C L A I M S

1. A social infrastructure control system comprising:

a plurality of control apparatuses each configured to be implemented for one of a plurality of kinds of social infrastructures and to locally control the social infrastructure; and

a server capable of communicating with the control apparatuses,

each of the control apparatuses comprising:

a collection unit configured to collect sensing data concerning control targets in the social infrastructure;

a transmission unit configured to transmit the collected sensing data to the server via a communication network;

a reception unit configured to receive, from the server, a control instruction to control the control targets; and

a control unit configured to control the control targets based on the received control instruction, and

the server comprising:

an acquisition unit configured to acquire the sensing data from each of the control apparatuses via the communication network;

a database configured to store the acquired sensing data;

a generation unit configured to generate the control instruction ~~capable of optimally controlling the social infrastructures comprehensively~~ by processing the sensing data acquired from each of the control apparatuses; and

an instruction unit configured to transmit the generated control instruction to the control apparatus~~.~~

~~2. The social infrastructure control system according to claim 1~~,

wherein each of the control apparatuses further comprises:

a storage unit configured to queue the received control instruction; and

a priority control unit configured to read out the queued control instruction at a timing based on a priority defined for each of the control targets and transfer the control instruction to the control unit.

2~~3~~. A~~The~~ social infrastructure control system comprising:~~according to claim 1,~~

a plurality of control apparatuses each configured to be implemented for one of a plurality of kinds of social infrastructures and to locally control the social infrastructure; and

a server capable of communicating with the control apparatuses,

each of the control apparatuses comprising:

a collection unit configured to collect sensing data concerning control targets in the social infrastructure;

a transmission unit configured to transmit the collected sensing data to the server via a communication network;

a reception unit configured to receive, from the server, a control instruction to control the control targets; and

a control unit configured to control the control targets based on the received control instruction, and

the server comprising:

an acquisition unit configured to acquire the sensing data from each of the control apparatuses via the communication network;

a database configured to store the acquired sensing data;

a generation unit configured to generate the control instruction by processing the sensing data acquired from each of the control apparatuses;

an instruction unit configured to transmit the generated control instruction to the control apparatus;

~~wherein the server further comprises:~~

a storage unit configured to queue the generated control instruction; and

a priority control unit configured to read out the queued control instruction at a timing based on a priority defined for each of the control targets and transfer the control instruction to the instruction unit.

3~~4~~. The social infrastructure control system according to claim 1 or 2, wherein each of the control apparatuses further comprises a notification unit configured to notify the server of a result of control for each control target.

~~5. The social infrastructure control system according to claim 1, wherein each of the control apparatuses further comprises a storage unit configured to store a control program, and~~

~~the server further comprises a correction unit configured to determine a state of each control target from a monitor result of each of the control apparatuses and correct the control program based on the result.~~

4~~6~~. The social infrastructure control system according to claim 1 or 2, wherein each of the control apparatuses collects information from each control target via a communication adapter provided between each of the control apparatuses and the control target and transmits the control instruction to relating control target via the communication adapter, and

the server decides control contents based on the information collected by the communication adapter and transmits the control instruction according to the control contents to the control target via the communication adapter.

~~7. The social infrastructure control system according to claim 1, wherein each of the control apparatuses further comprises:~~

~~a failure detection unit configured to detect a communication failure to the server; and~~

~~an autonomous control unit configured to autonomously continue control when the failure detection unit has detected the communication failure.~~

~~8. The social infrastructure control system according to claim 1, wherein each of the control apparatuses further comprises:~~

~~a failure detection unit configured to detect a communication failure to the server; and~~

~~a path switching unit configured to switch a communication path to the server so as to continue cooperation with the server when the failure detection unit has detected the communication failure.~~

~~9. The social infrastructure control system according to claim 1, further comprising an operation support system configured to adjust optimization of an operation~~

~~associated with processing of one of the control apparatuses and the server,~~

~~the operation support system comprising:~~

~~determination means for determining appropriateness of control contents from the control instruction and monitor information of each of the control apparatuses and the server; and~~

~~operation plan execution means for making an optimum operation plan and causing one of the control apparatuses and the server to execute control according to the operation plan.~~

~~10. The social infrastructure control system according to claim 1, further comprising an offline operation system configured to collect information about processing of one of the control apparatuses and the server and executing an infrastructure work offline based on the collected information.~~

~~11. The social infrastructure control system according to claim 10, characterized in that the offline operation system increases/decreases a charging cost based on processing information acquired from each of the control apparatuses.~~

5~~12~~. The social infrastructure control system according to claim 1 or 2, wherein the server is included in a cloud computing system comprising the database.

