

MOBILE INTEGRATED DEVICE AND SYSTEM FOR IDENTIFYING POTENTIAL INFECTED SUBJECTS AND MANAGING HEALTH DATA AND METHOD OF OPERATION

BACKGROUND

5 Technical Field

The invention relates to a mobile integrated device and system for health screening and management of health data, and more particularly to a mobile integrated device and system for identifying potential infected subjects by detecting body temperature and visual symptoms and analysing for anomalies.

10 Description of Related Art

Presently, educational centres are required to take attendance and temperature of their students and, at the same time, screen for symptoms of infectious illnesses such as Hand, Foot & Mouth Disease (HFMD). With the increase in population density and air travel, the risk of imported infectious diseases and outbreak in the community has increased. Accordingly, other organisations have also taken to screening their members for symptoms of infectious illness.

Such screening process usually includes:

- (a) attendance registration of an individual
- (b) taking temperature of the individual using a thermometer
- 20 (c) visual screening of the person to check for symptoms.

In order to complete the above mentioned steps, up to three devices may be needed, e.g. a scanner for identifying the person, a thermometer for measuring temperature; and a light source (e.g. torchlight) for visual checking. If the cohort is large, recording and managing data from the screening process would be time-consuming. Further, current practice may not allow previous data to be retrieved and analysed with present data. Yet further, current practice relies on the expertise of the screening personnel who may be lacking in experience to identify anomaly situations.

Summary

According to one embodiment of the invention, a mobile integrated device for identifying potential infected subjects and managing health data of a cohort of subjects is provided. The device comprises: an identity detection module configured to detect an identifier of a subject; a temperature sensor module configured to obtain a temperature data of the subject; a camera configured to obtain an image of a body part of the subject; a memory unit; a computing unit coupled to the identity detection module, the temperature sensor module, the camera and the memory unit to receive data therefrom; wherein the computing unit is configured to ascertain whether the obtained temperature data breaches a predetermined range, receive an indication of presence or absence of a predetermined visual symptom in the subject, provide a first alert if the predetermined range is breached and if the predetermined visual symptom is indicated present, ascertain a validity of the detected identifier based on a database of registered identifiers stored in the memory unit, and store in the memory unit the obtained temperature data, the indication of presence or absence of the predetermined visual symptom in the subject and the obtained image in association with the detected identifier if the detected identifier is ascertained valid; and a communication module configured to communicatively couple to an external computing device to transfer data in the memory unit to the external computing device.

According to one embodiment of the invention, a system for identifying potential infected subjects and managing health data of a cohort of subjects is provided. The system comprises: a mobile integrated device including: an identity detection module configured to detect an identifier of a subject; a temperature sensor module configured to obtain a temperature data of the subject; a camera configured to obtain an image of a body part of the subject; a communication module; an external computer configured to communicatively couple to the mobile integrated device via the communication module, the external computer including: a computing unit configured to ascertain whether the obtained temperature data breaches a predetermined range, receive an indication of presence or absence of a predetermined visual symptom in the subject, provide a first alert if the predetermined range is breached and if the predetermined visual symptom is

indicated present in the subject, wherein the external computing device is configured to communicatively couple to a server to ascertain a validity of the detected identifier based on a database of registered identifiers stored in a memory unit at the server, store in the memory unit the obtained temperature data, the indication of presence or
5 absence of the predetermined visual symptom in the subject and the obtained image in association with the detected identifier if the detected identifier is ascertained valid.

According to one embodiment of the invention, a method for identifying potential infected subjects and managing health data of a cohort of subjects is
10 provided. The method comprises: detecting an identifier of a subject by an identity detection module housed in the integrated device; obtaining a temperature data of the subject by a temperature sensor module housed in the integrated device;
obtaining an image of a body part of the subject by a camera housed in the integrated device; receiving an indication of presence or absence of a predetermined
15 visual symptom in the subject; upon ascertaining the obtained temperature data breaches a predetermined range and ascertaining the predetermined visual symptom is indicated present, providing a first alert; ascertaining a validity of the detected identifier based on a database of registered identifiers; and storing the obtained temperature data, the indication of predetermined visual symptom and the
20 obtained image in association with the detected identifier.

