Local Digital Display Assembly and Digital Content Broadcast Network Comprising Such Assemblies

FIELD

The present description relates to local digital display assemblies and digital content broadcast networks (local or wide area) comprising such assemblies.

More specifically, the present description relates to a local digital display assembly comprising several digital display devices located near each other, intended to be seen by members of the public, and each comprising at least one digital screen and one central unit comprising a screen control module able to have the digital screen display digital content.

BACKGROUND

The document US 2013/0151656 describes an example of such a display assembly.

SUMMARY

Local digital display assemblies of this type are provided for repetitively playing content playlists, with modifying as appropriate the content playlist according to local ambient conditions.

The goal of the present description is in particular to adapt in real time or near real time the operation of the local digital display assembly to the audience detected in order to maximize the impact on the audience, and to do so without requiring additional bandwidth for communicating with one or more remote servers and by using the limited calculation capacities of the usual digital display devices.

According to an aspect, the present disclosure refers to a local digital display assembly comprising several digital display devices located near each other, intended to be seen by members of the public, and each

comprising at least one digital screen and one central unit comprising a screen control module able to have the digital screen display digital content, wherein said local digital display assembly further comprises devices for audience detection able to gather information about people located near the digital display devices, wherein the local digital display assembly further comprises a local supervisory system suited for: based on collected information, determining in real time at least one crowd characteristic representative of a collective behavior of the people located near the digital display devices, where said at least one crowd characteristic is chosen among a crowd density and a crowd movement speed; and controlling the respective screen control modules of the digital display devices depending on said at least one crowd characteristic, where said local supervisory system is able to determine in real time the digital content to have respectively the digital display devices display depending on said at least one measured crowd characteristic; wherein the local supervisory system comprises supervisory modules belonging respectively to the central units of several display devices of the digital display assembly, where the supervisory modules communicate with each other by a peer to peer communication protocol; and where said local supervisory system comprises artificial intelligence distributed over said supervisory modules, which is able to determine said at least one crowd characteristic by a calculation distributed among said supervisory modules by the peer to peer communication.

In an example, a local digital display assembly is proposed of the type in question in which said local digital display assembly (E) further comprises devices for audience detection able to gather information about people located near the digital display devices,

In various examples of the local digital display assembly, use could further be made of one and/or the other of the following dispositions:

- Said local supervisory system is able to determine several crowd characteristics including the crowd density, the crowd movement speed, a crowd movement direction and a proximity of the crowd to at least one of the digital display devices;
- Said local supervisory system is able to receive external data from at least one remote resource and for controlling the respective screen control modules of display devices depending on said external data;
- Said external data comprise meteorological data;
- Said external data comprise mobile phone data provided by mobile phone operators on the location and use of mobile terminals;
- Said external data comprise geolocalized data coming from social networks;
- Said audience detection device comprises at least one detector chosen among a camera, WiFi interface, NFC interface, Bluetooth® interface, radar detector, and passage detector;
- The camera is chosen among a motion detection camera (in particular an infrared camera), a 360° camera and a 3D camera;
- At least one of the digital display devices comprises an input interface with which a member of the public can control said digital display device;
- Said input interface is chosen among a touch interface and a radio communication interface allowing an interaction with a mobile phone used by said member of the public;
- Each digital display device is able to operate:
    - oEither in normal mode where said digital display device displays digital content

CLAIMS

1. A local digital display assembly comprising several digital display devices located near each other, intended to be seen by members of the public, and each comprising at least one digital screen and one central unit comprising a screen control module able to have the digital screen display digital content,

wherein said local digital display assembly further comprises devices for audience detection able to gather information about people located near the digital display devices,

wherein the local digital display assembly further comprises a local supervisory system suited for:

- based on collected information, determining in real time at least one crowd characteristic representative of a collective behavior of the people located near the digital display devices, where said at least one crowd characteristic is chosen among a crowd density and a crowd movement speed; and
- controlling the respective screen control modules of the digital display devices depending on said at least one crowd characteristic, where said local supervisory system is able to determine in real time the digital content to have respectively the digital display devices display depending on said at least one measured crowd characteristic;

wherein the local supervisory system comprises supervisory modules belonging respectively to the central units of several display devices of the digital display assembly, where the supervisory modules communicate with each other by a peer to peer communication protocol;

and where said local supervisory system comprises artificial intelligence distributed over said supervisory modules, which is able to determine said at least one crowd

characteristic by a calculation distributed among said supervisory modules by the peer to peer communication.

2. The local digital display assembly according to claim 1, wherein said local supervisory system is able to determine several crowd characteristics including the crowd density, the crowd movement speed, a crowd movement direction and a proximity of the crowd to at least one of the digital display devices.

3. The local digital display assembly according to claim 1, wherein said local supervisory system is able to receive external data from at least one remote resource and for controlling the respective screen control modules of display devices depending on said external data.

4. The local digital display assembly according to claim 3, wherein said external data comprise meteorological data.

5. The local digital display assembly according to claim 3, wherein said external data comprise mobile phone data provided by mobile phone operators on the location and use of mobile terminals.

6. The local digital display assembly according to claim 3, wherein said external data comprise geolocalized data coming from social networks.

7. The local digital display assembly according to claim 1, wherein said audience detection device comprises at least one detector chosen among a camera, WiFi interface, NFC interface, Bluetooth® interface, radar detector, and passage detector.

8. The local digital display assembly according to claim 7, wherein said camera is chosen among a motion detection camera, a 360° camera and a 3D camera.

9. The local digital display assembly according claim 1, wherein at least one of the digital display devices comprises an input interface with which a member of the public can control said digital display device.

