A STANDALONE REMOTE SURVEILLANCE SYSTEM AND A METHOD OF OPERATION THEREOF

FIELD OF THE INVENTION

The present invention generally relates to the field of surveillance and security camera system. More particularly, the present invention relates to a standalone remote surveillance system which continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations wirelessly. Advantageously, the present invention automatically monitors anomalies in 360-degree directions in the sensitive sites such as military bases, border areas, warehouses, residential areas or company offices without any interruption.

BACKGROUND OF THE INVENTION

Generally Closed-Circuit Television (CCTV) video monitoring security systems, are popularly utilized in both residential and commercial areas, at shopping malls, construction sites, and border areas and virtually at any location at which it would be beneficial to monitor activities. The CCTV monitoring system comprises the deployment of a network of surveillance cameras in a designated area, with these cameras transmitting their video feeds to a central recording device, known as a Network Video Recorder (NVR). The recorded video can be accessed in real-time and archived for future reference. Operators at a monitoring center monitor live video feeds and can promptly respond to security events and suspicious activities, often triggered by motion detection.

However, existing CCTV security systems are based on non-calibrated still cameras or manually operated Pan-Tilt-Zoom (PTZ) cameras, which provide merely a passive video stream for recording or live real-time control room observation. Objects of interest cannot be automatically detected and no close-up images of an object of interest such as a suspect's face are recorded automatically in real-time. In order to provide a close-up image of a suspect's face with such systems a control room operator must manually steer a PTZ camera toward the object of interest. Otherwise, labor-intensive post-event viewing and retrieval of the record video stream must be undertaken.

Furthermore, existing CCTV surveillance records provide a passive constant recording when there is no activity in the scene. There are no known techniques to retrieve the required video records automatically from the vast video record. In the current state of the art, operators perform labor

intensive manual screening to retrieve the required video. As the number of installed cameras increases, so does the amount of video and hence the amount of manual labor required increases accordingly.

Some of the prior arts are:

IN202111010174 discloses a smart surveillance system for detection of intruders in an area comprising, cameras with inbuilt motion sensors linked with the system for capturing images of an area, a controller linked with the cameras for receiving and processing images captured by the cameras, a cloud storage unit and an object recognition unit linked with the system for storing the received and processed data and classifying the objects contained in captured images using artificial intelligence. However, in this smart surveillance system, camera will only get active and start image processing whenever it detects any motion in its range. This motion will be detected using PIR motion detection sensor and sound sensor and fails to continuously monitor with respect to the changes in the environment of the surveillance area.

IN202211065493 discloses a surveillance camera system for suspicious activities tracking includes a set of cameras capturing and retrieving a collection of video image data, a drone automatically dispatches the camera in response to a location of an event in the security system and transmits at least video with at least one camera from the location of the event, a database for storing a video image data, a storage unit configured to store machine-readable instruction, a one or more processing unit configure to automatically detect an object of interest entering or moving in the live scene and automatically controlling the camera to enable close-up real time video capture of the object of interest, and a communication module to communicate data throughout the system. However, in this video surveillance system, the set of cameras in the location is not capable to focus on object of interest in the event and it requires a drone to that location of the event for recording the event with automatically zoom-in the object of interest which adds on the complexity as it requires additional devices for capturing live data of the event. This increases the burden on storing the data in the database and as well as more energy consumption.

US2014/0375453A1 discloses a system for detecting an intrusion attempt inside a perimeter defined by a fence including panels attached onto posts, comprising at least one housing including at least one central processing unit or CPU, which is connected to at least one memory unit, to at least one shock and/or vibration detector, and to at least one field bus and/or at least one video bus, each housing being self-contained and connected to another housing and/or to at least one remote station for transmitting at least one computer file generated by the central processing unit when a

shock and/or vibrations are detected by one of the housings. However, said system camera being triggered by the central processing unit, when the said central processing unit detects an impact and/or vibration to create a photo and/or a video sequence which is recorded in the memory unit and then transmitted to the remote station and fails to continuously monitor in 360-degree directions any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective surveillance area.

KR101399020B1 discloses a boundary line monitoring system for detecting invaders who invade an area such as the ceasefire line or the coastal area where is necessary to be monitored and for enabling a central control center to remotely monitor the invaders by capturing images through a camera and by turning on light around the invaders at the same time. The wireless sensor units aperiodically or periodically transmit encrypted communication data to an opposite wireless sensor unit by organizing a system capable of consistently executing monitoring and guard management using low-power wireless sensor units. However, in this boundary line monitoring system, the camera and illumination are activated only when there is a trigger received by the wireless sensor unit, lacking continuously capturing of visual data in the surveillance area and fails to continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective surveillance area.