As would be apparent from the following description, embodiments of the invention provide improved and more efficient identification of potential infected subjects by integrating various device functions into a mobile device, managing health data obtained from a cohort of subjects for future retrieval and analysis, and
25 provide machine analysis for detecting anomalies. As this integrated device is portable and handheld, mobility of the integrated device is an advantage and, accordingly, the collection, management and analysis of data can be managed conveniently from a single device and at any location.

Brief Description of the Drawings

30 Embodiments of the invention are disclosed hereinafter with reference to the drawings, in which:

FIG. 1A is a system block diagram of a mobile integrated device according to one embodiment of the invention;

FIG. 1B is a system block diagram of a mobile integrated device according to another embodiment of the invention

5 FIG. 2 is a flow sequence according to one embodiment of the invention;

FIG. 3 is a flow sequence according to another embodiment of the invention;

FIG. 4 illustrates different modes of operation;

FIG. 5A is an exploded view of a mobile integrated device of FIG. 1A; and

FIG. 5B is an exploded view of a mobile integrated device of FIG. 1B.

10 **Detailed Description**

In the following description, numerous specific details are set forth in order to provide a thorough understanding of various illustrative embodiments of the invention. It will be understood, however, to one skilled in the art, that embodiments of the invention may be practiced without some or all of these specific details. In
15 other instances, well known process operations have not been described in detail in order not to unnecessarily obscure pertinent aspects of embodiments being described. In the drawings, like reference numerals refer to same or similar functionalities or features throughout the several views.

FIG. 1A is a functional block diagram illustrating various components in a
20 mobile integrated device 100a according to one embodiment of the invention. The integrated device 100a comprises a microprocessor or computing unit 102, a communication module 104, input devices, e.g. a temperature sensor module 106 and an identity detection module 108, user-actuable input buttons 110a, 110b, output devices, e.g. indicator lights 112a, 112b, torchlight 114, magnetic buzzer or speaker
25 116. It is to be appreciated that the integrated device may include other components. These various components may be powered by a battery 118, e.g. lithium-ion polymer battery, which may be charged from a standard USB port or 5-V DC (direct current) adaptor. A DC to DC converter may connect the battery to various components of the integrated device 100a to provide correct supply voltages thereto.

The temperature sensor module 106 is configured to obtain or measure a temperature of a subject or human being and transmit the obtained temperature data to the computing unit 102. The temperature sensor module 106 may be an infrared contactless thermal sensor or other suitable thermal measurement devices.

5 The identity detection module 108 is configured to detect a unique parameter which identifies a subject, and transmit the detected identifier to the computing unit 102. The identity detection module 108 may include a barcode scanner for reading a barcode, a Quick Response (QR) code scanner for reading a QR code, a camera for capturing a face portrait or image of the subject, a biometric scanner for capturing a
10 biometric parameter of a subject, a Near Field Communication (NFC) reader for reading NFC tags, or other suitable devices. The identity detection module 108 may be coupled to an audio output device 116, e.g. magnetic buzzer or speaker, which provides an auditory notification or voice notification when the identity detection module 108 completes detection.

15 User-actuable buttons 110a, 110b are provided to activate or deactivate the respective temperature measuring and identity detecting functions. Such user-actuable buttons may be implemented as physical buttons or virtual buttons. The computing unit 102 is configured to receive inputs at least from the user-actuable buttons 110a, 110b to control i.e. activate or deactivate, the temperature sensor
20 module 106 and identity detection module 108. The computing unit 102 is configured to receive from the identity detection module 108 a detected identifier of a subject, ascertain a validity of the detected identifier by checking against a database of registered identifiers, provide an alert to a user if the detected identifier is invalid or unregistered. The computing unit 102 is also configured to receive temperature
25 data from the temperature sensor module 106. Both the temperature data and the detected identifier may be transmitted to an external computing device e.g. desktop computer, laptop computer, notebook computer, tablet computer, smartphone device. This transmission is enabled by the communication module 104 which may utilise suitable wired or wireless communication protocols such as, but are not limited
30 to, Wi-Fi, Bluetooth, infrared, radio frequency, cellular data communication technology and Near Field Communication (NFC). The communication module 104 may be coupled to a visual indicator 112b which may light up when a connection is

established between the integrated device 100a and an external computing device.

