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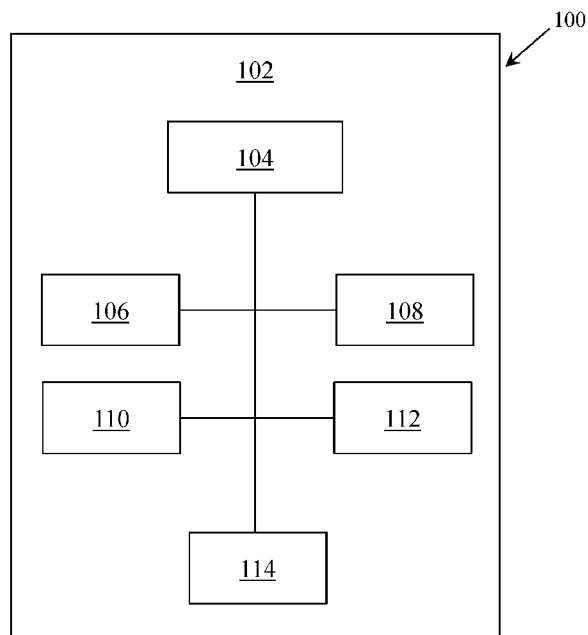


FIG. 1

(57) Abstract: The present invention relates to a system (100) for managing work schedule of a worker in a scenario (102), the system (100) includes a central server (104) coupled wireless tag (106); at least one sensor (108); data gateway (110) equipment (112); and a monitoring device (114). The present invention also seeks to provide a method (200) for managing work schedule of a worker in a scenario, the method (200) including retrieving data from at least one wireless tag; transmitting the data retrieved from the at least one wireless tag; retrieving the metadata from at least one sensor; processing the metadata by a central server; receiving data from at least one data gateway; processing the data received from the at least one data gateway; and generating a report based on the data collected from the at least one wireless tag, the at least one sensor, and the at least one data gateway.

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**A SYSTEM AND METHOD FOR MANAGING WORK SCHEDULE OF A WORKER
IN A SCENARIO**

FIELD OF INVENTION:

- 5 The present invention generally relates to management of working hours. More particularly, the present invention relates to systems and methods for managing work schedule of workers in a scenario such as warehouses, factories, offices and so forth.

BACKGROUND OF THE INVENTION:

- 10 Traditionally, factories and manufacturing plants uses different methods of calculating the working hours of their workers. Examples of methods that are conventionally used include manual inputs such as pen and paper method on a timesheet clocking in and out device, time attendance software and devices, and so forth. Particularly, goals of these systems and devices are to calculate the time a worker is in the building and hence translates to his
- 15 working hours in a day. More recent technologies use indoor location positioning to have a more automated system for attendance and to calculate actual work hours. However, the conventional systems determine the zones or locations for the worker to be in at a static place at certain time of the day. Moreover, there are no such provisions for relocations, dynamic status or work schedule.
- 20 Furthermore, there may be changes in locations and random change in the region of interest dynamically. With advancements, manual practises have been carried out for monitoring the dynamic change in area of interest. However, there are no such efficient outputs from the aforementioned techniques and also there are drawbacks and humans errors associated. Such drawbacks are but not limited to three-fourth of the manual labour loss, irregular machine

operations include untimed closing and opening schedule, and so forth. The irregular monitoring also leads to unproductive functioning of machines and that leads to unnecessary electricity cost and expenditures.

5 A prior art, US 105, 74619 by Harpas et al, aims to solve or address the current shortcomings of data transmission. However, Harpas does not teach or disclose an effective way to dynamically change load balancing behaviour at run-time, hence may still experience redundancy if deployed.

Accordingly, in light of foregoing discussion there is a need to overcome the above-mentioned limitations and drawbacks associated with the conventional work hour
10 management systems and techniques.

SUMMARY OF INVENTION:

In light of the limitations of the existing conventional systems as discussed above, it is evident that there arises a need of an efficient and cost effective labour management system. Furthermore, the present invention seeks to provide an automated system and method for
5 managing workers on a working platform along with the machines.

In one aspect, embodiments of the present disclosure provide a system for managing work schedule of a worker in a scenario. The system includes a central server coupled to at least one wireless tag attached to the worker, wherein the wireless tag includes information about the worker and region of interest. The system further includes at least one sensor to collect
10 metadata from the scenario, wherein the metadata may include data from the at least one wireless tag and location associated with the worker. The system further includes at least one data gateway coupled to the at least one sensor and the at least one wireless tag, to collect information associated with the worker. The system further includes at least one equipment communicably coupled to the at least one data gateway, and at least a monitoring device
15 operatively coupled to the central server.

