Claims

1. System (1) for checking and controlling access for a user to a refuse container (2), comprising a refuse container (2) having an electronic control unit (3), which comprises a first communication interface (4) for sending and receiving data and a server (5) that is arranged at a distance from the refuse container and comprises a second communication interface (6), an authentication manager (7) and a database (8), it being possible to initiate a transfer of data (11) between the first communication interface (4) and a third communication interface (10) of a communication apparatus (9), which apparatus can be assigned to a user, in order to identify a user before using the refuse container (2), and it being possible to initiate a transfer of data (11) between the third communication interface (10) and the second communication interface (6),
the first communication interface (4) does not comprise any devices for directly transferring data to the second communication interface (6), the communication apparatus (9) that can be assigned to the user comprising an interface device, via which indirect data transfer can be initiated between the first communication interface (4) and the second communication interface (6), the authentication manager (7) assigning user data from the database (8) to the data (11) and giving or denying said user access to said refuse container (2) on the basis of this assignment
characterised in that
the communication takes place via a first communication channel (15) and a second communication channel (16), which is different from the first communication channel (15), at different times, wherein an offline state, in which the communication between the third communication interface (10) and the second communication interface (6) is not possible, is detected by the communication apparatus (9), wherein the communication apparatus (9) can give or deny access to the refuse container (2) in the offline state by itself on the basis of the last result of the authentication by the server (5).

2. System according to claim 1,
characterised in that

the communication apparatus (9) is a portable data processing apparatus, preferably comprising a display device (9a), for example a mobile phone, a smartphone, a tablet or a laptop.

3. System according to either claim 1 or claim 2,
characterised in that
data (11) is transferred between the first (4) and the third (10) communication interface via the first communication channel (15), which is different from the second communication channel (16) that is set up for communication between the second (6) and the third (10) communication interface.

4. System according to any of the preceding claims,
characterised in that
at least portions of at least one, preferably both, of the communication channels (15, 16) use wireless technology for communication between the first (4) and the second (6) communication interface or between the second (6) and the third (10) communication interface.

5. System according to any of the preceding claims,
characterised in that
the first communication channel (15) for communication between the first (4) and the third (6) communication interface is based on wireless technology having a low energy consumption and a range of less than 300 m.

6. System according to any of the preceding claims,
characterised in that
at least portions of the second communication channel (16) for communication between the second (6) and the third (10) communication interface are based on wireless technology having a maximum range of more than 30 m.

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

additional data can be transferred between the second (6) and the first (4) communication interface via the interface device, which data is preferably selected from a group comprising time data, updates, system information, usage behaviour, (unsuccessful) attempted uses, (unsuccessful) attempted logins, fill level of the refuse container and location of the refuse container.

8. System according to any of the preceding claims,
characterised in that
the interface device of the communication apparatus (9), which apparatus can be assigned to the user, comprises a data processing device, which is designed to modulate data in order to transfer it to different communication channels (15, 16) and/or to encode and/or decode the data received by a first or second communication interface (4, 6) before it is forwarded to the other communication interface in each case, either the first or second communication interface (4, 6).

9. System according to any of the preceding claims,
characterised in that
the first communication channel (15) for communication between the first (4) and the third (6) communication interface is based on wireless technology selected from a group comprising NFC technology, RFID technology and optical transmission technology.

10. System according to any of the preceding claims,
characterised in that
at least portions of the second communication channel (16) for communication between the second (6) and the third (10) communication interface are based on wireless technology selected from a group comprising a WLAN connection, mobile connection, GSM connection, UMTS connection, GPRS connection or LTE connection.

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

the first communication channel (15) for communication between the first (4) and the third (6) communication interface is based on wireless technology having a low energy consumption and a range of less than 50 cm.

12. System according to any of the preceding claims,
characterised in that
at least portions of the second communication channel (16) for communication between the second (6) and the third (10) communication interface are based on wireless technology having a maximum range of more than 1 km.

13. Method for controlling access to a refuse container (2) for a user by means of an electronic control unit (3) that is connected to the refuse container (2) and comprises a first communication interface (4) for sending and receiving data, said method comprising the steps of:
a) initiating a transfer of identification data (11) from the first communication interface (4) to a communication apparatus (9), which apparatus can be assigned to a user and comprises a third communication interface (10), before the refuse container (2) is used;
b) transferring the identification data (11) relating to the refuse container (2) and to the user from the communication apparatus (9), which comprises the third communication interface (10), to a server (5) having a second communication interface (6);
c) receiving the identification data (11) by means of the second communication interface (6) and supplying the identification data (11) to an authentication manager (9) of the server (5);
d) assigning user data (12) from a database (8) of the server (5) to the identification data (11) by means of the authentication manager (9);
e) generating a signal in order to grant or deny access to said refuse container (2) for said user;
f) transmitting the signal from the second communication interface (6) to the third communication interface (10) and/or the communication apparatus (9) and optionally converting the signal inside the communication apparatus (9);

g) transmitting a signal from the third communication interface (10) and/or the communication apparatus (9) to the first communication interface (4);
h) granting or denying access to said refuse container (2) for the user on the basis of the signal received at the first communication interface (4),
wherein step a) takes place via a first communication channel (15), which is different to a second communication channel (16) used in step b), wherein the communication via the communication channels (15, 16) takes place at different times, when an offline state is detected by the communication apparatus (9), when the communication between the third communication interface (10) and the second communication interface (6) is not possible, wherein the access to the refuse container (2) is granted or denied by the communication apparatus (9) in the offline state by itself on the basis of the last result of the authentication by the server (5).

14. Method according to claim 13,
characterised in that
at least one, preferably both, of steps a) and b) is/are carried out by the transmission of data, which transmission is wireless at least in portions.

15. Method according to either claim 13 or claim 14,
characterised in that
the access by means of independent authentication by the communication apparatus (9) is restricted to a specific maximum number less than 10.

16. Method according to any of claims 13 to 15,
characterised in that
wireless technology that has a low energy consumption and a range of less than 300 m is used for step a), and
wireless technology having a maximum range of more than 30 m is used at least in portions for step b).

17. Method according to any of claims 13 to 16,
characterised in that,

in step h), when a signal is received at the first communication interface (4), which encodes the allowability of access for the user to said refuse container (2), a control signal is generated that unlocks an interlocking device of the refuse container (2).

18. Method according to any of claims 13 to 17,
characterised in that
the signal transmitted from the third communication interface (10) and/or the communication apparatus (9) to the first communication interface (4) in step g) comprises a one-time or rolling code.

19. Method according to any of claims 13 to 18,
characterised in that
a portable data processing apparatus, preferably having a display device (9a), for example a mobile phone, a smartphone, a tablet or a laptop, is used as the communication apparatus (9).

20. Method according to any of claims 13 to 19,
characterised in that
wireless technology is used for step a) that is selected from a group comprising NFC technology, RFID technology and optical transmission technology, and wireless technology is used at least in portions for step b) that is selected from a group comprising a WLAN connection, mobile connection, GSM connection, UMTS connection, GPRS connection or LTE connection.