The computing unit 102 may be further coupled to a light source and configured to activate the light source. The computing unit 102 may be further coupled to a camera which may be part of the identity detection module 108 and
5 configured to obtain an image of a body part of a subject. Based on the obtained image, the computing unit 102 is configured to analyse the obtained image for a correspondence or similarities to any of a plurality of known symptomatic images stored in a database, which may be established from prior verified cases of infected subjects. Depending on the outcome of this analysis, the computing unit 102 is
10 configured to perform a contrast analysis on the obtained image. The computing unit 102 is configured to add the obtained image to the database of symptomatic images if the subject becomes established as an infected subject.

FIG. 1B is a system block diagram of a mobile integrated device 100b according to another embodiment of the invention. The integrated device 100b of
15 FIG. 1B comprises the various components of the embodiment of FIG. 1A. In addition, the embodiment of the FIG. 1B at least further comprises a non-volatile memory unit 120, a display unit 122 and a camera 124, all coupled to the computing unit 102. A real-time clock module is also provided to capture the date and time of an event, e.g. obtaining temperature data.

20 Various operation set-ups may be implemented with the integrated device 110a, 110b of the invention.

In one embodiment, a system comprising the mobile integrated device 100a, 100b of FIG. 1A or 1B and an external computing device communicatively coupled via a wired or wireless connection to the integrated device 100a, 100b is set up at
25 the screening site. The external computing device may be communicatively coupled via a network, e.g. Internet, to a server which may be remote from the integrated device 100a, 100b and external computing device. An operation sequence 200 of the aforementioned system is illustrated with reference to FIG. 2.

As shown in FIG. 2, the identity detection module of the integrated device is
30 activated to detect or read a subject's identifier (block 202). If a subject's identifier has been detected by the integrated device (block 204), the detected identifier is

transmitted to an external computing device coupled to the integrated device (block 206). The external computing device has been in a waiting state (block 208) and if the detected identifier is received at the external computing device (block 210), the detected identifier may be displayed at the external computing device (block 212). A
5 user may thereby ascertain that the detected identifier has been received by the external computing device.

The temperature sensor module of the integrated device is activated to obtain or measure the temperature of the subject (block 214). If a temperature data has been obtained by the integrated device (block 216), the obtained temperature data is
10 transmitted to the external computing device in the network (block 218). The external computing device has been in a waiting state (block 220) and if the obtained temperature data is received at the external computing device (block 222), the obtained temperature data may be displayed at the external computing device (block 224). A user may thereby ascertain that the temperature data has been received by
15 the external computing device. The external computing device then awaits any further data inputs (block 226).

The light source 114 of the integrated device is activated to facilitate inspection of the subject, e.g. hand, foot and mouth, for predetermined visual symptoms, e.g. ulcers, rashes (block 228). If a predetermined visual symptom is
20 ascertained present in the subject (block 230), an indication of the presence of the predetermined visual symptom is inputted to the external computing device (block 232). This indication may be manually inputted into the external computing device by the user.

At the external computing device, based on the above-described inputs which
25 have been received, if the external computing device ascertains the obtained temperature data breaches a predetermined range and receives an indication that a predetermined visual symptom is present, a first alert is provided to the user either through the external computing device or the integrated device, and the subject is isolated (block 234). Separately, the external computing device may compile these
30 received inputs (block 236) and transfer these received data to a server (block 238).

The server has been in a waiting state (block 240) and if the detected

identifier and the obtained temperature are received at the server (block 242), the server checks whether the detected identifier is a valid identifier (block 244) such as by checking against a database containing a plurality of registered identifiers. If the server ascertains that the detected identifier is valid or registered, the obtained
5 temperature data and indication of presence or absence of visual symptom will be stored in a memory unit at the server and in association with the detected identifier (block 246). Thereafter, the server will notify the external computing device that the received data have been stored (block 248). The external computing device then provides a notification to the user, via a display prompt or other suitable methods
10 such as but not limited to voice notification, that the received data have been stored (block 250).

