

System for providing messages to a user of a refuse container

Description

The invention relates to a system for providing messages to a user of a refuse container, comprising a refuse container having an electronic control unit, which unit comprises a first communication interface for sending and receiving data, and said system comprising a server, which comprises a second communication interface, an authentication manager and a database.

Large refuse containers used by multiple households are often provided for disposing of household waste. Refuse containers of this kind may, for example, belong to a housing community or to a commune. In general, only registered users are intended to have access to refuse containers of this kind, it being possible to block access for example if disposal fees have not been paid. Such access can be granted by means of a wide variety of electronic systems. It is known from the prior art, for example, that a user is allocated an identification code. This identification code is input, for example, via a numeric keypad arranged on the refuse container. The corresponding authentication process is either performed by a local control unit in the refuse container or via a central server connected to the local control unit of the refuse container. After authentication, the refuse container is then temporarily opened and the user can dispose of his waste.

Furthermore, it is important to a wide range of authorities to provide the members of a housing community or commune with a wide variety of information, for example in relation to waste disposal. In general, information of this kind is provided by means of notices, newsletters, or the like. However, notices or newsletters of this kind are often ignored or are lost.

The object of the present invention is thus to provide a system which provides effective provision of information to a user of a refuse container.

5 This object is achieved by a system for providing messages to a user of a refuse container, comprising a refuse container having an electronic control unit, which unit comprises a first communication interface for sending and receiving data, and said system comprising a server, which comprises a second communication interface, an authentication manager and a database. Said system is characterised in that a transfer of identification data between the
10 first communication interface and a third communication interface of a communication apparatus can be initiated before the refuse container is used, the authentication manager assigning user data from the database to the identification data and making said user data available to an information provider, after which the information provider sends an information message for the user to the communication apparatus.

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Preferably, the identification data can be supplied to the authentication manager via the second communication interface of the server. By means of the system according to the invention, the user uses a communication apparatus for authentication, which apparatus is simultaneously designed to receive information messages. Information messages can therefore
20 be delivered to the user of the refuse bin in a simple, direct and effective manner, immediately at the point of or after opening. Furthermore, the user neither has to memorise an identification code, nor carry with him an additional electronic apparatus for opening the refuse bin.

Preferably, the communication apparatus is a portable data-processing apparatus comprising
25 a display device, for example a mobile telephone, a smartphone, a tablet or a laptop. Of course, the present invention is not limited to this list, and other similar data-processing apparatuses may also be considered for use. The use of mobile telephones or smartphones is so widespread that the overwhelming majority of members of a corresponding housing community or commune own a smartphone of this kind. The communication apparatus, which is
30 usually almost always at hand, is used as a means for authenticating for the use of the refuse container and also as a receiving apparatus for the corresponding information messages. Preferably, software is installed on the communication apparatus, by means of which software the user can initiate the transfer of the identification data. The information messages could, for example, appear in the form of push notifications on the communication appa-

ratus. Push notifications of this kind are messages that appear on the communication apparatus without the relevant software/app having been opened.

According to a preferred embodiment, the transfer of identification data between the first and the third communication interface takes place via a first communication channel. Advantageously, the first communication channel uses wireless technology. NFC (near-field communication) technology or RFID (radio-frequency identification) technology is particularly preferred as wireless technology. However, it would also be conceivable to use other forms of wireless technology, such as Bluetooth or WLAN. However, compared with NFC and RFID, Bluetooth and WLAN connections have the disadvantage that the connection between two apparatuses has to be done manually by the user.

A “communication channel” should be understood to mean a transmission path, in this case for the identification data. A transmission path of this kind connects a sender and a receiver. Said sender or receiver is advantageously part of the relevant (first/third) communication interface. As a result, it is advantageous if the communication apparatus and the refuse container are equipped with a corresponding sender or receiver of the relevant technology.

NFC technology and RFID technology both use high-frequency alternating magnetic fields for the transmission of data. RFID technology generally involves so-called “connectionless” transmission. A passive transponder is used here which is supplied with power by means of the alternating field of the reader. Furthermore, NFC technology also provides the possibility of so-called “connection-oriented” transmission. In connection-oriented transmission or peer-to-peer transmission, transmission is set up between two equivalent transmitters.