In an embodiment, the at least one wireless tag is attached to a uniform of the worker or worn as a gadget by the worker. The at least one wireless tag include barcode, magnetic strip, time stamp, ultra wideband tags, Radio Frequency Identification (RFID) tags, Wi-Fi beacons, GPS-enabled mobile phones and a combination thereof.

20 In another embodiment, the at least one sensor include proximity sensors, barcode readers, RFID readers, and a combination thereof. Furthermore, the metadata include information about a location, time duration, zones, zone boundaries, machine identity, machine location and a combination thereof. The monitoring device include cell phone, PDA, tablet, computer, and a combination thereof.

In a second aspect, embodiments of the present disclosure provide a method for managing work schedule of a worker in a scenario, the method includes retrieving data from the at least one wireless tag; transmitting the data retrieved from the at least one wireless tag; retrieving the metadata from the at least one sensor; processing the metadata by the central server;
5 receiving data from the at least one data gateway; processing the data received from the at least one data gateway; generating a report based on the data collected from the at least one wireless tag, the at least one sensor, and the at least one data gateway.

The method further includes analysing the data retrieved from the at least one wireless tag, wherein the analysis includes detecting whether static or dynamic.

10 The method further includes ensuring signal strength of the at least one wireless tag; and transmitting information of the at least one wireless tag, wherein information includes signal strength, type of data as static, start of job, end of job based on timestamp of location transmitted to the at least one data gateway, when detected as static.

The method further includes transmitting information of the at least one wireless tag, when
15 detected dynamic, wherein the information include signal strength, type of data as dynamic, start of job, end of job based on timestamp of location sent to the at least one data gateway.

The method further includes analysing the data retrieved from the at least one sensor, wherein the analysis includes detecting a type of location data and whether static or dynamic.

The method further includes interpolating data from the at least one sensor to determine
20 position and direction of the at least one wireless tag in the vicinity.

The method further includes associating the at least one wireless tag to the nearest machine based on signal strength information.

The method further includes transmitting the data of the at least one wireless tag associated with the machine to the central server.

- The method further includes checking an available job based on the machine data transmitted to the central server; retrieving of the at least one wireless tag locations in the same proximity
- 5 of the machine; calculating the boundary of a dynamic zone by analysing the location of the the at least one wireless tag in dynamic; assigning new zone boundaries on detection of changes in the data as dynamic; recording all the activities in the current zone; checking a threshold of the zone boundaries based on the locations of the at least one wireless tag and recalculating the zone boundaries again on detection of a location apart from predefined
- 10 boundaries; repeating the process when the zone boundaries requires to be recalculated and reassigned, and establishing the data accessible for report generation and enables a visualisation on the monitoring device.

BREIF DESCRIPTION OF DRAWINGS:

The drawings mentioned herein disclose exemplary embodiments of the claimed invention. Detailed description and preparation of well-known compounds/substances/elements are omitted to not unnecessarily obscure the embodiments herein. Other objects, features, and advantages of the present invention will be apparent from the following description when read with reference to the accompanying drawing.

FIG. 1 illustrates a block diagram of a system for managing work schedule of a worker in a scenario, in accordance with an embodiment of the present disclosure;

10 FIG. 2 illustrates a flow chart of a method for managing work schedule of a worker in a scenario, in accordance with an embodiment of the present disclosure; and

FIG. 3 illustrates a flow chart of a method for generating a report, in accordance with an embodiment of the present disclosure.

15 DETAILED DESCRIPTION:

This section is intended to provide explanation and description of various possible embodiments of the present invention. The embodiments used herein, and the various features and advantageous details thereof are explained more fully with reference to non-limiting embodiments illustrated in the accompanying drawings and detailed in the following description. The examples used herein are intended only to facilitate understanding of ways in which the embodiments may be practiced and to enable the person skilled in the art to practice the embodiments used herein. Also, the examples/embodiments described herein should not be construed as limiting the scope of the embodiments herein.

In one aspect, embodiments of the present disclosure provide a system for managing work schedule of a worker in a scenario. The system includes a central server coupled to at least one wireless tag attached to the worker, wherein the wireless tag includes information about the worker and region of interest. The system further includes at least one sensor to collect
5 metadata from the scenario, wherein the metadata may include data from the at least one wireless tag and location associated with the worker. The system further includes at least one data gateway coupled to the at least one sensor and the at least one wireless tag, to collect information associated with the worker. The system further includes at least one equipment communicably coupled to the at least one data gateway, and at least a monitoring device
10 operatively coupled to the central server.