If the server ascertains that the detected identifier is invalid or unregistered (block 244), the server will return an error message to the external computing device (block 252). The external computing device then provides a notification to the user,
15 via a display prompt or other suitable methods, that the detected identifier is invalid or unregistered (block 254). The user may then take appropriate measure, e.g. registering or recording the subject's identifier in the database (block 256).

The above-described sequence 200 may be repeated for other subjects. Eventually, data of various subjects are stored in the memory unit at the server and
20 in association with the respective subject identifiers. The stored data may be retrievable for purposes of report preparation or screening assessment.

In another embodiment, the mobile integrated device of FIG. 1B operates independently or is communicatively coupled with an external computing device at a screening site. As and when required, the integrated device is communicatively
25 coupled directly or via an external computing device to a server to transfer data stored in the integrated device to the server. An operation sequence 300 of the integrated device of FIG. 1B is illustrated with reference to FIG. 3.

As illustrated in FIG. 3, the identity detection module of the integrated device is activated to detect or read a subject's identifier (block 302). If a subject's identifier
30 has been detected by the integrated device, the detected identifier may be displayed on a display unit. A user may thereby ascertain that the detected identifier has been

received at the integrated device.

The temperature sensor module 106 of the integrated device is activated to obtain or measure the temperature of the subject (block 304). If a temperature data has been obtained by the integrated device, the obtained temperature data may be displayed on the display unit. A user may thereby ascertain that the temperature data has been received by the integrated device.

Optionally, historical temperature data corresponding to the detected identifier is retrieved from a memory unit at the integrated device (block 306). This may assist in assessing the temperature data trend of the subject.

The camera and/or light source of the integrated device is activated to facilitate inspection of the subject, e.g. hand, foot and mouth, for predetermined visual symptoms, e.g. ulcers, rashes. Particularly, at least a static or moving image of a body part e.g. mouth, hands and legs, of the subject is captured or obtained (block 308). The obtained image may be enlarged and displayed on a display unit which is provided on the integrated device or at the external computing device. The obtained image may be manually analysed by a user for correspondence to known symptoms including, but not limited to, ulcers. Optionally, if machine analysis is desired, the obtained image may be analysed by the computing unit at the integrated device, which checks for a correspondence of the obtained image to any of a plurality of known symptomatic images stored in a database at the memory unit of the integrated device (block 310). If the image corresponds or shows obvious similarities to any of the known symptomatic images stored in the database (block 312), the computing unit provides an alert to notify the user to manually inspect the subject (block 314). A detailed manual inspection may then be carried out to ascertain whether the subject shows predetermined visual symptoms.

If a predetermined visual symptom is ascertained present in the subject (block 316), an indication is inputted to the computing unit and the obtained image is added to the database of known symptomatic images to be used for future analysis (block 318). Further, if the computing unit ascertains that the obtained temperature data breaches a predetermined range (block 320), the computing provides an alert to notify the user of the identification of a potential infected subject (block 322). The

subject may then be isolated. The computing unit also ascertains whether the detected identifier is a valid identifier (block 324) such as by checking against a database containing a plurality of registered identifiers. If the detected identifier is ascertained valid or registered, the temperature data and indication of presence or absence of visual symptom data will be stored in a memory unit at the integrated device and in association with the detected identifier (block 326). If the detected identifier is ascertained invalid or unregistered, the computing unit will provide an alert to the user on the invalid detected identifier. The user may then take appropriate measure, e.g. registering or recording the subject in the database (block 328).

At block 316, if the predetermined visual symptom is ascertained absent or not present in the subject after manual inspection and an appropriate indication is inputted to the computing unit, the sequence 300 proceeds to block 324 to ascertain the validity of the detected identifier.

At block 312, if the obtained image does not correspond to any of the known symptomatic images stored in the database, a contrast analysis is performed (block 330). If the result of the contrast analysis matches any of a plurality of predetermined disease profiles stored in a memory unit, the sequence 300 proceeds to block 314 where the computing unit provides an alert to notify the user to manually inspect the subject. If the result of the contrast analysis does not match any of the stored predetermined disease profiles, the sequence 300 proceeds to block 324 to ascertain the validity of the detected identifier.

