Design and Implementation of a Web Audio/Video Recorder in HTML5

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Abstract

This paper discusses the design and implementation of a Web Audio/Video recorder using HTML5. The recorder leverages modern web technologies such as the MediaRecorder API and WebRTC for real-time audio and video capture. The implementation prioritizes usability, cross-platform compatibility, and privacy, with additional features for saving and exporting recorded media in common formats like MP4 and WebM. The application showcases the flexibility of HTML5 in building multimedia tools directly accessible through web browsers.

1 Introduction

The emergence of HTML5 has revolutionized web development by enabling native support for multimedia functionalities. Among its key capabilities is the ability to record and manipulate audio and video streams. This feature eliminates the need for third-party plugins like Flash, making web applications more secure and efficient. This paper focuses on the design considerations and technical implementation of a Web Audio/Video recorder, highlighting its use cases in education, remote collaboration, and media production.

2 Methodology

The project follows a modular design approach, emphasizing ease of integration with existing web platforms. The key technologies used include:

- **MediaDevices API**: To access the user's microphone and camera.

- **MediaRecorder API**: For recording and processing audio/video streams.
- **WebRTC**: To enable low-latency data transmission.
- **HTML5 and CSS3**: For building an intuitive user interface.

The system architecture consists of three main components:

1. **Capture Module**: Interfaces with the device's input hardware.
2. **Recording Module**: Encodes and stores media streams in real time.
3. **Export Module**: Allows users to save recordings in various formats.

3 Implementation

The implementation begins with an HTML5 front-end that provides a user-friendly interface. The core functionality is driven by JavaScript, utilizing the MediaRecorder API for media handling. Below is a snippet of the recording logic:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width,
       initial-scale=1.0">
    <title>Web Audio/Video Recorder</title>
</head>
<body>
    <h1>Audio/Video Recorder</h1>
    <video id="preview" autoplay muted></video>
    <button id="start">Start Recording</button>
    <button id="stop" disabled>Stop Recording</button>
    <script>
        const preview = document.getElementById('preview
           ');
        const startButton = document.getElementById('
           start');
        const stopButton = document.getElementById('stop
           ');
        let mediaRecorder;
        let chunks = [];
```

```
        navigator.mediaDevices.getUserMedia({ video:
           true, audio: true })
            .then(stream => {
                preview.srcObject = stream;
                mediaRecorder = new MediaRecorder(stream
                   );

                mediaRecorder.ondataavailable = event =>
                    chunks.push(event.data);
                mediaRecorder.onstop = () => {
                    const blob = new Blob(chunks, { type
                       : 'video/webm' });
                    const url = URL.createObjectURL(blob
                       );
                    const a = document.createElement('a
                       ');
                    a.href = url;
                    a.download = 'recording.webm';
                    a.click();
                };
            });

        startButton.addEventListener('click', () => {
            chunks = [];
            mediaRecorder.start();
            startButton.disabled = true;
            stopButton.disabled = false;
        });

        stopButton.addEventListener('click', () => {
            mediaRecorder.stop();
            startButton.disabled = false;
            stopButton.disabled = true;
        });
    </script>
</body>
</html>
```

4 Results

The implemented recorder successfully captures high-quality audio and video streams in real time. Testing across major browsers (Chrome, Firefox, and

Edge) confirms compatibility and smooth performance. The export functionality supports WebM and MP4 formats, ensuring broad usability. User feedback indicates that the interface is intuitive and easy to navigate.

5 Conclusion

This project demonstrates the potential of HTML5 in creating robust and accessible multimedia applications. The Web Audio/Video recorder is a step towards democratizing content creation tools by providing free, open-source solutions accessible through web browsers. Future work will focus on enhancing features such as video editing, cloud integration, and advanced privacy settings.

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References

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