CLAIMS

1. A charging infrastructure management system managing a charging infrastructure for an electric vehicle, comprising:

a charger control unit configured to control a charger for charging the electric vehicle so as to change the behavior of the charger at the time of charging the electric vehicle depending on a pattern of operation of the charging infrastructure determined by a combination of the charger with various charging-infrastructure devices other than the charger.

2. The charging infrastructure management system according to claim 1, further comprising:

a member authenticating unit configured to authenticate a member on the basis of member data read by a member data reader when the charging infrastructure is under a pattern of operation in which the member data reader for reading the member data from a storage device storing member data of the charging infrastructure is included as the charging-infrastructure device,

wherein the charger control unit controls an operation of the charger so as to start a charging operation after the member authenticating unit authenticates the member.

3. The charging infrastructure management system according to claim 2, further comprising:

a reservation confirming unit configured to confirm whether the member authenticated by the member authenticating unit has reserved the charger,

wherein the charger control unit controls the operation of the charger so as to

start the charging operation when the reservation confirming unit determines that the member is a member who has reserved the charger.

4. The charging infrastructure management system according to claim 3, further comprising:

a charger specifying unit configured to specifies a charger to be used by a member authenticated by the member authenticating unit from among a plurality of the chargers; and

an entry regulating device control unit configured to control the operation of an entry regulating device so as to release the regulation of entry of the electric vehicle into the parking space having the charger, which is specified by the charger specifying unit, installed therein when the charging infrastructure is under a pattern of operation in which the entry regulating device for regulating entry of an electric vehicle into a parking space having the charger installed therein is included as the charging-infrastructure device.

5. The charging infrastructure management system according to claim 4,

wherein the charger specifying unit specifies a charger to be used by the member when the reservation confirming unit confirms that the member is a member who has reserved the charger.

6. The charging infrastructure management system according to claim 4 or 5,

wherein the charger specifying unit specifies a charger to be used by the member when the reservation confirming unit confirms that the member is not a member who has reserved the charger.

7. The charging infrastructure management system according to any one of claims 4 to 6, further comprising:

a useful on-arrival data transmitting unit configured to transmit useful on-arrival data including information useful on arrival at the charging infrastructure to an onboard device of the electric vehicle via a wireless transmitter when the charging infrastructure is under a pattern of operation in which the wireless transmitter for transmitting data to the onboard device in a wireless manner is included as the charging-infrastructure device.

8. The charging infrastructure management system according to claim 7,

wherein the useful on-arrival data transmitting unit transmits useful on-arrival data including information indicating guidance to the charger specified by the charger specifying unit as the information useful on arrival at the charging infrastructure to the onboard device via the wireless transmitter.

9. The charging infrastructure management system according to claim 7 or 8,

wherein the useful on-arrival data transmitting unit transmits useful on-arrival data including information indicating an advertisement of a business relevant to the charging infrastructure as the information useful on arrival at the charging infrastructure to the onboard device via the wireless transmitter.

10. The charging infrastructure management system according to any one of claims 1 to 9, further comprising:

a useful before-arrival data transmitting unit configured to transmit useful before-arrival data including information useful before arrival at the charging infrastructure to an onboard device of the electric vehicle via a communication network.

11. The charging infrastructure management system according to claim 10,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating the location of the charging infrastructure as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

12. The charging infrastructure management system according to claim 10 or 11,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating a utilization status of the charger as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

13. The charging infrastructure management system according to any one of claims 10 to 12,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating a reservation status of the charger as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

14. The charging infrastructure management system according to any one of claims 10 to 13, further comprising:

a reachable charging infrastructure specifying unit configured to specify a charging infrastructure reachable by the electric vehicle from among a plurality of the

charging infrastructures on the basis of position information of the electric vehicle, information of remaining charging capacity of a rechargeable battery of the electric vehicle, and position information of the plurality of charging infrastructures,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating the location of the charging infrastructure specified by the reachable charging infrastructure specifying unit as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

15. The charging infrastructure management system according to any one of claims 1 to 14, further comprising:

a utilization fee calculating unit configured to calculate a utilization fee of the charging infrastructure including at least a charging fee when the charging infrastructure is under the pattern of operation in which an automatic fee settlement machine for settling the utilization fee of the charging infrastructure is included as the charging-infrastructure device and when the automatic fee settlement machine in addition to the charger is selected as the charging-infrastructure devices,

wherein the charger control unit controls the operation of the charger so as to separate a power supply interface connected to the electric vehicle after the utilization fee calculated by the utilization fee calculating unit is settled by the automatic fee settlement machine.

16. The charging infrastructure management system according to claim 15,

wherein the utilization fee calculating unit calculates the utilization fee of the charging infrastructure further including a parking fee depending on a parking time in the

charging infrastructure.

17. The charging infrastructure management system according to claim 15 or 16,

wherein the utilization fee calculating unit calculates the utilization fee depending on a time zone.

18. The charging infrastructure management system according to any one of claims 15 to 17, further comprising:

an electronic payment processing unit configured to make electronic payment of the utilization fee calculated by the utilization fee calculating unit when a member authenticated by the member authenticating unit registers electronic payment in advance,

wherein the charger control unit controls the operation of the charger so as to separate a power supply interface connected to the electric vehicle after the electronic payment is made by the electronic payment processing unit.

