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Game Controller Power Optimization Based On Hold Detection

Shantanu Goel

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ABSTRACT

This disclosure describes a game controller that can transition to suitable power states based on detection of whether it is being held by a user. Per techniques of this disclosure, the game controller includes touch sensors that can detect user touch and can transition to a suitable power mode based on the detected state. Upon detection that the user has let go of the game controller (both arms of the controller), the controller is automatically placed into low power mode, and is woken up upon detection of the controller being held. Optionally, an intermediate power state can be utilized such that the game controller is still connected to the game console but at reduced power consumption relative to a normal waking state.

KEYWORDS

- Hold detection
- Touch sensor
- Game controller
- Game console
- Idle mode

BACKGROUND

Game controllers are automatically switched into a low power state or turned off upon detection of an idle state in which a game controller is detected to be not in use. For example, the game controller is configured to be switched off or placed in a low power state if no button press and/or controller motion is detected for a specified time duration. A subsequent button press by the user is an indicator commonly utilized to wake up the game controller to enable the user to start playing again. This can lead to unnecessary power consumption or battery usage when the

user is not playing actively, but the game controller is not put in the low power state due to the specified time duration not having elapsed. Further, the latency to wake up the device upon a button press to bring the controller based into use can lead to a diminished user experience.

DESCRIPTION

This disclosure describes a game controller that can transition to suitable power states based on detection of whether the game controller is being held by a user. Per techniques of this disclosure, the game controller includes touch sensors that can detect the presence or absence of user touch and can automatically transition to a suitable power mode based on the detected state.

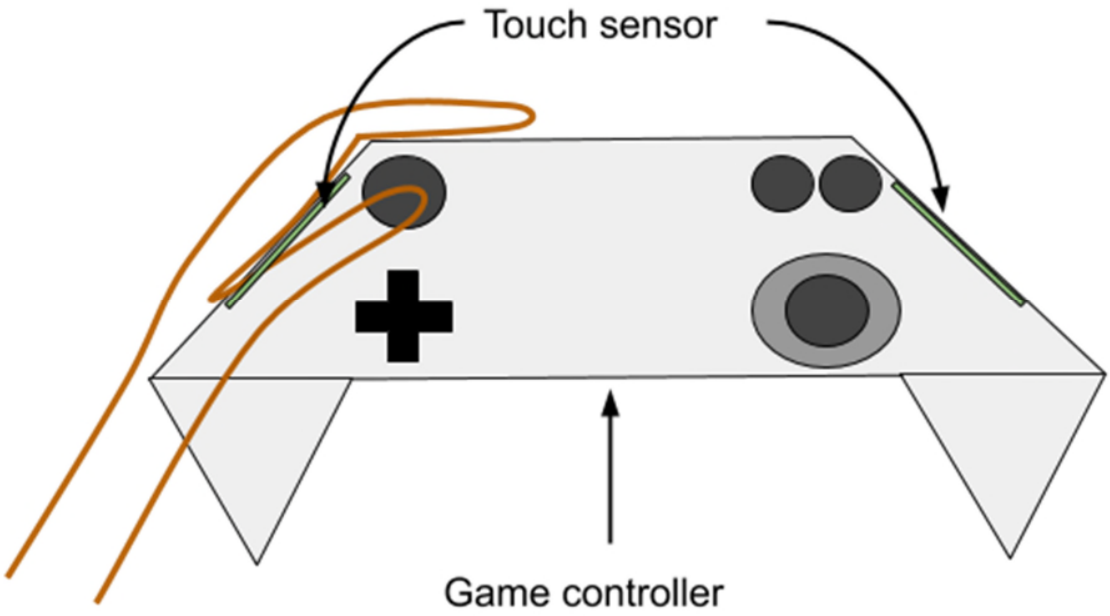

Fig. 1: A controller power mode is based on user hold detection

Fig. 1 depicts an example game controller that utilizes user hold detection via touch sensing, per techniques of this disclosure. As depicted in Fig. 1, touch sensor(s) are included in the arms of the game controller. The touch sensors are utilized to determine whether the user is holding the controller (with one or both hands). The touch sensors can use capacitive touch

sensing or other suitable technology. For example, a touch sensor can be based on electrical connectivity, e.g., by utilizing closely parallel metal rings placed such that an electrical circuit is closed when touched by a user's hand(s).

Upon detection that the user has let go of both game controller arms (e.g., which occurs when the user puts down the game controller), the game controller is placed into low power mode, thus reducing battery usage. At a time when the user wants to play again, the game controller is placed in a wake (normal power) mode as soon as it is detected that the controller is being held. This reduces latency when resuming use of the game controller.

Techniques of this disclosure can reduce game controller power consumption in situations when the user is looking at the screen but not actively playing a game, e.g., watching a movie via a game console, watching a long cutscene in a game while placing the controller down, etc. In some implementations, an intermediate power state can be utilized such that the game controller is still connected to the computing device/game console (e.g., to prevent pausing of the game due to powering the controller down completely), but reduces power consumption relative to a normal waking state. In some implementations, sideband signaling between the game controller and game console/computing device can be utilized to confirm the game state before placing the game controller in a suitable state. The described techniques are usable for any game controller including controllers for standalone gaming consoles or for cloud-based game streaming.

CONCLUSION

This disclosure describes a game controller that can transition to suitable power states based on detection of whether it is being held by a user. Per techniques of this disclosure, the game controller includes touch sensors that can detect user touch and can transition to a suitable

power mode based on the detected state. Upon detection that the user has let go of the game controller (both arms of the controller), the controller is automatically placed into low power mode, and is woken up upon detection of the controller being held. Optionally, an intermediate power state can be utilized such that the game controller is still connected to the game console but at reduced power consumption relative to a normal waking state.