Nowadays, a large number of commercially available smartphones are equipped with an NFC device. NFC technology achieves a data-transmission rate of from 106 to 424 kbit/s. The data transmission is based on a modulation of the amplitude of a high-frequency magnetic field having a standardised frequency of 13.56 MHz. Only two participants can be involved in data transmission, a so-called initiator, which acts as a sender of information, and a receiver, which receives said information.

Analogously to RFID technology, NFC technology also provides “connectionless” transmission. Transmission of this kind is often also referred to as passive transmission. In this case, only the initiator generates the high-frequency magnetic field. The receiver can transmit data

by means of load modulation. This involves energy intake from the magnetic field by means of a specially tuned resonant circuit of the receiver, to which the initiator responds.

In the case of "connection-oriented" or active transmission, both the initiator and the receiver generate a high-frequency magnetic field. Firstly, a so-called "handshake" is carried out, in which authentication takes place and in which various settings such as the optimal transmission speed are selected. Subsequently, the data exchange is carried out. On account of the authentication, this active transmission is considered to be substantially more secure than the passive transmission.

According to another preferred embodiment, the first or the third communication interface send the identification data to the second communication interface of the server via a second or third communication channel. Preferably, the second and/or third communication channel is a mobile radio connection. Preferably, the mobile radio connection is a GSM connection or a UMTS connection or a GPRS connection or an LTE connection. Of course, other connections such as radio connections, for example in the ISM band, are also considered. The second or third communication channel should also be understood to mean a transmission path for the identification data. A transmission path of this kind connects a sender and a receiver. In this case, the sender is part of the first or third communication interface, and the receiver is part of the second communication interface of the server.

It would also be conceivable for an authentication process, a confirmation process, or the like, to be implemented before/after data transmission. The first or third communication interface would then have to be designed for data reception as well. Furthermore, the second communication interface would have to be capable of sending data.

According to a preferred embodiment, the refuse container comprises a port device having a locking mechanism. Preferably, the authentication manager authenticates the user using the user data. Advantageously, after authentication, the authentication manager then sends a release signal for unlocking the locking mechanism.

Advantageously, the identification data transmitted by the first or third communication interface comprise data for identifying the user, for example an identification code, and data for identifying the corresponding refuse container, for example the location. The assigned user data can for example contain information regarding the payment of fees or the like. If the fees

have not been paid, then, advantageously, no release signal would be sent and a corresponding information message would be delivered to the user.

A release signal of this kind is preferably initially transmitted to the second communication interface. The second communication interface then sends the release signal to the third communication interface of the refuse container via a fourth communication channel. Subsequently, the release signal is delivered to the electronic control unit or the locking mechanism. Analogously to the second or third communication channel, the fourth communication channel is a mobile radio connection. The mobile radio connection is preferably a GSM connection or a UMTS connection or a GPRS connection or an LTE connection. Of course, other connections, such as radio connections, for example in the ISM band, are also considered.

The locking mechanism is preferably an electric latch mechanism. Advantageously, the information messages can be delivered to the user before or after the locking mechanism is unlocked. The port device preferably has a limited receiving volume, such that only a limited amount of waste can be thrown into the container when said container is opened once.

According to another preferred embodiment, the refuse container comprises a GPS device and/or at least one sensor device. Advantageously, the refuse container comprises a power supply for the electronic control apparatus and/or the locking mechanism and/or the GPS device and/or the at least one sensor device.

The corresponding GPS and sensor data are preferably transmitted from the first communication interface of the refuse container to the second communication interface or to the server via a fifth communication channel. The fifth communication channel is also preferably a mobile radio connection, for example a GSM connection, a UMTS connection, a GPRS connection or an LTE connection. Of course, also in this case, other connections such as radio connections, for example in the ISM band, are also considered.

The power supply is advantageously a battery. Alternatively or additionally, a solar cell or the like could also be provided.

The GPS data can advantageously be used to determine the location of the refuse container. Determining the location in this manner could be used to identify individual refuse containers.