10. The local digital display assembly according to claim 9, wherein said input interface is chosen among a touch interface and a radio communication interface allowing an interaction with a mobile phone used by said member of the public.

11. The local digital display assembly according to claim 1, wherein each digital display device is able to operate:

- either in normal mode where said digital display device displays digital content chosen among a first group of content;

- or in a crowd interaction mode where said digital display device displays at least one digital content chosen among a second group of preemptive content;

said local supervisory system is able to have at least one of the digital display devices from the local digital display assembly operate in crowd interaction mode when a crowd is identified.

12. The local digital display assembly according to claim 11, wherein the local supervisory system is able to determine in real time at least the crowd density, and the local supervisory system is able to have at least one of the digital display devices operate in crowd interaction mode when the local supervisory system detects a crowd density over a minimum density in the area of said at least one digital display after a period of operation in normal mode.

13. The local digital display assembly according to claim 12, wherein said local supervisory system is farther able to determine in real time at least the crowd speed, and the local supervisory system is able to have at least one of the digital display devices operate in crowd interaction mode when the local supervisory system detects a crowd density over a minimum density and a crowd speed under a maximum speed in the area of said at least one

digital display after a period of operation in normal mode.

14. The local digital display assembly according to claim 13, wherein the local supervisory system is able to return all digital display devices of said local digital display assembly to operation in normal mode when the crowd moves farther than a maximum distance away from each digital display device of said local digital display assembly after a time operating in crowd interaction mode.

15. The local digital display assembly according to claim 12, wherein the local supervisory system is further suited for determining in real time at least a proximity of the crowd relative to each digital display device in the local digital display assembly, and the local supervisory system is able to determine, in said local digital display assembly, at least one digital display device closest to the crowd and to have said at least one digital display device closest to the crowd operate in crowd interaction mode.

16. The local digital display assembly according to claim 15, wherein said local supervisory system is able, depending on said crowd movement direction and said proximity of the crowd to each digital display device from the local digital display assembly:

- to determine, in said local digital display assembly, at least one digital display device best able to draw the crowd in a desired direction;

- and to have said digital display device operate in crowd interaction mode.

17. The local digital display assembly according to claim 11, wherein when the local supervisory system makes at least one of the digital display devices operate in crowd interaction mode, said local supervisory system continuously analyzes the behavior of the audience and goes through several successive predetermined phases depending on said behavior of the audience for progressively

increasing the influence thereof on the crowd.

18. The local digital display assembly according to claim 17, wherein said local supervisory system is able:

- when the local supervisory system goes into crowd interaction mode, to go into a first phase in which said local supervisory system has geolocalized data coming from social networks corresponding to a location of said local digital display assembly displayed on said at least one digital display device.

19.The local digital display assembly according to claim 18, wherein said local supervisory system is able:

- when the local supervisory system is in the first phase of crowd interaction mode, to determine whether the audience satisfies at least one audience targeting criterion indicating that the audience is targeted and in the affirmative, to go into a second phase in which said local supervisory system has targeted content corresponding to the audience displayed on said at least one digital display device.

20.The local digital display assembly according to claim 19, wherein said local supervisory system is able:

- when the local supervisory system is in the second phase of crowd interaction mode, to determine whether the audience satisfies at least one interactive criterion indicating that the audience is ready to interact with at least one digital display device and in the affirmative, to go into a third phase in which said local supervisory system has at least one simple interactive content displayed on said at least one digital display device.

21.The local digital display assembly according to claim 20, wherein said local supervisory system is able:

- when the local supervisory system is in the third phase of crowd interaction mode, to determine whether the audience satisfies at least one domination criterion

indicating that the audience is ready to let itself be directed by at least one digital display device and in the affirmative, to go into a fourth phase in which said local supervisory system has at least one personalized interactive content chosen by the at least one audience member displayed on said at least one digital display device.

22.The local digital display assembly according to claim 20, wherein said local supervisory system is able:

- when the local supervisory system is in the third phase or in the fourth phase of the crowd interaction mode to have at least one other of the digital display devices display said targeted content as defined in claim 19.

23. The digital content broadcast network according to claim 1, wherein said artificial intelligence distributed over the supervisory modules comprises at least one neural network.

24. The digital content broadcast network according to claim 23, wherein said at least one neural network is at least one compressed deep neural network.

25.A digital content broadcast network comprising at least one first local digital display assembly according to claim 14 and one second local digital display assembly according to claim 15, where the local supervisory systems of the first and second local digital display assemblies communicate with each other and are able to:

- when the local supervisory system of the first local digital display assembly returns all the digital display devices of said first local digital display assembly to operation in normal mode and detects that the crowd is moving towards the second local digital display assembly, to determine a digital display device within the second local digital display assembly best able to capture the attention of the crowd and/or to draw in the crowd;

- and to have said digital display device of the second local digital display assembly operate in crowd interaction mode.

26. A digital content broadcast network comprising at least one local digital display assembly according to claim 1 and at least one remote server, wherein the local supervisory system of the local digital display assembly comprises artificial intelligence suited for at least determining in real time the digital content to have respectively the digital display devices display depending on said at least one measured crowd characteristic, where the local supervisory system of said local digital display assembly is able to communicate to said at least one remote server information about the operation in crowd interaction mode of said local digital display assembly, and where said at least one remote server comprises at least one machine learning module able to enrich the artificial intelligence of the local supervisory system depending on said information about the operation in crowd interaction mode from said local digital display assembly.

27.The digital content broadcast network according to claim 26, wherein the artificial intelligence of the local supervisory system comprises a set of heuristic rules and said at least one remote server is able to improve said set of heuristic rules by adapting the pre-existing heuristic rules and/or by creating new heuristic rules added to said heuristic rules set.