At block 308, optionally, at least one image (static or moving) of any injury sustained by the subject, e.g. cuts and bruises, may be obtained in addition to the obtained image(s) of predetermined visual symptoms. The obtained image of sustained injury may be stored in association with the detected identifier at block 326.

The above-described sequence 300 may be repeated for other subjects. Eventually, data of various subjects are stored in the memory unit of the integrated device and in association with the respective subject identifiers.

At intervals, the integrated device may communicatively couple to a server via

wired or wireless communication, and transfer stored data in the memory unit, including the detected identifiers and their corresponding obtained temperature data, indications of presence or absence of a predetermined visual symptom and images obtained from the subjects to the server to be stored therein.

5 The integrated device of FIG. 1B allow different modes of operation including, Data Procurement Mode (as described above in relation to FIGs. 2 and 3), Export Data Mode and Search Mode as illustrated by the sequence 400 in FIG. 4. The desired mode of operation is activated by using the identity detection module or by pressing a predetermined button or key sequence to read identifiers respectively
10 associated with each mode (block 402).

 If an identifier such as barcode, QR code, biometric input, NFC tag or a sequence of button or key presses corresponding to the Export Data mode is detected (block 404), the integrated device communicatively couples to a server and transfers data stored in the memory unit at the integrated device to the server via
15 wired or wireless connection (block 406). Such data relate to the detected identifiers, obtained temperature data and indications of a presence or absence of a predetermined visual symptom and images of visual symptoms and/or injury, which are accumulatively stored in the integrated device over a period of time. Upon completion of the data export, an audio and/or visual notification is provided to the
20 user (block 408).

 If an identifier such as barcode, QR code, biometric input, NFC tag or a sequence of button or key presses corresponding to the Data Entry mode is detected (block 410), the sequence as described with reference to FIG. 3 will be performed.

 If an identifier such as barcode, QR code, biometric input, NFC tag or a
25 sequence of button or key presses corresponding to the Search mode is detected (block 412), the integrated device detects an identifier of a subject (block 414), and based on the detected identifier, retrieves from the memory unit historical temperature data associated with the detected identifier (block 416).

 Various modifications or combinations of modifications may be made to the
30 above-described sequences 200, 300, including but not limited to the following:

- (1) The steps in the above-described sequences 200, 300 may be interchanged in certain other embodiments of the invention. For example, ascertaining the validity of the detected identifier may be performed and the ascertained outcome presented to the user before the user proceeds to obtain the temperature reading of the subject or input an indication of a presence or absence of the predetermined visual symptom. In another example, ascertaining whether the obtained temperature breaches a predetermined range may immediately follow after a temperature data is obtained from a subject.
- (2) The detected identifier and/or obtained temperature data may be transmitted to a public announcement system and/or public display to communicate the acquired data to a wider audience. The acquired data may be transmitted from the integrated device or from the external computing device.
- (3) At least one of the obtained temperature data, indication of predetermined visual symptoms and images of predetermined visual symptoms and/or injury may be transmitted via at least one of Short Message Service (SMS), Multimedia Messaging Service (MMS), electronic mail, mobile messaging application or apps to recipient(s), e.g. parents and/or guardians, stored in a memory unit and associated with the detected identifier to inform them the state of health of their children. Push technology may be deployed to initiate transmission of notification messages. In the case of potential outbreak, social media such as Facebook or Twitter may be deployed to notify the interest group and provide necessary instructions on the cause of action.
- (4) The detected identifier, obtained temperature data and indications of a presence or absence of a predetermined visual symptom may be transmitted to another information procurement or management system. In a hospital, for example, the acquired data may form part of the patient information record in the hospital's databases. In a corporate organisation, the acquired data may form part of the employee health information record in the organisation's databases. In an educational institution, the acquired data may form part of the students' health information record in the institution's databases. In a military organisation, the acquired data may be used to alert the units on the

state of health of each soldier before he is allowed to participate in exercise or field operation.

(5) The integrated device may be integrated with other equipment and used to monitor objects or products whose temperatures are critical to product quality.

5 (6) The integrated device may be used solely as a temperature measurement device or as an identification device, by disabling one or the other function. The acquired data may be transmitted to an external computing device or server as required.