In an embodiment, the at least one wireless tag is attached to a uniform of the worker or worn as a gadget by the worker. The at least one wireless tag include barcode, magnetic strip, time stamp, ultra wideband tags, Radio Frequency Identification (RFID) tags, Wi-Fi beacons, GPS-enabled mobile phones and a combination thereof.

15 In another embodiment, the at least one sensor include proximity sensors, barcode readers, RFID readers, and a combination thereof. Furthermore, the metadata include information about a location, time duration, zones, zone boundaries, machine identity, machine location and a combination thereof. The monitoring device include cell phone, PDA, tablet, computer, and a combination thereof.

20 In a second aspect, embodiments of the present disclosure provide a method for managing work schedule of a worker in a scenario, the method includes retrieving data from the at least one wireless tag; transmitting the data retrieved from the at least one wireless tag; retrieving the metadata from the at least one sensor; processing the metadata by the central server; receiving data from the at least one data gateway; processing the data received from the at

least one data gateway; generating a report based on the data collected from the at least one wireless tag, the at least one sensor, and the at least one data gateway.

The method further includes analysing the data retrieved from the at least one wireless tag, wherein the analysis includes detecting whether static or dynamic.

- 5 The method further includes ensuring signal strength of the at least one wireless tag; and transmitting information of the at least one wireless tag, wherein information includes signal strength, type of data as static, start of job, end of job based on timestamp of location transmitted to the at least one data gateway, when detected as static.

- 10 The method further includes transmitting information of the at least one wireless tag, when detected dynamic, wherein the information include signal strength, type of data as dynamic, start of job, end of job based on timestamp of location sent to the at least one data gateway.

The method further includes analysing the data retrieved from the at least one sensor, wherein the analysis includes detecting a type of location data and whether static or dynamic.

- 15 The method further includes interpolating data from the at least one sensor to determine position and direction of the at least one wireless tag in the vicinity.

The method further includes associating the at least one wireless tag to the nearest machine based on signal strength information.

The method further includes transmitting the data of the at least one wireless tag associated with the machine to the central server.

- 20 The method further includes checking an available job based on the machine data transmitted to the central server; retrieving of the at least one wireless tag locations in the same proximity of the machine; calculating the boundary of a dynamic zone by analysing the location of the

the at least one wireless tag in dynamic; assigning new zone boundaries on detection of changes in the data as dynamic; recording all the activities in the current zone; checking a threshold of the zone boundaries based on the locations of the at least one wireless tag and recalculating the zone boundaries again on detection of a location apart from predefined boundaries; repeating the process when the zone boundaries requires to be recalculated and reassigned, and establishing the data accessible for report generation and enables a visualisation on the monitoring device.

Throughout the present invention, the term “work schedule of a worker in a scenario” refers to management of working hours of workers in factories, workshops, offices, and so forth.

10 The present invention provides a management system to monitor and manage the daily work hours of the workers. Furthermore, the system also monitor a real time assess of each sections of a give scenario such as a department in an office, a section in a factory, zones in industries and so forth. Moreover, the system also monitors the movement of the workers in one or more scenarios. The present invention also seeks to provide a micro-management on each of

15 machines being operated and the worker associated the same.

FIG. 1 illustrates a block diagram of a system (100) for managing work schedule of a worker in a scenario (102), in accordance with an embodiment of the present disclosure. The system (100) includes a central server (104) coupled to at least one wireless tag (106), at least one sensor (108), at least one data gateway (110), at least one equipment (112), and at least a

20 monitoring device (114). The term “central server” as used herein refers to computing arrangements that may include but not limited to microprocessors, computers, wireless networks, and so forth. Furthermore, the central server (104) is configured to receive and transmit and process data.

According to an embodiment, the at least one wireless tag (106) attached to the worker, wherein the at least one wireless tag (106) include information about the worker and region of interest. The at least one wireless tag (106) may include tranceiving circuits to receive and transmit signals, when in operation. Furthermore, the at least one wireless tag (106) may

5 include pre-programmed algorithm to save information about the worker. The information about the worker may include worker identity (such as designation, area of function, machine associated with, skills, experience, and so forth), personal information (residential address, blood group, vehicle number, and the like). In one embodiment, the at least one wireless tag (106) is attached to a uniform of the worker. Furthermore, the at least one wireless tag (106)

10 may be affixed to fabric, pinned to pocket, and so forth. In another embodiment, the at least one wireless tag (106) is worn as a gadget by the worker. Moreover, the gadgets may include identity cards (magnetic, electronic and the like), badges, and so forth.

