

Introduction

Commercials form a major part of TV broadcast, it becomes a problem of great interest to detect these commercials in any TV segment, regardless of the transmission noise. Such detection can engender many applications, for example, targeted ads display, learning the data in commercials and so on. The goal of the project was to develop a system which could detect the content and location of all the commercials found in a recorded TV segment. With good maintenance, it obtains an accuracy of nearly 100%.

Method employed

Audio fingerprinting of commercial segments was used for the detection of commercials. Fingerprint matching has a very high accuracy when dealing with audio, even severely distorted audio can be recognized with very high accuracy. The major problem faced was that the system had to be generic for all TV broadcasts, regardless of audio/video quality, aspect ratio and other transmission related errors. Audio fingerprinting provides a solution for all these problems. It was seen after implementation that several theoretical ways of detecting commercials as suggested in the proposal was not as accurate as audio fingerprinting and hence audio fingerprinting stayed in the final version of the system.

Working

Initially the user uses a set of hand tagged commercials. The system detects these set of commercials in the TV segment. On detecting these commercials, it divides the entire broadcast into blocks. Each of these blocks can be viewed and tagged as commercials by the user. This comprises of the maintenance of the system. There is a set of 60 hand labelled commercials for one to work with. This process takes about 10-30min for a 1hr TV segment, depending on the number of commercials that have to be tagged.

When the database has an appreciable amount of commercials(usually around 30 per channel worked perfectly) we can use it to recognize commercials in any unknown TV segment.

Results

On running the system on any video, one can expect the following format of output file

00:00:00 - 00:00:38 = Unclassified
00:00:38 - 00:01:20 = ad by Jeopardy
00:01:21 - 00:02:20 = ad by Jerome's
... and so on

The above is the location of the commercials and the content it advertises in the video.

In case the system missed detecting a few commercials, one can edit this file through a web interface which looks as follows:

Save changes				
Start	End	Name	Play	Add/Del
00:00:00	00:01:00	unclassified	Seek	+ -
00:01:00	00:11:21	unclassified	Seek	+ -
00:11:21	00:11:51	ad by Horizon	Seek	+ -
00:11:51	00:12:06	ad by Cuero	Seek	+ -
00:12:06	00:12:36	ad by Macy's	Seek	+ -
00:12:36	00:12:52	ad by Expedia	Seek	+ -
00:12:52	00:13:06	ad by Lipton	Seek	+ -
00:13:06	00:13:21	ad by breathe right	Seek	+ -
00:13:21	00:13:51	ad by deep pizza	Seek	+ -
00:13:51	00:14:20	ad by Lexus	Seek	+ -
00:14:20	00:14:57	ad by keep your home	Seek	+ -
00:14:57	00:15:28	ad by microsoft	Seek	+ -
00:15:28	00:22:59	unclassified	Seek	+ -
00:22:59	00:23:29	ad by microsoft laptops	Seek	+ -
00:23:29	00:23:43	ad by aveno	Seek	+ -
00:23:43	00:23:59	ad by petco	Seek	+ -

Instructions

- Click play in the video player to start playing the video
- Use "seek" button to seek to the starting of each video block
- When you tag a block as a commercial, always start it with 'ad', else the system will not recognize it
- Once you have tagged all content, click on save changes and the system will update the db accordingly

On making changes to the web interface, the system updates its db with new/edited commercials. This web interface can be used for viewing the detected commercials as well.

Applications

This system is extremely useful for people with the following interest:

1. People who despise commercials by a particular company, or who despise commercials all together can use it to detect location of commercials. With help of the script `ffmpeg.py`(part of the system) one can remove all commercials detected, or selectively chose to keep some. This way, it can be used as an alternative to TiVo (with a few exceptions though).
2. Those who are working on building a very effective automatic commercial detection system can use this to reliably build training data. This method promises to be much faster and more effective than the normal way of building the entire training data by manually tagging content.
3. TV broadcasters who are wishing to employ targeted ads based on location can use it too. I am positive that this system can be used in many other ways as well.

Future works:

Hope to use this system as a base and automate the process of maintaining the system, to implement an automated commercial detector.