FIG. 5A is an exploded view of the integrated device 100a according to one
10 embodiment of the invention as illustrated in FIG. 1A. The integrated device 100a includes a housing formed by a top 51 and a bottom cover 52. The housing contains a thermal sensor 53, a camera or barcode scanner 54, a light source 55, a communication module 56 (e.g. Bluetooth, Wi-Fi, infrared, radio frequency and NFC module), a battery 57, micro-USB port 58 or other types of connector port, press
15 button(s) 59 for activating the thermal sensor 53, camera or barcode scanner 54, etc.

The housing may be provided with a holder 66 which is configured to receive a smartphone or a smart device such as iPod Touch in juxtaposition with the integrated device. In this juxtaposed arrangement, the smartphone functions as an external computing device as described in the above paragraphs. The integrated
20 device may be provided with suitable water and/or dust proof covers (e.g. indicator light cover 60, scanner/camera cover 62, micro-USB port cover 63) to protect the integrated device 100a from environment wear and/or render the integrated device 100a suitable for use in different environments, e.g. in water, light drizzle or a dusty environment. The cover 60 may be provided with an opening to allow the thermal
25 sensor operate while the surrounding indicator lights remain covered.

FIG. 5B is an exploded view of the integrated device 100b according to one embodiment of the invention as illustrated in FIG. 1B. This integrated device 100b is similar to the various components of FIG. 5A.. In addition, the embodiment of FIG. 5B at least further comprises an internal memory unit (not shown), a display unit 64,
30 a light source cum camera 65 and thermal sensor cover 67 to protect the thermal sensor from dust and/or water.

It is to be appreciated that in certain other embodiments, the integrated device may house only one camera which is configured to function as the identity detection module (i.e. read a subject's identifier) and obtain image of a visual symptom on the subject.

5 As would be apparent from the above, the integrated device and above-described methods are advantageous in improving the efficiency of mandatory tasks that would be performed by educational institutions and other organisations to prevent spread of infectious diseases within the organization. Particularly, recording and managing data from the screening process are less time-consuming and more
10 reliable. Previous data can be retrieved and analysed with respect to present data. Further, machine analysis is available to assist in identifying anomaly situations.

Other embodiments will be apparent to those skilled in the art from consideration of the specification and practice of the invention. Furthermore, certain terminology has been used for the purposes of descriptive clarity, and not to limit the
15 disclosed embodiments of the invention. The embodiments and features described above should be considered exemplary.

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Claims

1. A mobile integrated device for identifying potential infected subjects and managing health data of a cohort of subjects, the mobile integrated device comprising:

5 an identity detection module configured to detect an identifier of a subject;

 a temperature sensor module configured to obtain a temperature data of the subject;

 a camera configured to obtain an image of a body part of the subject;

 a memory unit;

10 a computing unit coupled to the identity detection module, the temperature sensor module, the camera, and the memory unit to receive data therefrom;

 wherein the computing unit is configured to ascertain whether the obtained temperature data breaches a predetermined range, receive an indication of presence or absence of a predetermined visual symptom in the subject, provide a
15 first alert if the predetermined range is breached and if the predetermined visual symptom is indicated present, ascertain a validity of the detected identifier based on a database of registered identifiers stored in the memory unit, and store in the memory unit the obtained temperature data, the indication of presence or absence of the predetermined visual symptom in the subject and the obtained image in
20 association with the detected identifier if the detected identifier is ascertained valid;
 and

 a communication module configured to communicatively couple to an external computing device to transfer data in the memory unit to the external computing device.

25 2. The mobile integrated device of claim 1, wherein the computing unit is configured to analyse the obtained image for a correspondence to any of a plurality of symptomatic images stored in the memory unit, and store the obtained image in the memory unit as an addition to the plurality of symptomatic images if the

correspondence is present and if the predetermined visual symptom is indicated present in the subject.

3. The mobile integrated device of claim 2, wherein the computing unit is configured to perform contrast analysis on the obtained image if the correspondence is absent,
5 and store the obtained image in the memory unit as an addition to the plurality of symptomatic images if a result of the contrast analysis matches any of a plurality of predetermined disease profiles stored in the memory unit and if the predetermined visual symptom is indicated present in the subject.

