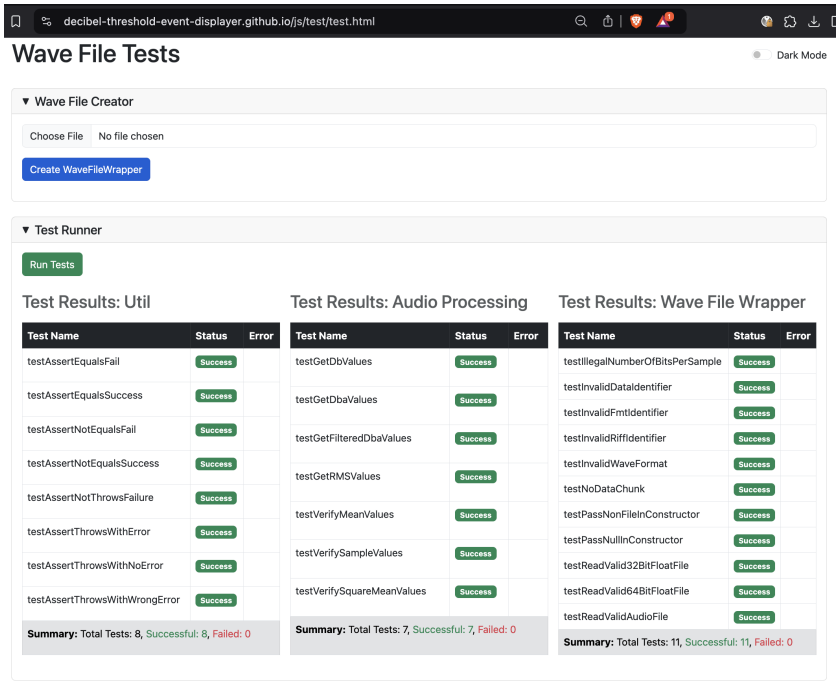
1. Read *.wav File
2. Group samples into frames (duration of 300ms)
3. Calculate root-mean-square (RMS) per frame
4. Convert RMS dB values per frame
5. Map the relative dB to absolute dB(A)
6. Filter the resulting list of dB(A)
7. Render PDF with dB(A) and user data

```
function rms(values){
  const squared = values.map(
      sample => Math.pow(sample, 2)
  );
  const sum = squared.reduce((a, b) => a + b);
  const mean = sum / values.length;
  return Math.sqrt(mean);
}

function rmsToDb(rms) {
  return 20 * Math.log10(rms);
}

function dbToDba(db, dbMin, dbMax, dbaMin, dbaMax) {
  return (db - dbMin) * (dbaMax - dbaMin) /
         (dbMax - dbMin) + dbaMin;
}
```


Testing - Overview

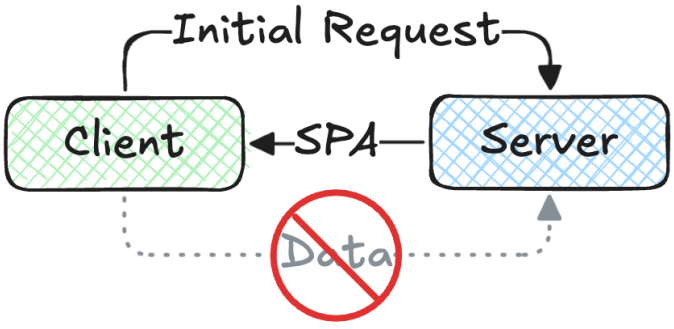


Testing - In action



Privacy concerns

- No data is sent to the server, after the initial request
- From the Plot on the PDF the original Audio File cannot be recreated



The user does not get into legal trouble, using the application or the resulting PDF!

License

Dependency Licenses:

- SwiftLaTeX: AGPL-3.0
- pgfplots: GPL-3.0

Resulting License:

- **GPL-3.0 licence (FLOSS)**

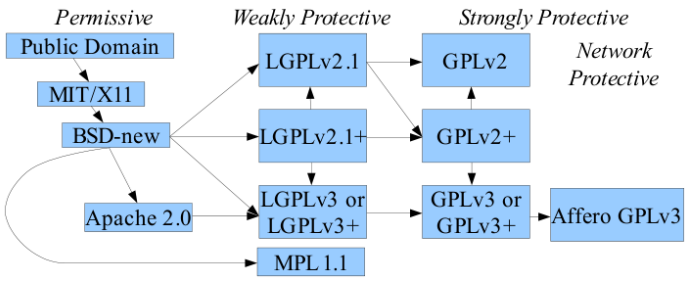
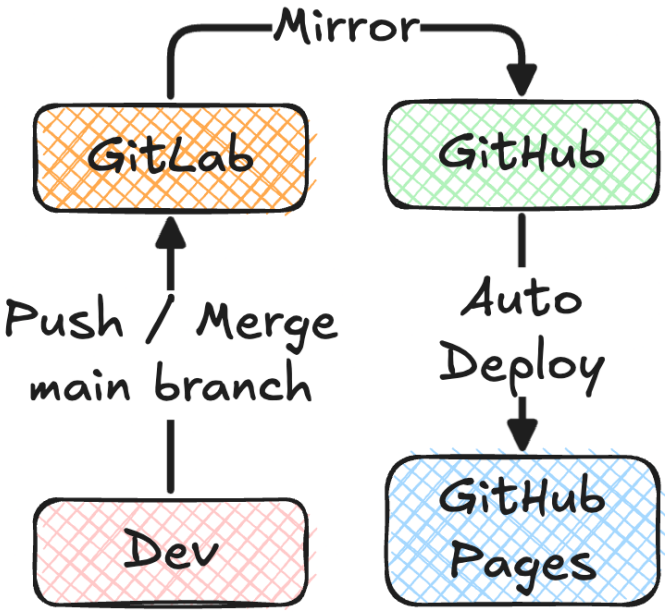


Image Source: https://dwheeler.com/essays/floss-license-slide.html

Deployment / Distribution

1. A dev pushes or merges code to the main branch
2. GitLab automatically mirrors the repository to GitHub
3. GitHub deploys automatically to GitHub Pages
4. The Application is available under: https://decibel-threshold-event-displayer.github.io/



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Scrum

- 2 week iterations
- Daily every week
- Review / planning every other week
- Product goals / sprint goals
- GitLab, MS Teams, LaTeX, excalidraw, draw.io

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Demo

- Watch the demo on YouTube
- Or better yet: Try it yourself on Github Pages!

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Conclusion

- Product goals achieved
- Scrum generally applied
- Minor issues with GitLab
- Great teamwork and team chemistry
- Interesting and well-defined project
- Lots of insights about audio, WAV files, and WebAssembly

Future Work

- Localization (DE, FR, IT)
- Custom thresholds
- Custom form fields
- Support more audio formats
- Dark mode / visual improvements

Questions / Discussion