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Streaming Rate Based Playback Speed Control For Live Video

STREAMING RATE BASED PLAYBACK SPEED CONTROL FOR LIVE VIDEO

ABSTRACT

A system, method, and computer readable media for automatically varying the playback speed of live media content to match the measured streaming rate is disclosed. The system includes one or more live streaming devices, host devices or server, and client playback devices connected through a network. The method includes running an application configured to display an interface for accessing the built-in camera functionalities and for posting live feeds to an online system at the broadcaster side and viewing the live stream on the client side. The system includes a smart speed control module configured to automatically limit the rate of speed change (acceleration) and the allowed maximum percentage of speed change when compensating for the streaming rate changes to make the playback changes less noticeable. The disclosed method largely reduces the number of stalls and interruptions during playback and improves the user experience.

KEYWORDS: live streaming, streaming rate, video, audio, smart control, playback speed.

BACKGROUND

Live streaming of digital content such as the streaming of audio, video and/or text media content over the web has been on the rise steadily as they provide users with interesting content real-time. A client device may play the streamed media received as data packets from a server or host device over a network rather than waiting for the entire content to be delivered. Streaming rate is a measure of the number of seconds of video content streamed per second. Currently, streaming rate of all the media players is assumed to be 1 so that the media player plays live streaming video with the speed of the video content. However, in reality, it's hard to guarantee

that broadcasts are received with streaming rate of 1. It is estimated that 15% of broadcasts have streaming rate < 0.95 and 15% of broadcasts have streaming rate > 1.05.

Media players on the client side may play video based on the timestamp of the video content. If the streaming rate falls below 1 feed, content to the players cannot be fed fast enough, therefore media players are guaranteed to run into stall, once in a while. For example, at a streaming rate of 0.9, the media player may see 1 second of stall in every 10 seconds. This means that the broadcasting device is providing more data than the media player can consume in real-time. The player's head would continue falling behind until it runs outside of the data range of the available timeline and dies. Depending on the streaming rate, the media players could be running into stall frequently. Accordingly, there is a need to regulate the data packet flow or live stream to overcome playback glitches or breaks when the streaming rate is altered.

DESCRIPTION

A system, method, and computer readable media for automatically varying the playback speed of live media content to match the measured streaming rate is disclosed. The disclosed system overcomes the issue of playback glitches or breaks when the streaming rate is altered. The system, as illustrated in FIG. 1, may include one or more of live stream source devices, a host device or server, and a client playback device connected through a network.

The live stream device may include built-in camera functionalities for relay of a live feed including video and audio data. Any suitable live stream source device such as a mobile phone or a laptop with a camera may be used for generating a live feed. The live stream device may be associated with an individual or entity that is responsible for creating the stream. The individual may be a user of an online system such as a social networking system. Similarly, the client device may be associated with users of the online system. The online system may be accessed

through a device application. The devices may include suitable encoders, decoders, means to encapsulate the encoded data as packets, a transmission protocol to transmit the packets through a network, and a play-out buffer to direct packets in the right order and to buffer enough data for the decoder. The device application may be installed in the device or an application actuated via a hyperlink on a browser page. In a typical scenario, multiple user devices may be able to send (broadcast) and receive (view) live streams via the online system. The live stream device may encode the video and audio of the live stream and send the encoded live stream through the network to a server or host device to be transmitted to one or more client devices. The server may transmit it to a client device for consumption.
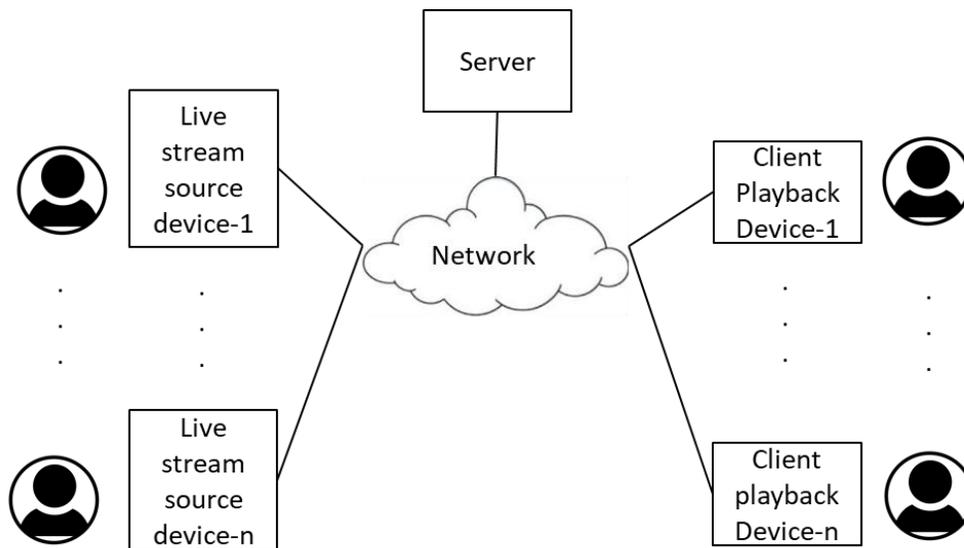
FIG. 1: System for automatically varying the playback speed to match the measured streaming rate in a live streaming system

The method includes running an application configured to display an interface for accessing the built-in camera functionalities and for posting live feeds to the online system. The application may live stream the video to the online system at a rate R. The online system is accessed by one or more connected client devices for streaming the video at a rate R. The

method further includes running a smart speed control module associated with the live feed media player. The smart speed control module is configured to keep the media player head close to the most live data based on measurements of the streaming rate. When the streaming rate changes from R, the smart speed control module automatically changes the playback speed to compensate for the changes to the streaming rate. In one instance, the method includes limiting the rate of speed change (acceleration) and the allowed maximum percentage of speed change when compensating for the streaming rate changes to make the playback changes less noticeable.

In one example, the user devices are connected over a network in a video call. The receiver device streams the data at a rate of 0.9. If the streaming rate changes from 0.9 to 1.2 in 1 second, the smart speed controller in the smart speed control module may adopt the playback speed from 0.9 to 1.1 in 5 seconds to make the playback speed changes less noticeable.

The proposed system, method and computer readable media regulate the data packet flow or live stream smoothly to overcome playback glitches or breaks when the streaming rate is altered while ensuring the changes to playback speed are not noticeable. The disclosed method largely reduces the number of stalls and interruptions during playback and improves the user experience.