In an embodiment, the at least one wireless tag (106) include barcode, magnetic strip, time stamp, ultra wideband tags, Radio Frequency Identification (RFID) tags, Wi-Fi beacons,

15 GPS-enabled mobile phones and a combination thereof. Furthermore, the at least one wireless tag (106) included readable electronic circuits or printed circuit boards, configured to transfer data when exposed to scanners, detectors or readers.

According to an embodiment, the central server (104) is coupled to the at least one sensor (108) to collect metadata from the scenario (102), wherein the metadata may include data

20 from the at least one wireless tag (106) and location associated with the worker. Furthermore, the at least one sensor (108) may be placed at various locations of the scenario, to provide information thereof. Moreover, various locations may include sections of factories (such as boiler, conveyor, and so forth), departments of offices (such as meeting room, assembly line, and so forth), zones in industries (such as production line, packaging area, and the like).

Notably, the at least one sensor (108) collects metadata from various sections, zones, and departments of the scenario (102). Additionally, the at least one sensor (108) may be coupled to machine equipment provided thereon.

5 In one embodiment, the at least one sensor (108) include proximity sensors. Furthermore, the proximity sensors may collect data from the objects or people in the vicinity. In another embodiment, the at least one sensor (108) include barcode readers, RFID readers, and a combination thereof. Furthermore, the at least one sensor (108) may include scanners to read the at least one wireless tag (106), barcodes, and the like.

10 In an embodiment, the metadata include information about a location, time duration, zones, zone boundaries, machine identity, machine location and a combination thereof. Furthermore, the metadata may include information of location of the worker, time lines (in time, out time, entry time exit time, and the like), zones associated with the worker or workers in the vicinity of a particular zone, zone boundaries (such as totality of workers in a particular location), machine identity (such as lathe, shaper, grinder, and the like), machine location (such as first
15 floor, row, column, and so forth).

According to an embodiment, the at least one data gateway (110) coupled to the at least one sensor (108) and the at least one wireless tag (106), to collect information associated with the worker. The at least one data gateway (110) as used herein refers to an initiator or entry door or pathway to proceed with the system (100) and run the devices or modules attached
20 therewith. Furthermore, the at least one data gateway (110) acts as a host and defines the allocation of machines and workers in a given scenario.

According to one embodiment, the at least one equipment (112) communicably coupled to the at least one data gateway (110). Furthermore, the at least one equipment (112) as used herein refers to machines such as lathe, shaper, and the like. Moreover, the at least one data

gateway (110) monitors and controls the functioning of the at least one equipment (112). In an example, the at least one sensor (108) and the at least one wireless tag (106) is attached to the at least one equipment (112).

According to an embodiment, the system (100) include the at least a monitoring device (114) operatively coupled to the central server (104). Furthermore, the system (100) may be operated remotely using the at least a monitoring device (114). In another embodiment, the at least a monitoring device (114) include cell phone, PDA, tablet, computer, and a combination thereof.

FIG. 2 illustrates a flow chart of a method (200) for managing work schedule of a worker in a scenario, in accordance with an embodiment of the present disclosure.

At a step (202), data from the at least one wireless tag is retrieved.

At a step (204), the data retrieved from the at least one wireless tag is transmitted.

At a step (206), the metadata from the at least one sensor retrieved.

At a step (208), the metadata by the central server is processed.

At a step (210), data from the at least one data gateway is received;

At a step (212), the data received from the at least one data gateway is processed.

At a step (214), a report is generated based on the data collected from the at least one wireless tag, the at least one sensor, and the at least one data gateway.

The method (200) further includes analysing the data retrieved from the at least one wireless tag, wherein the analysis includes detecting whether the data is static or dynamic.

The method (200) further includes ensuring signal strength of the at least one wireless tag; and transmitting information of the at least one wireless tag, wherein information includes signal strength, type of data as static, start of job, end of job based on timestamp of location transmitted to the at least one data gateway, when detected as static.

- 5 The method (200) further includes transmitting information of the at least one wireless tag, when detected dynamic, wherein the information include signal strength, type of data as dynamic, start of job, end of job based on timestamp of location sent to the at least one data gateway.

- 10 The method (200) further includes analysing the data retrieved from the at least one sensor, wherein the analysis includes detecting a type of location data and whether static or dynamic.

The method (200) further includes interpolating data from the at least one sensor to determine position and direction of the at least one wireless tag in the vicinity.