Furthermore, the refuse container could also be easily retrieved in the event of theft or vandalism.

5 The at least one sensor device could advantageously comprise a sensor for monitoring the temperature inside the refuse container. By means of such monitoring, the occurrence of a fire in the container can be detected and reported quickly.

Furthermore, the sensor device could comprise a fill-level sensor, by means of which timely emptying can be ensured.

10 It would also be possible for the sensor device to comprise a movement sensor for detecting movements inside the refuse container. As a result, the presence of animals trapped inside, for example, could be detected.

A sensor for detecting movements of the refuse container itself or a sensor for detecting
15 forces acting on the refuse container could also be provided. By means of sensors of this kind, vandalism could be identified and reported.

Furthermore, a weight sensor could be provided which detects the weight of the waste thrown into the container. A sensor of this kind could be used to calculate the cost for the
20 user based on the weight of the waste thrown into the container. As a result, a "fair" calculation of the cost for the user would be possible.

Finally, it would also be conceivable to provide sensors which detect particular materials, such as metals, being thrown in. In a container for general waste, instances of such unper-
25 mitted materials being thrown in could therefore be detected.

The sensor data of the at least one sensor device are preferably delivered to a control unit of the server, which evaluates the data and, if appropriate, initiates further steps, for example notifying the relevant competent authorities.

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According to another preferred embodiment, the information message contains information regarding the refuse container and/or the waste thrown therein and/or the nearest refuse container. Information messages of this kind may advantageously include information relating to the GPS data and/or the sensor data of the at least one sensor device. By means of

information messages of this kind relating to waste disposal, optimal disposal of waste and/or optimal use of the refuse container can be ensured.

5 Information messages regarding waste disposal could, for example, relate to permitted materials to be thrown in and/or to the detection of unpermitted materials in the container. The user of the refuse container could also be informed of the weight of the waste thrown in and, if appropriate, of the costs incurred thereby. Furthermore, positive feedback on the recycling habits of the user (gamification) could be sent as information messages. Information messages relating to the fill level of the refuse container, the next emptying of the refuse container or the impending inaccessibility of the refuse container due to the weather, flooding, etc.,
10 would also be conceivable.

Information messages that specify the location of the nearest refuse container to which the user has authorised access would be conceivable. The location of a refuse container of this
15 kind could be shown in the form of a corresponding map displayed on the communication apparatus. Finally, the information messages could also contain information regarding opening times of the nearest waste and/or recycling centre.

However, the information message would not have to be limited to the refuse container or the
20 disposal of waste. Accordingly, the information message could preferably contain official information and/or personalised information for advertising purposes. Such official information could include information relating to the commune, such as building measures or the like. Reminders for referenda, voting or events could also be issued to the user by means of the information message.

25 Finally, the information message could contain personalised information for advertising purposes. Personalised advertising is very attractive to many businesses, since the correspondingly customised advertisements can be directed to a particular clientele. A great deal of useless advertising can thus be avoided. The user data supplied to the content provider may, for example, include the age and/or gender of the user. Said data may then be used by corresponding businesses in order to send the user advertisements that are tailored to them. Furthermore, the user data transmitted may also include the location of the user (at the refuse container). The user can therefore be sent advertisements relating solely to the local area. Advertisements of this kind could for example contain information regarding the opening of a
30 new shop in the area or regarding a special sale nearby.
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According to another preferred embodiment, the information provider is associated with the server or is an external device. Consequently, the information messages can be sent to the communication apparatus via the server. As such, the server further comprises a memory in which corresponding information messages can be stored. Alternatively or additionally, the information provider may be independent of the server. The server then advantageously makes the corresponding user data available to the information provider.

Of course, it would also be conceivable to use the described system to provide messages to a user of a recycling container, such as a paper, bottle or plastics container.