6~~13~~. A control method applicable to a social infrastructure control system comprising a ~~plurality of~~ control apparatus~~es each~~ configured ~~to be implemented for one of a plurality of kinds of social infrastructures and~~ to control a~~the~~ social infrastructure, and a server capable of communicating with the control apparatus~~es~~, comprising:

causing ~~each of~~ the control apparatus~~es~~ to

collect sensing data concerning control targets in the social infrastructure;

transmit the collected sensing data to the server;

receive, from the server, a control instruction to control the control targets; and

control the control targets based on the received control instruction; and

causing the server to

acquire the sensing data from ~~each of~~ the control apparatus~~es~~;

store the acquired sensing data in a database;

generate the control instruction ~~capable of optimally controlling the social infrastructures comprehensively~~ by processing the sensing data acquired from ~~each of~~ the control apparatus~~es~~; ~~and~~

transmit the generated control instruction to the control apparatus~~.~~

~~14. The control method according to claim 13~~,

further comprising:

causing ~~each of~~ the control apparatus~~es~~ to

queue the received control instruction in a storage unit; and

read out the queued control instruction at a timing based on a priority defined for each of the control targets and transfer the control instruction to the control unit.

7~~15~~. A~~The~~ control method applicable to a social infrastructure control system comprising a control apparatus each configured to control a social infrastructure, and a server capable of communicating with the control apparatus~~according to claim 13, further~~ comprising:

causing the control apparatus to

collect sensing data concerning control targets in the social infrastructure;

transmit the collected sensing data to the server;

receive, from the server, a control instruction to control the control targets; and

control the control targets based on the received control instruction; and

causing the server to

acquire the sensing data from the control apparatus;

store the acquired sensing data in a database;

generate the control instruction by processing the sensing data acquired from the control apparatus;

transmit the generated control instruction to the control apparatus;

queue the received control instruction in a storage unit; and

read out the queued control instruction from the storage unit at a timing based on a priority defined for each of the control targets and transfer the control instruction to the instruction unit.

~~16. The control method according to claim 13, further comprising:~~

~~causing each of the control apparatuses to notify the server of the result of the control for the control target.~~

8~~17~~. A social infrastructure control system control apparatus~~ which is implemented for one of a plurality of kinds of social infrastructures and controls the social infrastructure~~, comprising:

a collection unit configured to collect sensing data concerning a control target in the social infrastructure;

a transmission unit configured to transmit the collected sensing data to a server;

a reception unit configured to receive, from the server, a control instruction to control the control

target, wherein the control instruction ~~is capable of optimally controlling the social infrastructures comprehensively and~~ is generated by processing the sensing data acquired from each of a plurality of control apparatuses; ~~and~~

a control unit configured to control the control target based on the received control instruction; ~~.~~

~~18. The control apparatus according to claim 17, further comprises:~~

a storage unit configured to queue the received control instruction; and

a priority control unit configured to read out the queued control instruction at a timing based on a priority defined for each of the control targets and transfer the control instruction to the control unit.

9~~19~~. The control apparatus according to claim 8~~17~~, further comprises a notification unit configured to notify the server of a result of control for each control target.

10. The control apparatus according to claim 8, wherein the control apparatus collects information from each control target via a communication adapter provided between the control apparatus and the control target and transmits the control instruction to relating control target via the communication adapter, and

the server decides control contents based on the information collected by the communication adapter and transmits the control instruction according to the control contents to the control target via the communication adapter.

11. The control apparatus according to claim 8, wherein the control apparatus further comprises:

a failure detection unit configured to detect a communication failure to the server; and

an autonomous control unit configured to autonomously continue control when the failure detection unit has detected the communication failure.

12. The control apparatus according to claim 8, wherein the control apparatus further comprises:

a failure detection unit configured to detect a communication failure to the server; and

a path switching unit configured to switch a communication path to the server so as to continue cooperation with the server when the failure detection unit has detected the communication failure.

13. The control apparatus according to claim 8, further comprising an operation support system configured to adjust optimization of an operation associated with processing of one of the control apparatus and the server,

the operation support system comprising:

determination means for determining appropriateness of control contents from the control instruction and monitor information of each of the control apparatuses and the server; and

operation plan execution means for making an optimum operation plan and causing one of the control apparatuses and the server to execute control according to the operation plan.