The method (200) further includes associating the at least one wireless tag to the nearest machine based on signal strength information.

- 15 The method (200) further includes transmitting the data of the at least one wireless tag associated with the machine to the central server.

FIG. 3 illustrates a flow chart of a method (300) for generating a report, in accordance with an embodiment of the present disclosure.

- 20 At a step (302), an available job is checked based on the machine data transmitted to the central server.

At a step (304), the at least one wireless tag locations in the same proximity of the machine is retrieved.

At a step (306), the boundary of a dynamic zone is calculated by analysing the location of the at least one wireless tag in dynamic.

At a step (308), new zone boundaries are assigned on detection of changes in the data as dynamic.

5 At a step (310), all the activities in the current zone are recorded.

At a step (312), a threshold of the zone boundaries is checked based on the locations of the at least one wireless tag and recalculating the zone boundaries again on detection of a location apart from predefined boundaries.

At a step (314), the process is repeated when the zone boundaries requires to be recalculated
10 and reassigned.

At a step (316), the data is established accessible for report generation and enables a visualisation on the monitoring device.

As will be readily apparent to a person skilled in the art, the present invention may easily be produced in other specific forms without departing from its essential composition and
15 properties. The present embodiments should be construed as merely illustrative and non-restrictive and the scope of the present invention being indicated by the claims rather than the foregoing description, and all changes which come within therefore intended to be embraced therein.

We Claim:

1. A system (100) for managing work schedule of a worker in a scenario (102), characterised in that, the system (100) comprising:

a central server (104) coupled to:

5 at least one wireless tag (106) attached to the worker, wherein the at least one wireless tag (106) include information about the worker and region of interest;

at least one sensor (108) to collect metadata from the scenario (102), wherein the metadata may include data from the at least one wireless tag (106) and location associated with the worker;

10 at least one data gateway (110) coupled to the at least one sensor (108) and the at least one wireless tag (106), to collect information associated with the worker; and

at least one equipment (112) communicably coupled to the at least one data gateway (110); and

at least a monitoring device (114) operatively coupled to the central server (104).

15 2. The system (100) as claimed in claim 1, wherein the at least one wireless tag (106) is attached to a uniform of the worker.

3. The system (100) as claimed in claim 1, wherein the at least one wireless tag (106) is worn as a gadget by the worker.

4. The system (100) as claimed in claim 1, wherein the at least one wireless tag (106) include
20 barcode, magnetic strip, time stamp, ultra wideband tags, Radio Frequency Identification (RFID) tags, Wi-Fi beacons, GPS-enabled mobile phones and a combination thereof.

5. The system (100) as claimed in claim 1, wherein the at least one sensor (108) include proximity sensors.

6. The system (100) as claimed in claim 1, wherein the at least one sensor (108) include barcode readers, RFID readers, and a combination thereof.

7. The system (100) as claimed in claim 1, wherein the metadata include information about a location, time duration, zones, zone boundaries, machine identity, machine location and a
5 combination thereof.

8. The system (100) as claimed in claim 1, wherein the monitoring device (114) include cell phone, PDA, tablet, computer, and a combination thereof.

9. A method (200) for managing work schedule of a worker in a scenario, the method (200) comprising:

10 retrieving data from at least one wireless tag;

transmitting the data retrieved from the at least one wireless tag;

retrieving a metadata from at least one sensor;

processing the metadata by a central server;

receiving data from at least one data gateway;

15 processing the data received from the at least one data gateway; and

generating a report based on the data collected from the at least one wireless tag, the metadata from the at least one sensor, and the data from the at least one data gateway.

10. The method (200) as claimed in claim 9, further comprising analysing the data retrieved from the at least one wireless tag, wherein the analysis includes detecting whether the data is

20 static or dynamic.

11. The method (200) as claimed in claim 10, wherein when the data is detected as static, the method (200) further comprising:

ensuring signal strength of the at least one wireless tag; and

transmitting information of the at least one wireless tag, wherein the information includes

5 signal strength, type of data as static, start and end of job based on timestamp of location transmitted to the at least one data gateway.

12. The method (200) as claimed in claim 10, further comprising transmitting information of the at least one wireless tag, when the data is detected dynamic, wherein the information include signal strength, type of data as dynamic, start of job, and end of job based on

10 timestamp of location sent to the at least one data gateway.

13. The method (200) as claimed in claim 9, further comprising analysing the data retrieved from the at least one sensor, wherein the analysis includes detecting type of location data and whether the data is static or dynamic.

14. The method (200) as claimed in claim 13, further comprising interpolating the data from
15 the at least one sensor to determine position and direction of the at least one wireless tag in the vicinity.