The object is also achieved by a method for providing messages to users of a refuse container, the refuse container comprising an electronic control unit having a first communication interface for sending and receiving data, said method comprising the steps of:

- initiating a transfer of identification data between a first communication interface and a communication apparatus comprising a third communication interface before the refuse container is used;
- transmitting the identification data to a server comprising a second communication interface;
- receiving the identification data by means of the second communication interface and delivering the identification data to an authentication manager of the server;
- assigning user data from a database of the server to the identification data by means of the authentication manager;
- providing the user data to an information provider;
- sending an information message for the user to the communication apparatus by means of the information provider.

Preferably, the communication apparatus using the method for providing messages is a portable data-processing apparatus comprising a display device, for example a mobile telephone, a smartphone, a tablet or a laptop. Of course, the present invention is not limited to this list, and other similar data-processing apparatuses may also be considered for use.

According to a preferred embodiment, the transfer of identification data between the first and the third communication interface is conducted via a first communication channel. Preferably,

the first communication channel uses wireless technology, for example NFC technology or RFID technology.

5 According to another preferred embodiment, the identification data are sent from the first or third communication interface to the second communication interface of the server via a second or third communication channel. Advantageously, the second and/or third communication channel is a mobile radio connection, for example a GSM connection or a UMTS connection or a GPRS connection or an LTE connection.

10 According to another preferred embodiment, the refuse container comprises a port device having a locking mechanism. Advantageously, the user is authenticated using the user data and, after authentication, a release signal for unlocking the locking mechanism is sent.

15 Advantageously, the refuse container used in the method comprises a GPS device and at least one sensor device. Preferably, the refuse container further comprises a power supply for the electronic controller and/or the locking mechanism and/or the GPS device and/or the at least one sensor device.

20 According to another preferred embodiment, the sent information message contains information regarding the refuse container and/or the waste thrown therein and/or the nearest refuse container.

Alternatively or additionally, the information message may also contain official information and/or personalised information for advertising purposes.

25 Advantageously, the information provider is associated with the server or is an external device.

30 Further advantages, aims and properties of the present invention are explained in the following description of the appended drawings. Identical components may have identical reference signs in the various embodiments.

In the drawings:

Fig.1 is an overview of the system for providing messages to a user of a refuse container;

Fig.2 is a schematic sketch of the system for providing messages to a user of a refuse container according to one embodiment;

Fig.3 is a schematic sketch of the system for providing messages to a user of a refuse container according to another embodiment;

Fig.4 is a schematic sketch of the system for providing messages to a user of a refuse container according to another embodiment;

Fig.5 is a schematic sketch of the system for providing messages to a user of a refuse container according to another embodiment.

In Fig. 1-5, a system (1) for providing messages to a user of a refuse container (2) is shown. The system (1) comprises a refuse container (2) having an electronic control unit (3), which unit comprises a first communication interface (4) for sending and receiving data, and said system comprising a server (5), which comprises a second communication interface (6), an authentication manager (7) and a database (8), it being possible to initiate a transfer of identification data (11) between the first communication interface (4) and a third communication interface (10) of a communication apparatus (9) before the refuse container (2) is used, the authentication manager (9) assigning user data (12) from the database (10) to the identification data (11) and making said user data (12) available to an information provider (13), after which the information provider (13) sends an information message (14) for the user to the communication apparatus (9).

Fig. 1 shows an overview of said system, in which the refuse container (2), the communication apparatus (9) in the form of a smartphone and the server (5) are shown.

In Fig. 2 to 5, various embodiments of the system for providing information messages to the user of the refuse container (2) are shown.

The communication apparatus (9) is a portable data-processing apparatus, for example a mobile telephone, a smartphone, a tablet or a laptop, and comprises a display device (9a).

The communication apparatus (9) further comprises the third communication interface (10).

Said third communication interface (10) comprises sending and receiving devices for a mobile radio connection, for example a GSM connection or a UMTS connection or a GPRS connection or an LTE connection. The third communication interface (10) further comprises additional sending and/or receiving devices which use wireless technology, for example NFC technology.

The refuse container comprises a port device (18) having a locking mechanism (19). The refuse container further comprises the electronic control unit (3) having the first communication interface (4). Said first communication interface (4) comprises sending and/or receiving devices which use wireless technology, for example NFC technology. Furthermore, the first communication interface (4) may comprise additional sending and receiving devices for a mobile radio connection, for example a GSM connection or a UMTS connection or a GPRS connection or an LTE connection.

