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Embossed audio tag activated by touch

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ABSTRACT

This disclosure describes techniques to affix an embossed pattern on an object such that when the pattern is scratched over by a hard object such a coin, pencil, or fingernail, a distinctive sonic signature is emitted. The sonic signature can be used, e.g., by a virtual assistant application, a smart speaker, or other device, to identify the object.

KEYWORDS

- Audio tag

- QR code

- Bar code

- Sonic signature

- Embossed code

- Embossed pattern

- Smart speaker

- Virtual assistant

- Object identification

BACKGROUND

Audio-based techniques to identify objects are advantageous in some situations, e.g., to identify an object by screen or scanner-free devices such as devices that provide virtual assistant applications, e.g., smart speakers. Many such devices may lack a visual sensor, e.g., a camera.
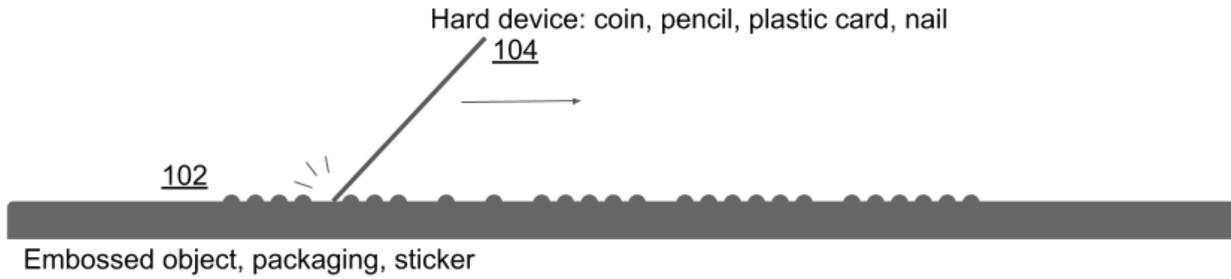
DESCRIPTION

Hard device: coin, pencil, plastic card, nail
104

102

Embossed object, packaging, sticker

Fig. 1: Side view of an embossing with a pattern of ridges

Fig. 1 illustrates a side view of an embossing that can be affixed to an object in order to identify the object. The embossing has a series of bumps or ridges (102) spaced in a unique manner. Alternately, the embossing can have a series of grooves, or a series of bumps and grooves, spaced in a unique manner. The embossing can be manufactured in the form of a sticker that can be affixed on an object or its packaging.

When a hard object (104), e.g., a coin, credit card, pencil, fingernail, etc., is drawn over the pattern of ridges in the embossing, the resulting sound has a distinct sonic signature. The sonic signature can be used to identify the object, e.g., by a virtual assistant application or another application executing on a device such as a smart speaker or other device.
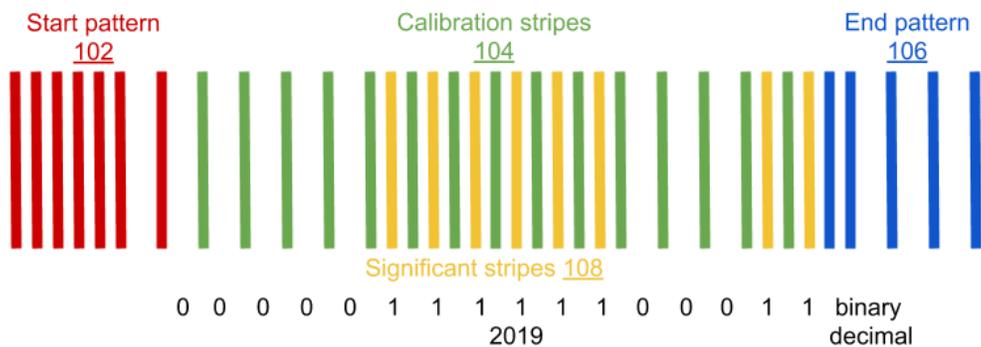
Start pattern
102

Calibration stripes
104

End pattern
106

Significant stripes 108

0 0 0 0 0 1 1 1 1 1 1 0 0 0 1 1 binary decimal
2019

Fig. 2: Top view of embossing

Fig. 2 illustrates a top view of the embossing. The ridges are illustrated in color for visual clarity, but in actual implementation, they need not be colored. An initial sequence of ridges, the start pattern (102), is used to trigger audio recognition by the virtual assistant application. The spacing between the ridges of the start pattern establishes the tempo of the emitted sonic signature. A final sequence of ridges (106) signifies the end of the pattern. The start pattern and end pattern are selected such that the sonic signature can be recognized regardless of whether the embossing is scratched from left to right or from right to left. To prevent accidental activation of the virtual assistant application, the start and end patterns can be designed to be dissimilar to an activation or wake word of the virtual assistant application.

Equi-spaced stripes (104), illustrated in green, serve as calibration stripes, e.g., time-markers in the sonic signature. These are uniformly present between the start and the end patterns, and are similar in function to carrier waves in wireless communication. Stripes illustrated in yellow (108) serve as significant, e.g., information-bearing, stripes, and may appear between the calibration stripes. When present, a significant stripe translates to a bit-value of 1. When absent, a significant stripe translates to a bit-value of 0.

There are numerous ways to affix the embossing onto an object. For example, the embossing can be directly embedded on the surface of the object, similar to injection-molded plastic or engraved metal. Alternatively, the embossing can be in the form of a sticker that can be glued to the object.

The embossing can be made part of the packaging of a product. For example, pharmaceuticals, products in small size packaging, etc. can be identified by affixing the embossing on their package. Since information on such packaging is often difficult to read, a

user can more easily scratch over the embossing to activate a virtual assistant application to provide greater information about the product.

There are numerous applications of the audio tag that emits a sonic signature. For example, a user can scratch an embossed object to get more information about the object via a virtual assistant application. Items for sale in a store can be audio-tagged using these techniques, similar to barcodes or QR codes, such that a customer can easily pull up pricing information or do other research prior to purchase. Once the virtual assistant application identifies the object, with user permission, it may launch specific content or applications, initiate a conversation with the user, or perform other actions based on information included within the audio tag.

The audio-tagging techniques described herein require no additional hardware aside from an audio receiver and a speech recognizer, as are already provided in virtual assistant applications available on smartphones, smart speakers, and other devices. There is little or no cost to embossing audio tags to objects. Being simple and intuitive to use, there is no need to educate the end-user as to the usage of audio tags.

Further to the descriptions above, a user may be 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 social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be 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, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of

a user cannot be determined. Thus, the user may have 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 to affix an embossed pattern on an object such that when the pattern is scratched over by a hard object such a coin, pencil, or fingernail, a distinctive sonic signature is emitted. The sonic signature can be used, e.g., by a virtual assistant application, a smart speaker, or other device, to identify the object.