15. The method (200) as claimed in claim 13, further comprising associating the at least one wireless tag to a nearest machine based on signal strength information.

16. The method (200) as claimed in claim 13, further comprising transmitting the data of the
20 at least one wireless tag associated with the machine to the central server.

17. The method (200) as claimed in claim 9, further comprising a method (300) of generating a report further comprising:

checking an available job based on the machine data transmitted to the central server;

retrieving of the at least one wireless tag locations in the same proximity of the machine;

calculating the boundary of a dynamic zone by analysing the location of the at least one wireless tag in dynamic;

- 5 assigning new zone boundaries on detection of changes in the data as dynamic;

recording all the activities in the current zone;

checking a threshold of the zone boundaries based on the locations of the at least one wireless tag and recalculating the zone boundaries on detection of a location apart from predefined boundaries;

- 10 repeating the process when the zone boundaries requires to be recalculated and reassigned;
and

establishing the data accessible for report generation and enables a visualisation on a monitoring device.

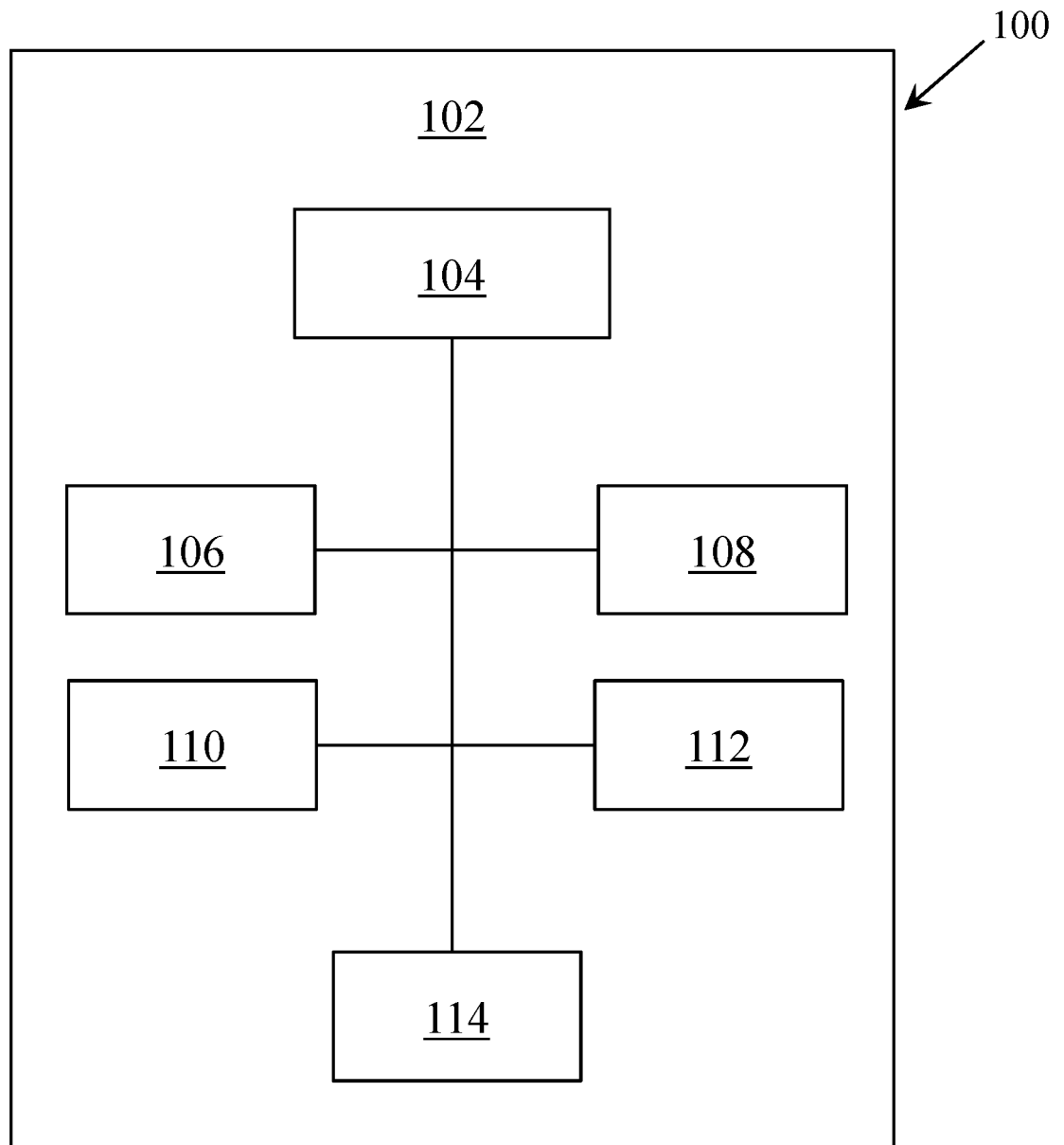
1/3

FIG. 1

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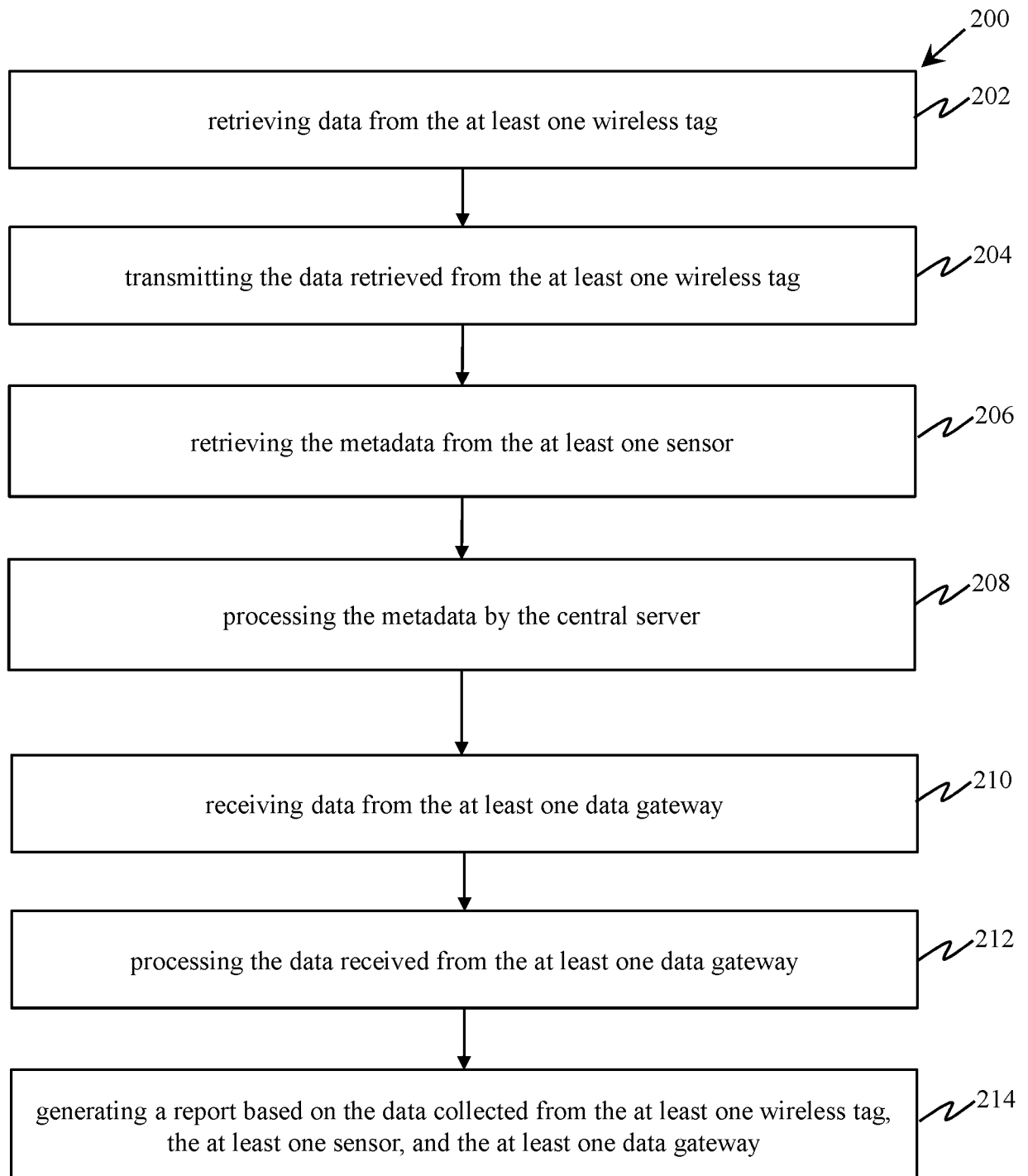