The server (5) comprises the authentication manager (7), the database (8), the information provider (13) and the second communication interface (6). Said second communication interface (6) comprises sending and receiving devices for a mobile radio connection, for example a GSM connection or a UMTS connection or a GPRS connection or an LTE connection.

In the embodiments according to Fig. 2-5, the transfer of identification data (11) is initiated between the first communication interface (4) of the refuse container (2) and the third communication interface (10) of the communication apparatus (9) via a first communication channel (15), which uses wireless technology. Preferably, software is installed on the communication apparatus (9), by means of which software the user can initiate the transfer of the identification data (11).

Said identification data (11) may comprise both identification data of the user and identification data of the refuse container.

Subsequently, said identification data (11) are transmitted to the second communication interface (6) of the server (5).

Said transmission can take place by means of a second communication channel (16) between the first communication interface (4) of the refuse container (2) and the second communication interface (6) of the server (5), as shown in Fig. 3 and 4. In this case, said second communication channel (16) is a mobile radio connection.

Alternatively, the transmission of the identification data (11) could take place by means of a third communication channel (16) between the third communication interface (10) of the communication apparatus (9) and the second communication interface (6) of the server (5). This is shown in Fig. 2 to 5. In this case, the third communication channel (17) is a mobile radio connection.

After the identification data (11) have been received by the second communication interface (6) of the server (5), they are sent to the authentication manager (7) of the server (5). The authentication manager (7) then assigns the received identification data (11) to user data (12) from the database (10).

After successful authentication, a release signal (20) for unlocking the locking mechanism (19) is transmitted to the refuse container (2). This is conducted via a fourth communication channel (26), which is a mobile radio connection between the second (6) and the first communication interface (4).

The user data (12) are additionally made available to an information provider (13). Said information provider sends an information message (14) for the user to the communication apparatus (9). The information messages (14) may contain information regarding the refuse container (2) and/or the nearest refuse container and/or the waste thrown in and/or official information and/or personalised information for advertising purposes. The information messages (14) could for example appear in the form of push notifications on the communication apparatus (9). Push notifications of this kind are messages that appear on the communication apparatus (9) without the relevant software/app having been opened.

The information provider (13) may be provided as a component of the server (5) or as an external device. In the case of an internal information provider (13), the corresponding information messages (14) are stored in a memory (25). The information provider (13) selects the corresponding information messages (14) using the user data (12) and passes on said messages to the second communication interface (6) of the server (5) for forwarding to the communication apparatus (9).

In the case of an external information provider (13), the user data (12) are provided to the external information provider (13) by the second communication interface (6) of the server (5)

via a sixth communication channel (29), which is preferably a mobile radio connection or the like.

Optionally, the refuse container (2) may be equipped with a GPS device (21) for determining
5 the location of said container and at least one sensor device (22). The sensor device (22)
may comprise sensors for monitoring the temperature inside the refuse container (2), for de-
tecting movements inside the refuse container (2), for detecting movements of the refuse
container (2) itself, for displaying the fill level, for determining the weight of the waste thrown
in, or for detecting particular materials in the waste thrown in.

10 Said GPS/sensor data (27) are preferably transmitted from the first communication interface
(4) of the refuse container (2) to the second communication interface (6) or to the sever (5)
via a fifth communication channel (28). The fifth communication channel (28) is preferably
also a mobile radio connection, for example a GSM connection, a UMTS connection, a
15 GPRS connection or an LTE connection.

The GPS/sensor data (27) received by the second communication interface (6) are prefera-
bly delivered to a control unit (24) of the server, which evaluates the data and, if appropriate,
initiates further steps, for example notifying the relevant competent authorities. Correspond-
20 ing contact data can be stored in the memory (25).

All of the features disclosed in the application documents are claimed as essential to the in-
vention, if they are novel over the prior art in isolation or in combination.