IN202421033594 discloses an intelligent surveillance system with anomaly detection and notification capabilities begins with an anomaly action triggering the surveillance system, captured by outdoor CCTV cameras for further analysis. The footage is transmitted to a network video recorder (NVR) (3) for secure storage and then broadcasted to a server mainframe for central processing. The server mainframe utilizes novel Automated Learning System and Computational framework using data from an Automated Learning data model server to detect anomaly action. Upon detection, the alert system generates alerts sent to designated recipients in real-time via mobile or laptop devices which ensures prompt identification and resolution of anomalies, bolstering the surveillance system's efficacy in maintaining security and safety. However, this entire recorded video requires to be transmitted to the server for detecting anomalies increases the burden on storing the data in the server and complexity in data transmission which leads to more energy consumption.

IN202411027062 discloses a surveillance system for monitoring a region-of-interest. The surveillance system includes a plurality of sensors configured to detect one or more parameters of the region-of-interest, a communication tower in communication with the plurality of sensors, a central station in communication with the communication tower, and a drone in communication with the central station. The central station is configured to analyses the detected one or more parameters to identify a threat event in the region-of-interest. The drone upon identification of the threat event by the central station is deployed and configured to monitor the region-of-interest, and request an instruction from the central station to eliminate the threat event verified by the central station, and proceed to eliminate the threat event. However, in this system entire recorded video requires to be transmitted to the central station for detecting threat event which increases the burden on storing the data in the central station and complexity in data transmission which leads to more energy consumption.

IN202211029292 discloses a surveillance system comprising a tracking device and a control unit configured to: receive surveillance data selected from one of imaging data from an image capturing device, sensed signal from sensors, sensed data from a laser fencing and collected underground surveillance data, and collected underwater surveillance data from a ground surveillance device; detect an intrusion based on the surveillance data; generate an alarm when the intrusion is detected; and transmit the generated alarm to a user device of a concerned authority. However, when an intrusion is detected only alert is transmitted to the user and fails to transmit the real time visual data of the surrounding area of surveillance.

None of the prior arts discuss about a standalone remote surveillance system which continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations. All the data from the respective source are stored in the storage unit/any cloud server in the central station irrespective of anomalies detected data in the surveillance area. This adds on burden in storing the necessary data and retrieving the same.

Therefore, there exists a need in the state of art for a standalone remote surveillance system which continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective

surveillance area with a network of surveillance towers connected in different locations wirelessly overcoming the drawbacks of the existing system.

The information disclosed in this background of disclosure section is only for enhancement of understanding of the general background of the invention and should not be taken as acknowledgement or any form of suggestion that this information forms the prior art already known to person skilled in the art.

OBJECTS OF THE INVENTION

One or more problems of the conventional prior art may be overcome by various embodiments of the present invention.

The main object of the present invention is to provide a standalone remote surveillance system for continuous 360-degree monitoring of anomalies in surveillance area with a network of surveillance towers connected in different locations wirelessly.

Another object of the present invention is to provide a standalone remote surveillance system for continuous 360-degree monitoring of anomalies in surveillance area, which transmit real-time visual data along with alert data to the control station only upon detection of anomalies in respective surveillance area, reducing the complexity of data transmission and burden in the control station.

It is yet another objective of the present invention is to provide a standalone remote surveillance system which continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to the control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations wirelessly.

It is yet another objective of the present invention is to provide a standalone remote surveillance system, which continuously monitors any change in the surrounding visual environment based on mapped topography of the surveillance area using artificial intelligence.

It is yet another objective of the present invention is to provide a standalone remote surveillance system, which automatically monitors anomalies in 360-degree directions in the sensitive sites

such as military bases, border areas, warehouses, residential areas or company offices without any interruption.

It is yet another object of the present invention, wherein the anomalies in the surveillance area is any change in the surrounding environment including visual, sound, and vibration.

It is another object of the present invention is to provide a method for operating the standalone remote surveillance system.

These and other objects and advantages of the present subject matter will be apparent to a person skilled in the art after consideration of the following detailed description taken into consideration with accompanying drawings in which the preferred embodiment of the present subject matter are illustrated.

SUMMARY OF THE INVENTION

The following disclosure presents a simplified summary of the invention in order to provide a basic understanding of some aspects of the invention. This summary is not an extensive overview of the present invention. It is not intended to identify the key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some concept of the invention in a simplified form as a prelude to a more detailed description of the invention presented later.

