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## INTEGRATION OF ACTUATORS AND SENSORS IN VEHICLE INTERIORS FOR PASSIVE OR INTERACTIVE AUDIO BOOKS

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## INTEGRATION OF ACTUATORS AND SENSORS IN VEHICLE INTERIORS FOR PASSIVE OR INTERACTIVE AUDIO BOOKS

### **Technical task:**

The technical solution incorporates vehicle functions such as actuators and sensors for audio book playback to create an immersive experience while driving.

### **Initial situation:**

Audio books have long been a popular alternative to reading books because, among other things, they can be consumed in parallel with other activities. They are therefore also suitable for use in the vehicle while driving. Recently, more and more interactive audio books have been published, which run on smart speakers, such as Amazon Alexa, and involve the listener in the action by asking specific questions about the next step. The answers to the questions influence the path of the story in the audio book. Pure audio playback can be boring on long journeys. Especially in level 3 vehicles, where the role of the driver is present but less demanding, this can negatively influence the overall experience of the ride. This may also apply to a similar extent to interactive audio books that are played in the vehicle. The invention listed below differs from the already existing patent application DE102018208774A1 in that it specifically relates to active and passive audio books, runs in the vehicle itself rather than in an external control device, describes a format which links media content with specific control signals to actuators and also enables the use of elements in the vehicle to interact with reproduced content and thereby e.g. influence the action in the audio book.

### **Solution:**

The listening experience is made more interesting by incorporating various elements in the vehicle interior when playing the audio book. The elements are activated or deactivated in accordance with the events described in the audio book in order to convey the current situation more intensively. These can be elements that the occupants experience actively or passively.

### **Advantages:**

Through the described, accompanying control, the experience of the audio book is amplified and made more immersive, making the journey less monotonous. At the same time, the driver's attention can remain focused on the traffic situation.

### **Possible application:**

The MMI offers the driver the option of choosing from a range of audio books, which can be downloaded online or streamed on-demand. The audio books are stored in a special format. It contains the soundtrack and the corresponding control commands to various elements in the vehicle interior to achieve a specific effect. In the case of an interactive audio book, an additional program evaluates the stored action paths and asks the appropriate questions. Depending on the answer, the user is told the next action path. The following possibilities result from the synchronized coupling of audio data and control commands:

#### *Integration of the rotary pushbutton*

The integration of the rotary pushbutton is particularly conceivable for interactive audio books in order to offer - in addition to answering decision questions - an additional interaction possibility without having to take the driver's attention off the road.

##### Example 1

Audio book: "Look, Lilly. There's a knob! I wonder what it does."

User: \*Turn the knob\*

Audio book: \*There is a sound that corresponds to the rotation \*

Audio book: "There's a gate opening!"

##### Example 2

Audio book: "The room is full of voices. It is hard to tell them apart! <Pause>"

Users: \*turn the rotary pusher\*

Depending on the direction of rotation, a different tone comes to the fore from the babble of voices.

#### *Integration of the air conditioning*

The air conditioning is used to underline the scenery just described in the audio book, if necessary.

##### Example

Audio book: "Tim and Lilly went into the room. "Why is it so cold in here?" moaned Lilly.

Vehicle: \*Inside the car, the air conditioning system turns on and cools down\*

#### *Integration of the seat massage*

The massage function built into the seat is used for an immersive listening experience.

##### Example

Audio book: "And so Lilly swam through the water. She was still thinking about her conversation with Tim."

Vehicle: \*The massage seat turns on and simulates a smooth wave motion\*

#### *Integration of seat heating or cooling*

The heating or cooling ventilation built into the seat is used for an immersive listening experience.

##### Example 1

Audio book: "Tim and Lilly snuggled up and warmed themselves by the crackling fire."

Vehicle: \*The seat heater turns on\*

##### Example 2

Audio book: "Tim hurried up the stairs and stepped onto the observation deck. A cool breeze welcomed him."

Vehicle: \*The seat cooler will turn on\*

#### *Integration of the seat occupancy sensors*

By evaluating the seat occupancy sensors, an interactive audio book specifically asks different people in the vehicle about the next step.

##### Example

Audio book: "Lilly froze in shock. Would you, dear passenger in the back on the left, like Lilly to run or attack?"

#### *Integration of ambient lighting*

The ambient lighting installed in the vehicle interior can be controlled by selective activation of the Done in the audio book underline.

##### Example

Audio book: "The door opens! A creepy, pulsating green light fills the room!"

Vehicle: \*The ambient lighting switches to green and pulsates\*

#### *Integration of the loudspeakers*

In the vehicle interior, loudspeakers are usually placed at different locations.

This placement is used to emphasise the events in the audio book.

##### Example

Audio book: "'Stop!' Heard Lilly from the right corner of the hall."

Vehicle: "Stop" is played from the loudspeaker at the rear right.

#### *Integration of the infotainment display*

Graphics described in the audio book are displayed on the infotainment display to accompany the events in the audio book. To minimize potential distraction, the display is limited to simple symbols.

##### Example

Audio book: "Hey look! What's that symbol?"

Vehicle: \*The MMI display shows the simple symbol\*

Furthermore, the display and its input option is used to present small puzzles at certain points, which have to be solved for the progress of the audio book. This option is only used if a passenger has been detected by the seat occupancy sensor system.

##### Example

Audio book: "Tim was at a loss. Quick! Can you - dear passenger - help Tim solve the puzzle? You can find it on the infotainment display. You only have 30 seconds before the gate closes again!"

#### *Integration of the perfume*

Some luxury class vehicles have the option of perfuming the interior.

This is also used to underline the events described in the audio book.

##### Example

Audio book: "When he hugged Lilly, her wonderful perfume rose into his nose. It smelled of the summer he missed so much in his new home."

Vehicle: \*In the vehicle the perfume is activated\*