FIG. 2

3/3

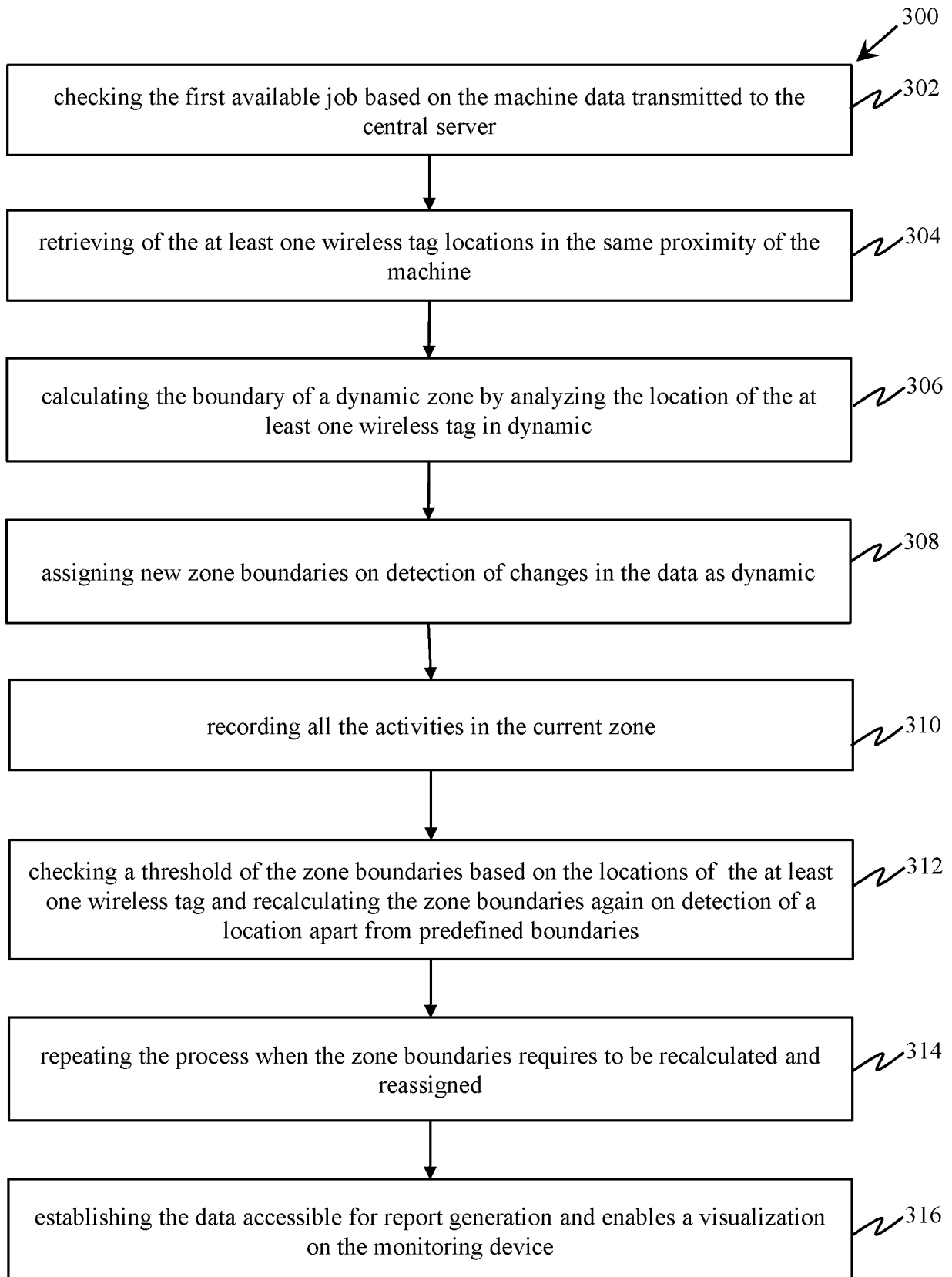


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/MY2020/050184

A. CLASSIFICATION OF SUBJECT MATTER**G06Q 10/06**(2012.01)i

FI: G06Q10/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06Q10/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2021
 Registered utility model specifications of Japan 1996-2021
 Published registered utility model applications of Japan 1994-2021

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2007-4619 A (HITACHI, LTD.) 11 January 2007 (2007-01-11) the whole document	1-17
A	WO 2018/179621 A1 (HITACHI SOLUTIONS, LTD.) 04 October 2018 (2018-10-04) the whole document	1-17

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance
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 “&” document member of the same patent family

Date of the actual completion of the international search

30 March 2021

Date of mailing of the international search report

06 April 2021

Name and mailing address of the ISA/JP

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