Thus, the basic aspect of the present invention is to provide a standalone remote surveillance system, comprising:

a. plurality of surveillance towers fixed at a pre-defined distance from one another for monitoring anomalies in respective surveillance area;
b. one or more repeaters in communication with the respective surveillance towers in a mesh network to wirelessly communicate with each other and extend the transmission distance, in which the repeaters are configured to receive and transmit the data securely using Long Range (LoRa) communication from the surveillance towers to a control station positioned remotely,

in which each of the surveillance towers comprises:

- a pair of cameras are positioned on top of the respective surveillance towers one above the other respectively, in which the first camera is configured to capture real-time visual data of the surveillance area in 360-degree directions in vertical axis

and the second camera is configured to capture real-time visual data of the surveillance area in 360-degree directions in horizontal axis;

- at least two vibration sensors to detect vibrations in the surveillance area, in which the first vibration sensor is positioned at bottom of the surveillance towers configured to detect underground vibration in the surveillance area and the second vibration sensor positioned below the second camera in the surveillance towers configured to detect real-time resonating sounds in the surveillance area;
- a controller connected with a memory unit and a global positioning system (GPS) module, positioned within a housing of the respective surveillance towers, configured to map the topography of the surveillance area using artificial intelligence based on the surrounding visual data from the respective camera and store the mapped data in the memory unit;
- a wireless transceiver module connected with the controller, configured to transmit data from the controller to the control station through the repeaters at a pre-defined LoRa Frequency band; and
- a power supply unit connected with the first camera, second camera, first vibration sensor, second vibration sensor, controller, memory unit, GPS module, and wireless transceiver module for supplying power for its operation,

  in which
  - the controller is configured to continuously compare the real-time visual data captured by the first camera, second camera with their mapped data respectively,
  - the controller is configured to send an alert data and simultaneously transmit real-time visual data for a predefined time period to the control station through the repeaters and store the same in the memory unit, if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit upon detection of anomalies in respective surveillance area,
  - the controller is configured to continuously compare the real-time resonating sounds in the surveillance area detected by the second vibration sensor with a pre-stored frequency data in the memory unit,
  - the controller is configured to activate the respective first camera, the second camera accordingly to focus towards direction of vibrations detected by the second vibration sensor in the surveillance area, if the frequency of the real-time resonating sound does not match with the pre-stored frequency

data upon detection of anomalies in respective surveillance area and to send an alert data and transmit real-time visual data for a predefined time period to the control station through the repeaters and store the same in the memory unit,

- the controller is configured to activate the respective first camera, the second camera accordingly to focus towards direction of vibrations detected by the first vibration sensor in the surveillance area, upon detection of underground vibration in the respective surveillance area and to send an alert and transmit real-time visual data for a predefined time period to the control station through the repeaters and store the same in the memory unit, and
- the controller is configured to send the alert data and simultaneously transmit real-time visual data for a predefined time period to the control station, if both the respective first camera and second camera and the first vibration sensor, second vibration sensor detect anomalies in the respective surveillance area simultaneously.

It is another aspect of the present invention, the anomalies in the surveillance area is any change in the surrounding environment including visual, sound, and vibration.

It is another aspect of the present invention, the first camera and the second camera is a 360-degree dome night vision camera, 360-degree dome infrared red.

It is another aspect of the present invention, the distance between each surveillance towers is in the range of 75 Km to 150 km.

It is another aspect of the present invention, the number of repeaters required is selected based on the number of surveillance towers and the distance between each surveillance towers.

It is another aspect of the present invention, the control station comprising a wireless receiver module for receiving the real-time visual data and alert data from the controller through the repeaters, plurality of display devices for viewing real-time visual data and alert data received from the respective surveillance towers through the wireless receiver module and a server.

It is another aspect of the present invention, the server stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers along with the time stamp in a network of surveillance towers.

It is another aspect of the present invention, the surveillance towers and the repeaters are wirelessly interconnected and connected to the control station in the mesh network automatically based on the signal strength received respectively from each other.

It is another aspect of the present invention, the pre-defined LoRa Frequency band used for communication in the range of 1100 to 1200 MHz.

It is another aspect of the present invention, the vibration sensors includes piezoelectric vibration sensor and optical vibration sensor.

It is another aspect of the present invention, the controller is ARM microcontroller.

It is another aspect of the present invention, the power supply unit comprises a renewable power source that is connected to a primary battery and a secondary battery for storing generated electrical energy.

It is another aspect of the present invention, the renewable power source is a solar panel.

It is another aspect of the present invention, the primary battery and the secondary battery connected to the first camera, second camera, first vibration sensor, second vibration sensor, controller, memory unit, GPS module and the wireless transceiver module through a switch.

It is another aspect of the present invention, the pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder.

