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Spatial Routing of Computer Sounds based on Window Location

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ABSTRACT

In certain contexts, e.g., a multi-monitor setup or a large external monitor connected to a laptop, it can be difficult for users to locate an application window that generated a notification sound. If the user has many windows of the application open, the user needs to review multiple windows to identify the source of the sound. This disclosure describes techniques that make it quicker and easier for users to locate the window of the application that generated a notification sound. With user permission, the screen coordinates of each window of an application on the screen are determined. When a particular window of the application causes a notification sound to be generated, the sound is be played only via the left or the right speaker (or the combination with appropriate weighting), corresponding to whether the particular window is placed on the left or right side of the screen.

KEYWORDS

- Window location
- Window position
- Screen coordinates
- Notification sound
- Notification alert
- Dual monitor
- Multi-monitor setup
- Large display
- Spatial audio

BACKGROUND

Many computer users have multiple monitors or a single large monitor. Such a setup that provides a large amount of screen real estate enables the user to arrange windows in different places across the desktop. These can be windows of different applications, or different windows of the same application. For instance, a user may choose to separate work and personal chat windows by placing them on different screens in a multi-monitor setup or on different sides of the desktop on a single monitor.

Notifications of various events, such as incoming messages in chat applications, are provided by generating a specific sound. When different windows of an application are spread across a large screen area, the user can find it confusing to determine which of the several windows of the application caused the notification sound. In such cases, the user needs to locate each of the application windows on the screen and check it to see if it was the one connected to the notification sound. This is a slow and inconvenient process.

DESCRIPTION

This disclosure describes techniques that make it quicker and easier for users to locate the window of the application that generated a notification sound. With user permission, the screen coordinates of each window of an application on the screen are determined. When a particular window of the application causes a notification sound to be generated, the sound is be played only via the left or the right speaker (or the combination with appropriate weighting), corresponding to whether the particular window is placed on the left or right side of the screen.
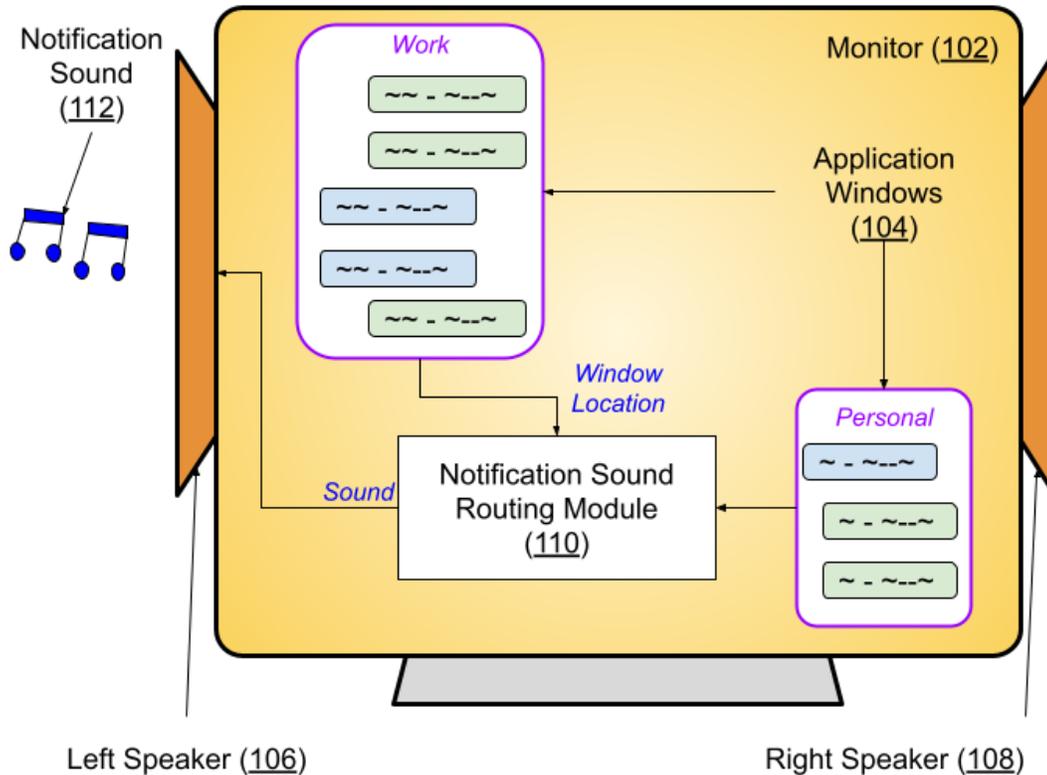
Fig. 1: Routing notification sound to a speaker based on window location on screen

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A user has multiple windows of a chat application (104) open on a large monitor (102) connected to a computer. The window in the left area of the screen is for work messages while the one in the right area of the screen is for personal messages.

With user permission, when an incoming work message results in a notification sound from the window connected to work chat, the location of the window is determined and provided to a module that determines how the sound should be routed (110). Since the window is on the left on the screen, the sound (112) is played via the left speaker (106), with no sound played via the right speaker (108). The notification sound playing from the left speaker indicates to the user that it was caused by the window on the left, thus eliminating the need to check multiple windows to identify the one that generated the sound.

Alternatively, or in addition, users can be provided with a setting for specifying the speaker(s) that are to be used to play the notification sounds generated by a specific application window. For example, such a setting can be used when an application does not have access to the needed size and position information for a window on screen.

In a dual-screen setup, the techniques can be implemented to route notification sounds from windows on the monitor placed to the left to the left speaker and those from the monitor on the right to the right speaker. The techniques can work similarly when the notification sound is output via headphones rather than speakers. The module for routing the notification sounds to the appropriate speaker(s) can be implemented within the application or can be provided by the device operating system.

The described techniques can support any application, such as web browsers, messaging applications, etc., that generates notification sounds on any operating system. Implementation of the techniques makes it easier and faster to find application windows connected to notification sounds and enhances the user experience (UX) of notifications, especially in a multi-monitor setup with large screen real estate or one or more external monitors connected to a laptop.

Further to the descriptions above, a user is provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's monitor setup, applications that generate notifications, or a user's preferences), and if the user is sent content or communications from a server. In addition, certain data are treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the

user. Thus, the user has control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques that make it quicker and easier for users to locate the window of the application that generated a notification sound. With user permission, the screen coordinates of each window of an application on the screen are determined. When a particular window of the application causes a notification sound to be generated, the sound is be played only via the left or the right speaker (or the combination with appropriate weighting), corresponding to whether the particular window is placed on the left or right side of the screen.