SYSTEMS AND METHODS FOR PROVIDING A TONE EMITTING DEVICE THAT COMMUNICATES DATA

CROSS REFERENCE

[0001] This application claims the benefit of U.S. Provisional Application Serial Number 62/529,296, filed on July 6, 2017, which is incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments described herein generally relate to systems and methods for utilizing tones to communicate information and, more specifically, to systems and methods for communicating data with a tone-emitting device.

BACKGROUND

[0003] While many advertisers, academic institutions, retailers, healthcare institutions, philanthropy institutions, payment instructions, etc. wish to reach consumers and improve the services they provide, many current technologies do not allow for such advancement. As an example, if a consumer visits a retail establishment, there is often difficulty locating products and paying for those products due to the inefficiencies of utilizing existing bar code technology. Similarly, tracking products, individuals, and/or other objects is often difficult, thus making inventory management, student participation, etc. difficult to manage.

SUMMARY

[0004] Embodiments disclosed herein generally relate to systems and methods for communicating data with a tone-emitting device. In one aspect, there is disclosed a method for communicating data related to a characteristic of a patient or visitor to a medical facility with a tone-emitting device wherein the characteristic includes at least one of the identity of the patient or visitor, the location of where the patient or visitor is to be, facility access for the patient or visitor, or medical details of the patient or visitor, includes receiving, by a tone-determining computing device of the tone-emitting device, data related to a characteristic of a patient or visitor and encoding, by the tone-determining computing device, an inaudible tone that represents at least a portion of the data. The method further includes sending instructions by the tone-

determining computing device, to a tone-emitting speaker of the tone-emitting device for outputting the inaudible tone and detecting, by virtue of a communication device the inaudible tone communicated from the tone emitting device and decoding the inaudible tone and determining the data encoded therein in the event of an authorization input to the communication device from an authorized user.

[0005] In another aspect, there is disclosed a system for communicating data related to a characteristic of a patient or visitor to a medical facility with a communication device by virtue of an inaudible tone, wherein the characteristic includes at least one of the identity of the patient or visitor, the location of where the patient or visitor is to be, facility access for the patient or visitor, or medical details of the patient or visitor, the system comprising: a tone-emitting device includes a tone-emitting speaker for emitting the inaudible tone and a tone-determining computing device communicatively coupled to the tone-emitting speaker. The tone-determining computing device includes a non-transitory computer-readable medium that stores logic that, when executed by the tone-determining computing device, causes the tone-determining computing device to perfom at least the following: receive data related to the characteristic of the visitor, encode the inaudible tone that represents at least a portion of the data and send instructions to the tone-emitting speaker for outputting the inaudible tone; the system further comprising a communication device for receiving the inaudible tone, the communication device arranged to receive an authorization input from an authorized user in response to receipt of the inaudible tone, and in the event of receipt of an authorization input the communication device is further arranged to decode the inaudible tone to determine the data.

[0006] In yet another embodiment, a system for communicating an inaudible tone includes a tone-emitting device. The tone-emitting device includes a tone-emitting speaker for emitting an inaudible tone and a tone-determining computing device communicatively coupled to the tone-emitting speaker. The tone-determining computing device includes a non-transitory computer-readable medium that stores logic that, when executed by the tone-determining computing device, causes the tone-determining computing device to perform at least the following: receive data related to a characteristic of an object, encode an inaudible tone that represents at least a portion of the data and send instructions to the tone-emitting speaker for outputting the inaudible tone.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The embodiments set forth in the drawings are illustrative and exemplary in nature and not intended to limit the disclosure. The following detailed description of the illustrative embodiments can be understood when read in conjunction with the following drawings, where like structure is indicated with like reference numerals and in which:

[0008] FIG. 1 depicts a computing environment for communicating data with a tone-emitting device, according to embodiments described herein;

[0009] FIGS. 2A, 2B depict a tone-emitting shelf label, according to embodiments described herein;

[0010] FIGS. 3A, 3B depict a tone-emitting self-adhesive label, according to embodiments described herein;

[0011] FIGS. 4A, 4B depict a tone-emitting fob, according to embodiments described herein;