14. The control apparatus according to claim 8, further comprising an offline operation system configured to collect information about processing of one of the control apparatus and the server and executing an infrastructure work offline based on the collected information.

15~~20~~. A social infrastructure control system server ~~which is capable of communicating with a plurality of control apparatuses for respectively controlling a plurality of social infrastructures, each of the control apparatuses being configured to be implemented for one of a plurality of kinds of social infrastructures~~, comprising:

an acquisition unit configured to acquire sensing data concerning a control target in the social infrastructure from each of the control apparatuses;

a database configured to store the acquired sensing data;

a generation unit configured to generate a control instruction to control the control target by processing the sensing data acquired from each of the control apparatuses~~,~~ ~~wherein the control instruction is capable of optimally controlling the social infrastructures comprehensively; and~~

an instruction unit configured to transmit the generated control instruction to the control apparatus~~;~~.

~~21. The server according to claim 20, further comprises:~~

a storage unit configured to queue the generated control instruction; and

a priority control unit configured to read out the queued control instruction at a timing based on a priority defined for each of the control targets and transfer the control instruction to the instruction unit.

16. The server according to claim 15, wherein each of the control apparatuses further comprises a storage unit configured to store a control program, and

the server further comprises a correction unit configured to determine a state of each control target from a monitor result of each of the control apparatuses and correct the control program based on the result.

17. The server according to claim 15, wherein each of the control apparatuses collects information from each control target via a communication adapter provided between

each of the control apparatuses and the control target and transmits the control instruction to relating control target via the communication adapter, and

the server decides control contents based on the information collected by the communication adapter and transmits the control instruction according to the control contents to the control target via the communication adapter.

18. The server according to claim 15, wherein the server is included in a cloud computing system comprising the database.

19. A control method applicable to a social infrastructure control system control apparatus which controls a social infrastructure, and a server capable of communicating with the control apparatus, comprising:

causing the control apparatus to

collect sensing data concerning control targets in the social infrastructure;

transmit the collected sensing data to the server;

receive, from the server, a control instruction to control the control targets; and

control the control targets based on the received control instruction; and

causing the server to

acquire the sensing data from the control apparatus;

store the acquired sensing data in a database;

generate the control instruction by processing the sensing data acquired from the control apparatus; and

transmit the generated control instruction to the control apparatus.

20. The control method according to claim 19, wherein the control apparatus further comprises a notification unit configured to notify the server of a result of control for each control target.

21. The control method according to claim 19, wherein the control apparatus collects information from each control target via a communication adapter provided between the control apparatus and the control target and transmits the control instruction to relating control target via the communication adapter, and

the server decides control contents based on the information collected by the communication adapter and transmits the control instruction according to the control contents to the control target via the communication adapter.

22. The control method according to claim 19, wherein the control apparatus further comprises:

a failure detection unit configured to detect a communication failure to the server; and

an autonomous control unit configured to autonomously continue control when the failure detection unit has detected the communication failure.

23. The control method according to claim 19, wherein the control apparatus further comprises:

a failure detection unit configured to detect a communication failure to the server; and

a path switching unit configured to switch a communication path to the server so as to continue cooperation with the server when the failure detection unit has detected the communication failure.

24. A control method applicable to a social infrastructure control system control server which is capable of communicating with a control apparatus for controlling a social infrastructure, comprising:

causing the control apparatus to

collect sensing data concerning control targets in the social infrastructure;

transmit the collected sensing data to the server;

receive, from the server, a control instruction to control the control targets; and

control the control targets based on the received control instruction; and

causing the server to

acquire the sensing data from the control apparatus;

store the acquired sensing data in a database;

generate the control instruction by processing the sensing data acquired from the control apparatus; and

transmit the generated control instruction to the control apparatus.

25. The control method according to claim 24, wherein the control apparatus further comprises a storage unit configured to store a control program, and

the server further comprises a correction unit configured to determine a state of each control target from a monitor result of the control apparatus and correct the control program based on the result.

26. The control method according to claim 24, wherein the control apparatus collects information from each control target via a communication adapter provided between the control apparatus and the control target and transmits the control instruction to relating control target via the communication adapter, and

the server decides control contents based on the information collected by the communication adapter and transmits the control instruction according to the control contents to the control target via the communication adapter.

27. The control method according to claim 24, wherein the server is included in a cloud computing system comprising the database.