19. The charging infrastructure management system according to any one of claims 1 to 18, further comprising:

a useful management data transmitting unit configured to transmit useful management data including information useful for management of the charging infrastructure to a manager device used by a manager of the charging infrastructure via a communication network.

20. The charging infrastructure management system according to claim 19,

wherein the useful management data transmitting unit transmits useful

management data including information indicating a utilization status of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

21. The charging infrastructure management system according to claim 19 or 20,

wherein the useful management data transmitting unit transmits useful management data including information indicating an operation status of the charging-infrastructure device as the information useful for management of the charging infrastructure to the manager device via the communication network.

22. The charging infrastructure management system according to any one of claims 19 to 21,

wherein the useful management data transmitting unit transmits useful management data including information indicating sales of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

23. The charging infrastructure management system according to any one of claims 19 to 22,

wherein the useful management data transmitting unit transmits useful management data including information indicating power consumption of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

24. The charging infrastructure management system according to any one of claims 1 to 23, further comprising:

a charger setting receiving unit configured to receive a setting for the operation of the charger from the manager of the charging infrastructure.

25. The charging infrastructure management system according to claim 24,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate from the manager of the charging infrastructure.

26. The charging infrastructure management system according to claim 24 or 25,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate for exclusive use of members from the manager of the charging infrastructure.

27. The charging infrastructure management system according to any one of claims 24 to 26,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate for exclusive use of members who have reserved the charger from the manager of the charging infrastructure.

28. A control method of controlling a charging infrastructure management system managing a charging infrastructure for an electric vehicle, the method comprising:

a charger control step of controlling a charger so as to change the behavior

thereof at the time of charging the electric vehicle depending on a pattern of operation of the charging infrastructure determined by a combination of the charger for charging the electric vehicle with various charging-infrastructure devices other than the charger.

29. A program for a charging infrastructure management system managing a charging infrastructure for an electric vehicle, making the charging infrastructure management system serve as:

a charger control unit configured to control a charger so as to change the behavior thereof at the time of charging the electric vehicle depending on a pattern of operation of the charging infrastructure determined by a combination of the charger for charging the electric vehicle with various charging-infrastructure devices other than the charger.

CLAIMS

1. A charging infrastructure management system managing a charging infrastructure for an electric vehicle, comprising:

a charger control unit configured to control a charger which is included in the charging infrastructure for charging the electric vehicle so as to change the behavior of the charger at the time of charging the electric vehicle depending on a combination of a pattern of operation of the charger and a presence of various charging-infrastructure devices which are arbitrarily included in the charging infrastructure.

2. The charging infrastructure management system according to claim 1, further comprising:

a member authenticating unit configured to authenticate a member on the basis of member data read by a member data reader when the charging infrastructure is under a pattern of operation in which the member data reader for reading the member data from a storage device storing member data of the charging infrastructure is included as the charging-infrastructure device,

wherein the charger control unit controls an operation of the charger so as to start a charging operation after the member authenticating unit authenticates the member.

3. The charging infrastructure management system according to claim 2, further comprising:

a reservation confirming unit configured to confirm whether the member authenticated by the member authenticating unit has reserved the charger,

wherein the charger control unit controls the operation of the charger so as to start the

charging operation when the reservation confirming unit determines that the member is a member who has reserved the charger.

4. The charging infrastructure management system according to claim 3, further comprising:

a charger specifying unit configured to specifies a charger to be used by a member authenticated by the member authenticating unit from among a plurality of the chargers; and

an entry regulating device control unit configured to control the operation of an entry regulating device so as to release the regulation of entry of the electric vehicle into the parking space having the charger, which is specified by the charger specifying unit, installed therein when the charging infrastructure is under a pattern of operation in which the entry regulating device for regulating entry of an electric vehicle into a parking space having the charger installed therein is included as the charging-infrastructure device.

5. The charging infrastructure management system according to claim 4,

wherein the charger specifying unit specifies a charger to be used by the member when the reservation confirming unit confirms that the member is a member who has reserved the charger.

6. The charging infrastructure management system according to claim 4 or 5,

wherein the charger specifying unit specifies a charger to be used by the member when the reservation confirming unit confirms that the member is not a member who has reserved the charger.

7. The charging infrastructure management system according to any one of claims 4

to 6, further comprising:

a useful on-arrival data transmitting unit configured to transmit useful on-arrival data including information useful on arrival at the charging infrastructure to an onboard device of the electric vehicle via a wireless transmitter when the charging infrastructure is under a pattern of operation in which the wireless transmitter for transmitting data to the onboard device in a wireless manner is included as the charging-infrastructure device.

8. The charging infrastructure management system according to claim 7,

wherein the useful on-arrival data transmitting unit transmits useful on-arrival data including information indicating guidance to the charger specified by the charger specifying unit as the information useful on arrival at the charging infrastructure to the onboard device via the wireless transmitter.

