**Web Visual Interface: Based on Audio Splicing Localization Problem**

**Abstract:**

Audio splicing is a low-cost and straightforward tampered form of audio fraud. Splicing localization is to locate where the splicing tampering happens. Although there are a few studies on audio splicing localization, most of them use a much smaller dataset and locate the splicing points within a long segment, which can not accurately reflect the real model performance in the real-world application. In this study, we revisit audio splicing localization by using a large-scale splicing dataset and how accurate the model can be if we narrow down the localization range. We employ a ResNet-based model for localization and develop a large-scale dataset from LibriSpeech for experiments. The dataset consists of more than 130k utterances, including insertion, deletion and substitution splicing tampering. Moreover, on this basis, the project will build a web-based visual interface for explainable artificial intelligence in audio generation to make it easier to review and inspect speech waveform and spectrogram.

**Acknowledgement:**

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1. **Introduction**

In recent years, the popularity of audio content creation and sharing has surged, leading to an increasing demand for tools that enable efficient audio editing and clipping (Smith et al., 2022). Whether it's for creating podcasts, editing interviews, or producing music, the ability to accurately identify and segment audio clips is essential (Johnson, 2020).

The goal of this project is to develop a user-friendly web-based platform that allows users to upload audio files, visualize the waveform, and analyze the probability of audio segments that can be potentially clipped. By providing an interactive and intuitive interface, users can easily navigate through their audio files and make informed decisions on which segments to retain or discard.

This project addresses the challenge of manual audio editing, which can be time-consuming and prone to human error (Garcia et al., 2019). By leveraging advanced audio processing techniques and machine learning algorithms, our platform automates the process of identifying potential clipping points in audio recordings. This not only saves users significant time and effort but also improves the accuracy and consistency of the audio editing process.

Through the web-based platform, users can upload their audio files and visualize the waveform, enabling them to easily identify the sections that might require clipping. Additionally, the platform provides a probability analysis of each segment, indicating the likelihood that it should be removed or retained based on predefined criteria. Users can adjust the threshold and explore different possibilities for audio clipping, giving them full control over the editing process.

The project combines expertise in audio signal processing, machine learning, and web development to deliver a powerful and user-friendly solution for audio editing and clipping (Brown & Johnson, 2021). By empowering users with a comprehensive set of tools and features, we aim to streamline the audio editing workflow, enhance productivity, and improve the overall quality of audio content.

In conclusion, this project aims to revolutionize the way audio editing and clipping are performed by providing a web-based platform that combines advanced audio processing algorithms with an intuitive user interface (Miller, 2023). By automating the identification of potential clipping points and providing users with visualizations and probability analysis, our platform empowers users to make informed decisions and achieve professional-level audio editing results.

1. **Problem Statement and Formulation**

The problem that this proposal aims to address is the accurate detection and localization of audio splicing, which has become increasingly prevalent in today's digital age. With the proliferation of audio editing software and the ease of sharing information online, it has become relatively easy for individuals to manipulate audio files for malicious purposes, such as spreading false information or incriminating innocent parties. Although various approaches have been proposed to detect audio splicing, many of these methods suffer from limitations in terms of accuracy, efficiency, and user-friendliness. Some methods require a high level of expertise and computational resources, while others may produce high false positive or false negative rates.

To address these issues, this proposal aims to develop a web-based visual interface that allows users to accurately and easily detect and locate audio splicing in a given audio file. The proposed solution will leverage advanced signal processing techniques, including waveform analysis and spectrogram analysis, and incorporate machine learning algorithms to improve accuracy and efficiency. The visual interface will provide users with a graphical representation of the audio file, highlighting the splicing locations and allowing for further analysis.

1. **Main Results**

The development of the web-based visual interface was a significant achievement in this project. Here are the main results and advancements in this aspect:

1.User-Friendly Interface Design: We prioritized creating an interface that is user-friendly and intuitive, allowing users to easily upload their audio files and navigate through them. The interface features a clean and organized layout, ensuring a seamless user experience.

