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Customizable Surround Lighting for Media Content Using Precoding

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Customizable Surround Lighting for Media Content Using Precoding

ABSTRACT

This disclosure describes techniques to provide surround light to enhance a media viewing experience. Lighting parameters such as color and brightness of lights installed in a media viewing room are automatically adjusted based on the media content being viewed to provide an immersive viewing experience. The media content is encoded based on predefined protocols. The encoding includes light parameters that can be mapped to the available lights in the room. Various light groups can be defined and automatically controlled to provide lighting appropriate to the portion of the content being viewed. In this manner, the described techniques can provide a uniform user experience across households or even commercial settings of various shapes and sizes.

KEYWORDS

- Ambient light
- Smart light
- Surround sound
- Immersive viewing
- Media encoding
- Media playback
- Light group
- Light intensity
- Light color
- Light brightness

BACKGROUND

Surround sound systems are utilized to enhance viewing experience when watching media content, e.g., movies, shows, etc. While surround sound systems help create a more immersive experience, their effect is limited to audio, and the visual experience is still only confined to the display. Controlling the color and brightness of lights in a room where the movie is being watched can create an even more immersive experience.

DESCRIPTION

This disclosure describes techniques for implementing surround light systems to enhance a media viewing experience. Per techniques of this disclosure, parameters such as color and/or brightness of lights installed in a media viewing room are adjusted based on the media content being viewed to provide a more immersive viewing experience. Similar to how subtitles and audio are mapped to specific timestamps (or frames) of the media content, the media content is encoded based on predefined protocols whereby parameters of the lights in a room are mapped to various scenes within the media content such as a movie or show.

The system is configurable and enables calibration of delays and/or lags in the control of lights based on the lighting installation in a particular viewer's room. For example, the time offset between a scene in the media content and the time for the lights to change can be calibrated. Information of the light parameters can be signaled by pre-encoding the light information into the media, thereby eliminating the problem of lag completely since the light information for a particular scene is provided to the available lights before the scene occurs in the media playback.

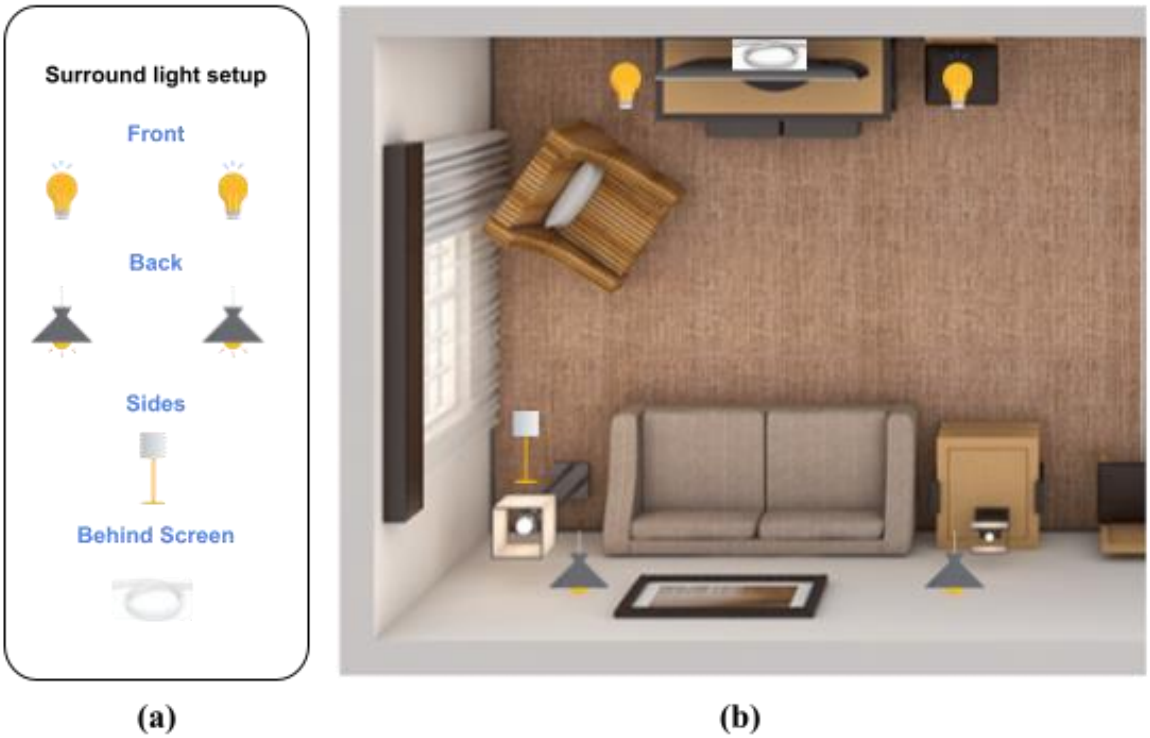
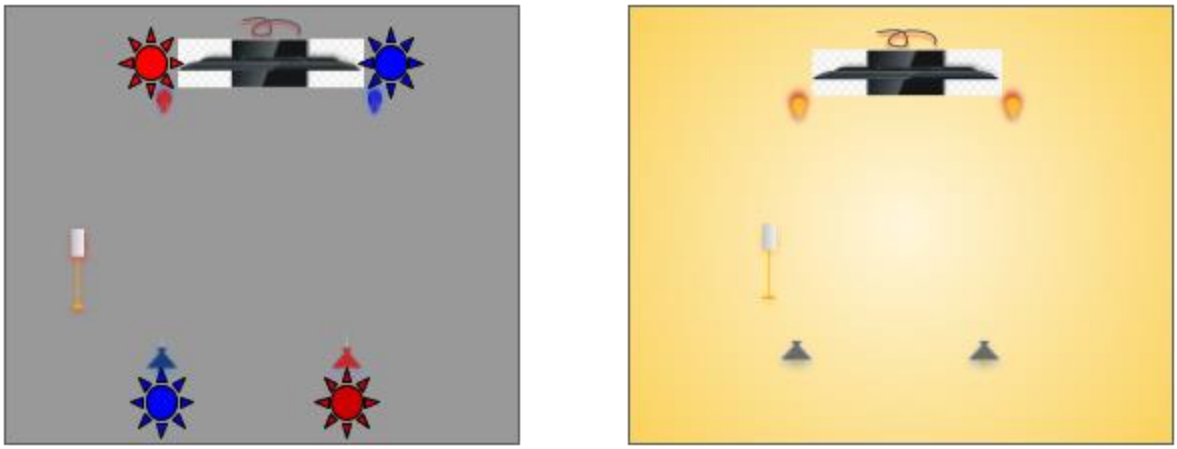