4. The mobile integrated device of claim 3, wherein the computing unit is configured
10 to enlarge the obtained image for display on a display unit at the mobile integrated device or at the external computing device.

5. The mobile integrated device of claim 4, wherein the computing unit is configured to retrieve from the memory unit historical temperature data associated with the detected identifier.

15 6. The mobile integrated device of claim 5, wherein the obtained image includes an image of the predetermined visual symptom in the subject and an image of an injury in the subject.

7. The mobile integrated device of any of claims 1 to 6, wherein the identity
20 detection module includes one of a barcode scanner, a Quick Response (QR) code scanner, the camera, a biometric scanner and a Near Field Communication (NFC) reader.

8. The mobile integrated device of any of claims 1 to 6, wherein the communication
25 module is configured to communicatively couple to the external computing device via one of Bluetooth, Wi-Fi, infrared, radio frequency, cellular data communication technology and Near Field Communication.

9. The mobile integrated device of claim 8, wherein the computing device is configured to transmit at least one of the obtained temperature data, the indication of predetermined visual symptom and the obtained image to a recipient associated with the detected identifier via at least one of Short Message Service (SMS), Multimedia
30 Messaging Service (MMS), mobile messaging application and electronic mail.

10. A system for identifying potential infected subjects and managing health data of a cohort of subjects, the system comprising:

a mobile integrated device including:

an identity detection module configured to detect an identifier of a subject;

5 a temperature sensor module configured to obtain a temperature data of the subject;

a camera configured to obtain an image of a body part of the subject;

a communication module; and

10 an external computer configured to communicatively couple to the mobile integrated device via the communication module, the external computer including:

a computing unit configured to ascertain whether the obtained temperature data breaches a predetermined range, receive an indication of presence or absence of a predetermined visual symptom in the subject, provide a first alert if the predetermined range is breached and if the
15 predetermined visual symptom is indicated present in the subject,

wherein the external computing device is configured to communicatively couple to a server to ascertain a validity of the detected identifier based on a database of registered identifiers stored in a memory unit at the server, store in the memory unit the obtained temperature data, the indication of presence or absence of the
20 predetermined visual symptom in the subject and the obtained image in association with the detected identifier if the detected identifier is ascertained valid.

11. The system of claim 10, wherein the computing unit is configured to analyse the obtained image for a correspondence to any of a plurality of symptomatic images stored in the memory unit, and store the obtained image in the memory unit as an
25 addition to the plurality of symptomatic images if the correspondence is present and if the predetermined visual symptom is indicated present in the subject.

12. The system of claim 11, wherein the computing unit is configured to perform contrast analysis on the obtained image if the correspondence is absent, and store the obtained image in the memory unit as an addition to the plurality of symptomatic images if a result of the contrast analysis matches any of a plurality of predetermined disease profiles stored in the memory unit and if the predetermined visual symptom is indicated present in the subject.
13. The system of claim 12, wherein the computing unit is configured to enlarge the obtained image for display on a display unit at the mobile integrated device or the external computing device.
14. The system of claim 13, wherein the computing unit is configured to retrieve from the memory unit historical data associated with the detected identifier.
15. The mobile integrated device of claim 14, wherein the obtained image includes an image of the predetermined visual symptom in the subject and an image of an injury in the subject.
16. The system of any of claims 10 to 15, wherein the identity detection module includes one of a barcode scanner, a Quick Response (QR) code scanner, the camera, a biometric scanner and a Near Field Communication (NFC) reader.
17. The mobile integrated device of any of claims 10 to 15, wherein the communication module is configured to communicatively couple to the external computing device via one of Bluetooth, Wi-Fi, infrared, radio frequency, cellular data communication technology and Near Field Communication.
18. The mobile integrated device of claim 17, wherein the external computing device is configured to transmit at least one of the obtained temperature data, the indication of predetermined visual symptom and the obtained image to a recipient associated with the detected identifier via at least one of Short Message Service (SMS), Multimedia Messaging Service (MMS), mobile messaging application and electronic mail.