CLAIMS

What is claimed is:

1. A method for communicating data related to a characteristic of a patient or visitor to a medical facility with a tone-emitting device wherein the characteristic includes at least one of the identity of the patient or visitor, the location of where the patient or visitor is to be, facility access for the patient or visitor, or medical details of the patient or visitor, comprising:

receiving, by a tone-determining computing device of the tone-emitting device, data related to a characteristic of the patient or visitor;;

encoding, by the tone-determining computing device, an inaudible tone that represents at least a portion of the data;

sending instructions by the tone-determining computing device, to a tone- emitting speaker of the tone-emitting device for outputting the inaudible tone;

detecting, by virtue of a communication device the inaudible tone communicated from the tone emitting device and decoding the inaudible tone and determining the data encoded therein in the event of an authorization input to the communication device from an authorized user.

2. The method of claim 1, wherein encoding the inaudible tone further comprises:

selecting sounds corresponding to at least one pair of non-naturally occurring frequencies in a range between about 15 kHz and about 25 kHz;

assigning the sounds corresponding to the at least one pair of frequencies a unique character;

arranging the sounds to form the inaudible tone comprising a sequence of the unique characters; and

packaging the at least a portion of the data with the inaudible tone.

3. A system for communicating data related to a characteristic of a patient or visitor to a medical facility with a communication device by virtue of an inaudible tone, wherein the characteristic includes at least one of the identity of the patient or visitor, the location of where the patient or visitor is to be, facility access for the patient or visitor, or medical details of the patient or visitor, the system comprising:

a tone-emitting device comprising:

a tone-emitting speaker for emitting the inaudible tone;

a tone-determining computing device communicatively coupled to the tone- emitting speaker and comprising a non-transitory computer-readable medium that stores logic that, when executed by the tone-determining computing device, causes the tone-determining computing device to perform at least the following:

receive data related to the characteristic of the visitor;

encode the inaudible tone that represents at least a portion of the data; and

send instructions to the tone-emitting speaker for outputting the inaudible tone;

the system further comprising a communication device for receiving the inaudible tone, the communication device arranged to receive an authorization input from an authorized user in response to receipt of the inaudible tone, and in the event of receipt of an authorization input the communication device is further arranged to decode the inaudible tone to determine the data.

4. The system according to claim 3, wherein the communication device includes a memory component storing at least detection logic configured to detect the inaudible tone communicated from the tone emitting device and analyzing logic for decoding the inaudible tone and determining the data encoded therein.

5. The system of claim 3, wherein the non-transitory computer-readable medium stores logic that, when executed by the tone-determining computing device, causes the tone- determining computing device to encode the inaudible tone by:

selecting sounds corresponding to at least one pair of non-naturally occurring frequencies in a range between about 15 kHz and about 25 kHz;

assigning the sounds corresponding to the at least one pair of frequencies a unique character;

arranging the sounds to form the inaudible tone comprising a sequence of the unique characters; and

sending the at least a portion of the data with the inaudible tone.

6. The system of claim 3 further comprising:

a remote computing device for receiving the data from the tone-emitting device, the remote computing device comprising:

a receiver for receiving the inaudible tone;

an output device for outputting data to a user; and

a memory component that stores logic that, when executed by the remote computing device, causes the remote computing device to:

receive the inaudible tone from the receiver;

decode the data and associated metadata encoded in the inaudible tone; and

provide an output related to the data through the output device;

and optionally wherein the remote computing device includes at least one of the following: a cellular communication device, a user computing device, or a stationary device operated by a third party for reporting the data to the remote computing device;

and/or wherein the tone-emitting device further comprises:

an accelerometer communicatively coupled with the tone-determining computing device, and wherein the tone-emitting speaker outputs the inaudible tone in response to detecting presence of the remote computing device within a certain range of distance of the tone-emitting device.

7. The system of claim 3, wherein:

the tone-emitting device is configured as a mobile device; and

the data includes identity and location of the patient or visitor when the patient or visitorenters a predetermined location.

8. The system of claim 7, wherein:

the mobile device is a bracelet worn by the patient or visitor and the patient or visitor is a medical patient

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