Fig. 1: Surround light setup

Fig. 1 depicts an example surround light setup, per techniques of this disclosure. Fig. 1(a) depicts an example user interface that can be used to set up various lights that are distributed throughout a room. Fig. 1(b) depicts a top view of an example arrangement of light in the room. In this illustrative example, the arrangement includes a behind-screen light, a side light, and a set of front lights and back (e.g., behind the viewer) lights.

The light parameters, e.g., color, brightness, etc., of the different lights for particular scenes can be predefined and be based on creative input from the original content creators and/or media houses. In some scenarios, the light parameters may be defined by third parties, in a manner similar to how movies are dubbed or subtitled. The lights are automatically adjusted based on the scene being displayed.



(a) (b)

Fig. 2: Room lighting can be adjusted based on particular scenes

Fig. 2 depicts examples of surround room lighting that is based on a particular scene, per techniques of this disclosure. In an illustrative example, depicted in Fig. 2(a), a scene that depicts police cars, sirens, and a police car chase can cause red and blue colors to rotate through the room, while the room is darkened. In another illustrative example, depicted in Fig 2(b), a sunset scene in the media can be accompanied by the lights in the room providing a sunset hue with a gradient, with different color variations for the front, mid and back sections and creating a more natural gradient across the room. Similarly, a thunderstorm scene in a movie can be accompanied by back, front. and side lights flickering at different times and/or intensity.

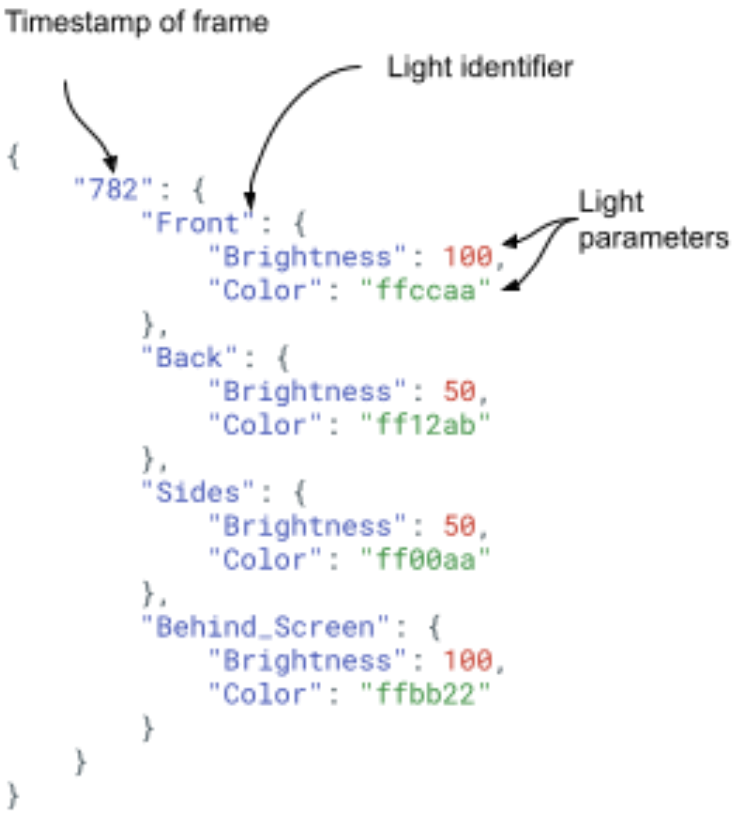


Fig. 3: Light parameters such as color and brightness are pre-coded for the scene

Fig. 3 depicts an example precoding of light parameters for surround light systems, per techniques of this disclosure. Scenes in the media content, identified by a timestamp or frame are pre-coded such that particular lights are identified and their parameters for the scene are defined. The definitions can include light groups, e.g., behind-screen, front, side, back, etc. The pre-coded light parameters are mapped to those groups. This can provide a uniform user experience and can be predictable across households or even commercial settings of various shapes and sizes.

The described techniques can be applied to a variety of media content such as movies, streaming video, user generated media content, etc., and can also be integrated with smart home and smart speaker systems. Specific hardware can be designed to integrate surround lights and

surround speakers. The encoding techniques can also be extended to virtual and augmented reality devices.

CONCLUSION

This disclosure describes techniques to provide surround light to enhance a media viewing experience. Lighting parameters such as color and brightness of lights installed in a media viewing room are automatically adjusted based on the media content being viewed to provide an immersive viewing experience. The media content is encoded based on predefined protocols. The encoding includes light parameters that can be mapped to the available lights in the room. Various light groups can be defined and automatically controlled to provide lighting appropriate to the portion of the content being viewed. In this manner, the described techniques can provide a uniform user experience across households or even commercial settings of various shapes and sizes.

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