SYSTEMS AND METHODS FOR INJECTING ADS INTO CONTENT STREAMS PLAYED BY CONSUMER ELECTRONICS DEVICES

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Consumer electronics devices, such as DVD players, Blu-Ray players, DVRs, among others, can play audiovisual content streams from physical digital media (for example, DVDs, and Blu-Ray Discs). Some of these content streams can include ads. However, these ads may pertain to events that are no longer relevant or include information that is now stale. For example, a physical digital medium (for example, a DVD) that was produced several years ago can include ads that still advertise films that were being released in theaters at the time the DVD was produced as though they are “coming soon to a theater near you.” Consumers should be able to enjoy content in playback media while viewing relevant and up-to-date ads.

This paper discusses systems and methods for injecting advertisements into content streams played by consumer electronics devices. The advertisement injection system can include a display, audio/video receiver, and playback device. The display can include a television, laptop, desktop, or any other electronics device. The audio/video receiver can include a set top box or an embedded component of the display. The audio/video receiver can be a separate component, embedded into the display, or a module or application residing inside the display. The playback device can include advertisement servers, Blu-Ray Disc players, or DVD players. The display can be connected to the audio/video receiver and the playback device.

To inject advertisements into content streams played by consumer electronics devices, an advertisement injection system, which can serve as a centralized hub, can be used to control the digital media playback device in the consumer's living room. Today, most playback devices provide signals for playback over HDMI cables, Bluetooth, and infrared remote signals. HDMI cables can support command-and-control channels that enable a sufficiently advanced television or audio/video receiver to coordinate the playback of one or more devices connected to it. For instance, to insert an ad during the playback of media content, the advertisement injection system can send a “pause” signal to the playback device to pause the playback of the media content.
The advertisement injection system can then insert an ad and upon the ad being displayed, the advertisement injection system can send a “play” signal to the playback device to continue the playback of the media content.

By controlling the playback device directly, the advertisement injection system can: (i) replace existing advertising content on the physical digital media by using the control system to fast forward through original advertisements during the inserted advertisement; (ii) add new advertisements to the audiovisual content stream by using the control system to pause the playback of the audiovisual content stream; (iii) add new advertisements to the audiovisual content stream by buffering the audiovisual content stream during an advertisement playback; or (iv) remove the original advertisement by automatically skipping the known, original advertisement.

The content streaming management device can include either a display that includes the advertisement injection system or a separate audio/visual receiver that includes the advertisement injection system. The advertisement injection system included in the content streaming management device can include software or hardware components that can execute in an audio/video receiver or a television. The advertisement injection system can include functionality to send “pause” and “play” signals, among others to one or more playback devices via a HDMI cable that establishes a communication between the content streaming management device and the playback devices.
Fig. 1 shows a content streaming management device including a television with an embedded advertisement injection system. The advertisement injection system can send pause, fast forward, skip, and play signals to the playback devices via HDMI connections between the television and the playback devices.
Fig. 2 shows an advertisement injection system that is remotely coupled to a television. The advertisement injection system can execute within an audio/video receiver that is positioned between a television and one or more playback devices. The advertisement injection system can send pause, fast forward, skip, and play signals to the playback devices via HDMI connections between the receiver and the playback devices.
Referring to Fig. 3, depicted is an example workflow for automatically injecting advertisements into content streams of physical media played by consumer electronics devices. In brief, the content streaming management system can: (1) play a first portion of the audiovisual content stream from physical digital media, (2) automatically send a first command to the playback device, (3) play an advertisement on the display, (4) automatically send a second command to the playback device, and (5) play a second portion of the audiovisual content stream from the physical digital media.

At step 1, a display device of the content streaming management device can display an audiovisual content stream from a playback device. For example, a television can display a
movie recorded on a Blu-Ray Disc processed by a Blu-Ray Disc player. The display device can receive signals corresponding to the audiovisual content stream via one or more HDMI cables that establish a communication between the display device and the playback device. The advertisement injection system can be embedded within the display device. The advertisement injection system can also be embedded in a device, such as a receiver, that is positioned between the display device and the playback device.

The audiovisual content stream can be separated into many portions (e.g., chapters or sections of a movie). The display device of the content streaming management device can display a first portion of the audiovisual content stream stored on a physical digital media via a playback device.

At step 2, the advertisement injection system of the content streaming management device can automatically send a first command to the playback device. The first command can be sent from the advertisement injection system to the playback device via an HDMI cable extending between the content streaming management device within which the advertisement injection system is embedded and the playback device. The first command can include a pause, fast forward, or skip command, or a combination of these commands. The advertisement injection system can automatically send a pause command to the playback device. The audiovisual content stream can include prescribed points in the stream indicating when to pause the stream. For example, when the advertisement injection system determines that the audiovisual content stream is at one of these prescribed points, the advertisement injection system can send a pause command to the playback device interrupting the audiovisual content stream. Additionally, the advertisement injection system can automatically send a fast forward command. For example, when the advertisement injection system determines that the audiovisual content stream is at an advertisement, the advertisement injection system can send a fast forward command to the playback device and pause once the advertisement injection system determines that the audiovisual content stream is no longer at the advertisement. The advertisement injection system can automatically send a skip command to the playback device. For example, when the advertisement injection system determines that the audiovisual content stream is playing an advertisement portion, the advertisement injection system can send a skip command.
command to the playback device to the next non-advertisement portion of the audiovisual content stream.

At step 3, the display device of the content streaming management device can display the advertisement. At prescribed points in the content stream, the advertisement injection system can access an advertisement from an advertisement server and provide the accessed advertisement for display to the display device. For example, if the advertisement injection system has sent a pause command to the playback device, while the playback device has paused the audiovisual content stream at the prescribed point in time, the advertisement injection system can access the advertisement from an advertisement server. Upon accessing the advertisement, the advertisement injection system can provide the advertisement received from the advertisement server to the display device such that the display device can display the advertisement. If the advertisement injection system has sent a fast forward command, while the playback device is fast-forwarding through the audiovisual content stream, the advertisement injection system can access an advertisement from an advertisement server. In this example, the advertisement injection system sends an additional pause command to the playback device while the display device plays the accessed advertisement. If the advertisement injection system has sent a skip command, the advertisement injection system can send an additional pause command to the playback device to interrupt the audiovisual content stream and access an advertisement from an advertisement server. In this example, the display can play the accessed advertisement until the display device has finished playing the advertisement. Furthermore, some playback devices may provide audiovisual content streams that are downloaded. In some situations, the display device may not be able to display the content stream until the stream has been downloaded. In such situations, the advertisement injection system can automatically provide an ad to the display device to display the ad while the content stream of the playback device is downloading.

At step 4, the advertisement injection system of the content streaming management device can automatically send a second command to the playback device via the HDMI cable that establishes a connection between the content streaming management device and the playback device. The second command can include a play command. Once the advertisement
has finished playing, the advertisement injection system can send a play signal to the playback
device. At step 5, the display device of the content streaming management device can play a
second portion of the audiovisual content stream from the physical digital media via the playback
device.
ABSTRACT

This paper describes an automated system for injecting advertisements into audiovisual content streams played on physical digital media, such as DVDs and Blu-Ray Discs. The system can include a display, audio/visual receiver, and a playback device. By controlling the playback device, the system can (i) replace existing advertisements with new advertisements; (ii) add new advertisement content to the content stream by pausing the content stream; (ii) add new advertisements to the content stream by buffering the content stream; and (iv) remove the existing advertisements by automatically skipping through the existing advertisements.