

Sound Visualization in Videos



Goal

In this master project, a system for sound analysis and visualization in videos is developed. The sound analysis relies on a machine learning system that can recognize up to 300 different classes of auditory cues. The classification results are further processed to identify significant events and used to visually annotate the video with appropriate static or dynamic stickers (e.g., a siren emoticon in the case of siren sounds). Subsequently, the annotated video can be summarized as a visual story that visually conveys the soundscape as well. The project will be based on technologies such as Swift, SwiftUI, ObjectiveC, CoreML, and CoreImage.

Description

This project is based on a high-end mobile video processing framework and app. The master project aims to (1) integrate an AI-based sound analysis tool for the sound of videos, (2) implement a system to detect sound-related events, and (3) develop a visualization technique to communicate sound-related events through visual annotations in videos. The work includes the following:

- Integration, configuration, and evaluation of the Apple Sound Analysis framework for sound classification;
- Design, implementation, configuration, and evaluation of an event-detection system for sound;
- Implementation of sound visualizations to visually express sound;
- Implementation of an event-driven video summarization module that generates a series of images;
- User-interface extension to enable exploration and configuration of the prototypical system;
- Preparation of an Appy Hour submission for SIGGRAPH 2023

This project relates to current research and software projects in the HPI Computer Graphics Systems group. It is particularly suitable for further research in the context of a Master's thesis or a later PhD thesis. In addition, the work can form a basis for employment as a student assistant or software developer with our research partners.

Contact

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