9. The charging infrastructure management system according to claim 7 or 8,

wherein the useful on-arrival data transmitting unit transmits useful on-arrival data including information indicating an advertisement of a business relevant to the charging infrastructure as the information useful on arrival at the charging infrastructure to the onboard device via the wireless transmitter.

10. The charging infrastructure management system according to any one of claims 1 to 9, further comprising:

a useful before-arrival data transmitting unit configured to transmit useful before-arrival data including information useful before arrival at the charging infrastructure to an onboard device of the electric vehicle via a communication network.

11. The charging infrastructure management system according to claim 10,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating the location of the charging infrastructure as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

12. The charging infrastructure management system according to claim 10 or 11,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating a utilization status of the charger as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

13. The charging infrastructure management system according to any one of claims 10 to 12,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating a reservation status of the charger as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

14. The charging infrastructure management system according to any one of claims 10 to 13, further comprising:

a reachable charging infrastructure specifying unit configured to specify a charging infrastructure reachable by the electric vehicle from among a plurality of the charging infrastructures on the basis of position information of the electric vehicle, information of remaining charging capacity of a rechargeable battery of the electric vehicle, and position

information of the plurality of charging infrastructures,

wherein the useful before-arrival data transmitting unit transmits useful before-arrival data including information indicating the location of the charging infrastructure specified by the reachable charging infrastructure specifying unit as the information useful before arrival at the charging infrastructure to the onboard device of the electric vehicle via the communication network.

15. The charging infrastructure management system according to any one of claims 1 to 14, further comprising:

a utilization fee calculating unit configured to calculate a utilization fee of the charging infrastructure including at least a charging fee when the charging infrastructure is under the pattern of operation in which an automatic fee settlement machine for settling the utilization fee of the charging infrastructure is included as the charging-infrastructure device and when the automatic fee settlement machine in addition to the charger is selected as the charging-infrastructure devices,

wherein the charger control unit controls the operation of the charger so as to separate a power supply interface connected to the electric vehicle after the utilization fee calculated by the utilization fee calculating unit is settled by the automatic fee settlement machine.

16. The charging infrastructure management system according to claim 15,

wherein the utilization fee calculating unit calculates the utilization fee of the charging infrastructure further including a parking fee depending on a parking time in the charging infrastructure.

17. The charging infrastructure management system according to claim 15 or 16,

wherein the utilization fee calculating unit calculates the utilization fee depending on a time zone.

18. The charging infrastructure management system according to any one of claims 15 to 17, further comprising:

an electronic payment processing unit configured to make electronic payment of the utilization fee calculated by the utilization fee calculating unit when a member authenticated by the member authenticating unit registers electronic payment in advance,

wherein the charger control unit controls the operation of the charger so as to separate a power supply interface connected to the electric vehicle after the electronic payment is made by the electronic payment processing unit.

19. The charging infrastructure management system according to any one of claims 1 to 18, further comprising:

a useful management data transmitting unit configured to transmit useful management data including information useful for management of the charging infrastructure to a manager device used by a manager of the charging infrastructure via a communication network.

20. The charging infrastructure management system according to claim 19,

wherein the useful management data transmitting unit transmits useful management data including information indicating a utilization status of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

21. The charging infrastructure management system according to claim 19 or 20,

wherein the useful management data transmitting unit transmits useful management data including information indicating an operation status of the charging-infrastructure device as the information useful for management of the charging infrastructure to the manager device via the communication network.

22. The charging infrastructure management system according to any one of claims 19 to 21,

wherein the useful management data transmitting unit transmits useful management data including information indicating sales of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

23. The charging infrastructure management system according to any one of claims 19 to 22,

wherein the useful management data transmitting unit transmits useful management data including information indicating power consumption of the charging infrastructure as the information useful for management of the charging infrastructure to the manager device via the communication network.

24. The charging infrastructure management system according to any one of claims 1 to 23, further comprising:

a charger setting receiving unit configured to receive a setting for the operation of the charger from the manager of the charging infrastructure.

25. The charging infrastructure management system according to claim 24,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate from the manager of the charging infrastructure.

26. The charging infrastructure management system according to claim 24 or 25,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate for exclusive use of members from the manager of the charging infrastructure.

27. The charging infrastructure management system according to any one of claims 24 to 26,

wherein the charger setting receiving unit receives a setting on whether the charger should be made to operate for exclusive use of members who have reserved the charger from the manager of the charging infrastructure.

28. A control method of controlling a charging infrastructure management system managing a charging infrastructure for an electric vehicle, the method comprising:

a charger control step of controlling a charger which is included in the charging infrastructure so as to change the behavior thereof at the time of charging the electric vehicle depending on a combination of a pattern of operation of the charger for charging the electric vehicle and a presence of various charging-infrastructure devices which are arbitrarily included in the charging infrastructure.

29. A program for a charging infrastructure management system managing a charging infrastructure for an electric vehicle, making the charging infrastructure management system serve as:

a charger control unit configured to control a charger which is included in the charging infrastructure so as to change the behavior thereof at the time of charging the electric vehicle depending on a combination of a pattern of operation of the charger for charging the electric vehicle and a presence of various charging-infrastructure devices which are arbitrarily included in the charging infrastructure.