List of reference signs

5	1	system
	2	refuse container
	3	electronic control unit
	4	first communication interface
	5	server
10	6	second communication interface
	7	authentication manager
	8	database
	9	communication apparatus
	9a	display device
15	10	third communication interface
	11	identification data
	12	user data
	13	information provider
	14	an information message
20	15	first communication channel
	16	second communication channel
	17	third communication channel
	18	port device
	19	locking mechanism
25	20	release signal
	21	GPS device
	22	sensor device
	23	power supply
	24	control unit of the server
30	25	memory
	26	fourth communication channel
	27	GPS/sensor data
	28	fifth communication channel
	29	sixth communication channel

Claims

1. System (1) for providing messages to a user of a refuse container (2), comprising a refuse container (2) having an electronic control unit (3), which unit comprises a first communication interface (4) for sending and receiving data, and said system comprising a server (5), which comprises a second communication interface (6), an authentication manager (7) and a database (8),
characterised in that
a transfer of identification data (11) between the first communication interface (4) and a third communication interface (10) of a communication apparatus (9) can be initiated before the refuse container (2) is used, the authentication manager (7) assigning user data (12) from the database (8) to the identification data (11) and making said user data (12) available to an information provider (13), after which the information provider (13) sends an information message (14) for the user to the communication apparatus (9), wherein the transfer of identification data (11) between the first (4) and the third communication interface (10) takes place via a first communication channel (15), the first communication channel (15) using wireless technology, wherein the first communication interface (4) sends the identification data (11) to the second communication interface (6) of the server (5) via a second communication channel (16), the second communication channel (16) being a mobile radio connection, wherein the user data (12) includes an age and/or a gender of the user.
2. System according to claim 1,
characterised in that
the communication apparatus (9) is a portable data-processing apparatus comprising a display device (9a), for example a mobile telephone, a smartphone, a tablet or a laptop.
3. System according to either claim 1 or claim 2,
characterised in that
the wireless technology is NFC technology or RFID technology.
4. System according to any of the preceding claims,
characterised in that
the mobile radio connection is a GSM connection or a UMTS connection or a GPRS

connection or an LTE connection.

5. System according to any of the preceding claims,
characterised in that

5 the refuse container (2) comprises a port device (18) having a locking mechanism (19), the authentication manager (7) authenticating the user using the user data (12) and, after authentication, sending a release signal (20) for unlocking the locking mechanism (19).

- 10 6. System according to any of the preceding claims,
characterised in that

the refuse container (2) comprises a GPS device (21) and/or at least one sensor device (22), the refuse container (2) comprising a power supply (23) for the electronic controller (3) and/or the locking mechanism (19) and/or the GPS device (21) and/or
15 the at least one sensor device (22).

7. System according to any of the preceding claims,
characterised in that

the information message (14) contains information regarding the refuse container (2)
20 and/or the waste thrown therein and/or the nearest refuse container.

8. System according to any of the preceding claims,
characterised in that

the information message (14) contains official information and/or personalised information for advertising purposes.
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9. System according to any of the preceding claims,
characterised in that

the information provider (13) is associated with the server (5) or is an external device.
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10. Method for providing messages to users of a refuse container (2), wherein the refuse container (2) comprises an electronic control unit (3) having a first communication interface (4) for sending and receiving data, said method comprising the steps of:

- initiating a transfer of identification data (11) between a first communication interface (4) and a communication apparatus (9) comprising a third communication interface (10) before the refuse container (2) is used;
- transmitting the identification data (11) to a server (5) comprising a second communication interface (6);
- receiving the identification data (11) by means of the second communication interface (6) and delivering the identification data (11) to an authentication manager (9) of the server (5);
- assigning user data (12) from a database (8) of the server (5) to the identification data (11) by means of the authentication manager (9), wherein the user data (12) includes an age and/or a gender of the user;
- providing the user data (12) to an information provider (13);
- sending an information message (14) for the user to the communication apparatus (5) by means of the information provider (13)

wherein the transfer of identification data (11) between the first (4) and the third communication interface (10) takes place via a first communication channel (15), the first communication channel (15) using wireless technology, wherein the first communication interface (4) sends the identification data (11) to the second communication interface (6) of the server (5) via a second communication channel (16), the second communication channel (16) being a mobile radio connection.