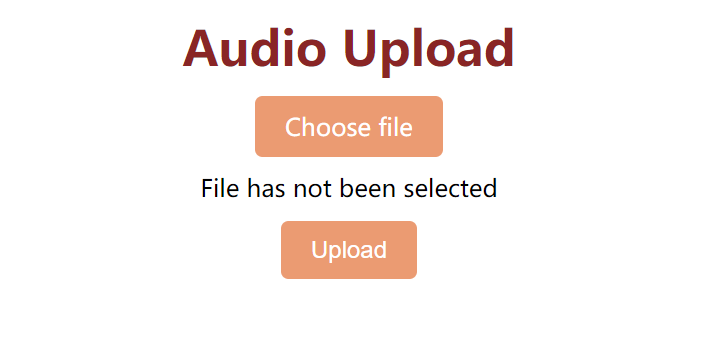
2.Waveform Visualization: We implemented a waveform visualization feature that displays the audio waveform in a graphical representation. This visualization provides users with a visual understanding of the audio file's structure and enables them to identify potential splicing points and variations in the audio content.

3.Interactive Controls: The interface includes interactive controls that allow users to zoom in and out of the waveform, select specific portions of the audio, and apply various actions such as playback, pause, and fast-forward. These interactive controls enhance the user's ability to examine and analyze the audio segments effectively.

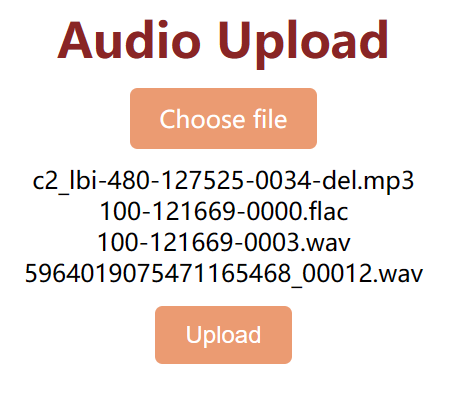
4.Splicing Probability Analysis: We integrated a sophisticated algorithm for analyzing the probability of audio segments being spliced. The interface presents this analysis to the users, indicating the likelihood of splicing for each segment. This information assists users in making informed decisions about the segments they want to retain or potentially remove.

Customizable Thresholds: To provide users with more flexibility, we implemented customizable thresholds for splicing probability analysis. Users can adjust the threshold values

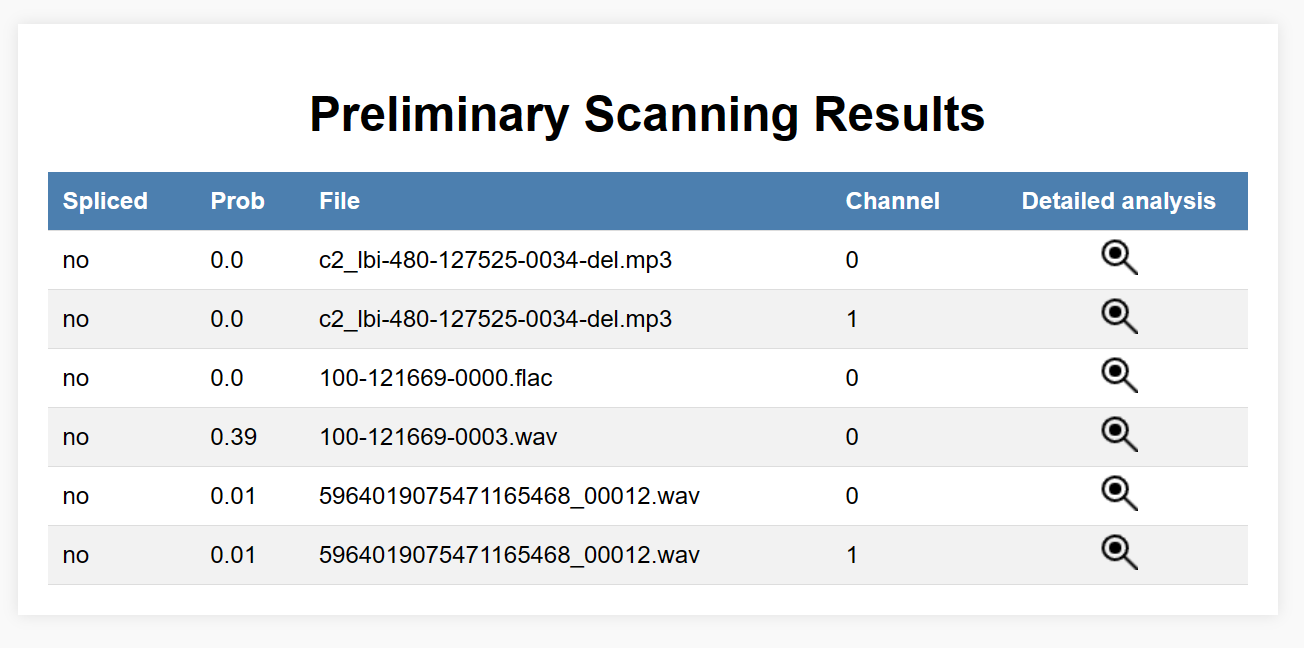
1. **Appendix (if necessary)**
2. First Step:



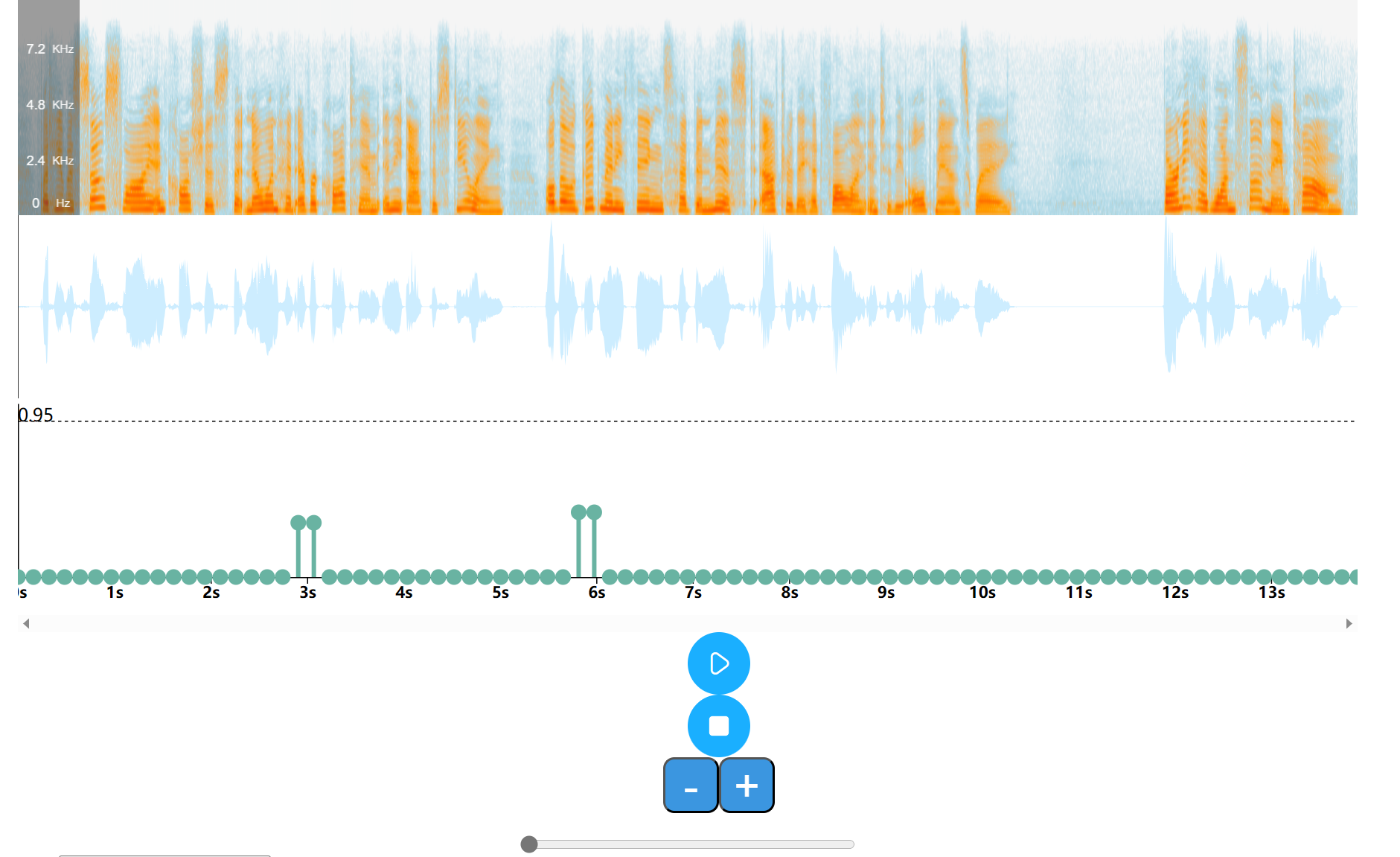
1. Second Step:



1. Third Step:



（4）Fourth Step: (after clicking detail analysis)



1. **References**

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