It is another aspect of the present invention, the predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1hour.

It is another aspect of the present invention, the alert data is classified by the controller as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers.

It is another aspect of the present invention, the controller is configured to send a malfunction alert to the control station in-case of malfunctioning of components in the surveillance towers.

It is another aspect of the present invention, the alert data includes surveillance tower identity detail along with location details of anomalies in respective surveillance area of the surveillance tower.

It is another aspect of the present invention, the surveillance tower identity detail includes unique identity number of the respective surveillance tower along with their status of primary battery and a secondary battery.

Another aspect of the present invention is to provide a method for operating the smart surveillance system, comprising steps:

a) capturing surrounding visual data of surveillance area in 360-degree directions in vertical axis through a first camera and in horizontal axis through a second camera;
b) mapping topography of the surveillance area using artificial intelligence based on the surrounding visual data from the first camera and the second camera and storing their mapped data in a memory unit by a controller;
c) capturing real-time visual data of surveillance area in 360-degree directions in vertical axis through the first camera and in horizontal axis through the second camera;
d) comparing the real-time visual data captured by the first camera and the second camera with their mapped data respectively by the controller;
e) sending an alert and simultaneously transmitting real-time visual data for a predefined time period to the control station through the repeaters and storing the same in the memory unit, if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit upon detection of anomalies in respective surveillance area;
f) monitoring underground vibration in the surveillance area through a first vibration sensor and resonating sounds in the surveillance area through a second vibration sensor;
g) comparing the real-time resonating sounds in the surveillance area detected by the second vibration sensor with pre-stored frequency data stored in the memory unit;

h) activating the respective first camera, the second camera accordingly to focus towards direction of resonating sounds detected by the second vibration sensor in the surveillance area, if the frequency of resonating sound does not match with the pre-stored frequency data sending an alert and transmitting real-time visual data for a predefined time period to the control station through the repeaters and store the same in the memory unit; and

i) activating the respective first camera, the second camera accordingly to focus towards direction of vibrations by the first vibration sensor in the surveillance area, upon detection of underground vibration in the respective surveillance area and sending an alert data and transmitting real-time visual data for a predefined time period to the control station through the repeaters and storing the same in the memory unit.

It is another aspect of the present invention, the control station comprising a wireless receiver module for receiving the real-time visual data and alert data from the controller through the repeaters, plurality of display devices for viewing real-time visual data and alert data received from the respective surveillance towers through the wireless receiver module, and a server.

It is another aspect of the present invention, the server stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers along with the time stamp in a network of surveillance towers.

It is another aspect of the present invention, the predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1 hour.

It is another aspect of the present invention, the alert data is classified by the controller as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers.

It is another aspect of the present invention, the alert data is classified as yellow alert upon detection of anomalies from one of the first vibration sensor and the second vibration sensor or one of the first camera and the second camera of the respective surveillance towers.

It is another aspect of the present invention, the alert data is classified as orange alert upon detection of anomalies from both of the first vibration sensor and the second vibration sensor or both of the first camera and the second camera of the respective surveillance.

It is another aspect of the present invention, the alert data is classified as red alert upon detection of anomalies from one of the first vibration sensor and the second vibration sensor and both of the first camera and the second camera or one of the first camera and the second camera and both of the first vibration sensor and the second vibration sensor of the respective surveillance towers.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate exemplary embodiments and, together with the description, serve to explain the disclosed principles.

Figure 1: Illustrates the view of the standalone remote surveillance system according to the present invention.

Figure 2: Illustrates the block diagram of the standalone remote surveillance system according to the present invention.

Figure 3: Illustrates the view of the surveillance tower in the standalone remote surveillance system according to the present invention.

List of Referral numerals used:

SL.NO.	PART NAME	PART NUMBER
1	Standalone remote surveillance system	100
2	Surveillance towers	1a, 1b, 1c, 1d, 1e, 1f
3	Repeaters	2a, 2b
4	Control station	3
5	First camera	4a, 4b, 4c, 4d, 4e, 4f
6	Second camera	5a, 5b, 5c, 5d, 5e, 5f
7	First vibration sensor	6a, 6b, 6c, 6d, 6e, 6f
8	Second vibration sensor	7a, 7b, 7c, 7d, 7e, 7f
9	Controller	8a, 8b, 8c, 8d, 8e, 8f
10	Memory unit	9a, 9b, 9c, 9d, 9e, 9f

11	Wireless transmitter module	10a, 10b, 10c, 10d, 10e, 10f
12	Power supply unit	11a, 11b, 11c, 11d, 11e, 11f
13	Switch	12a, 12b, 12c, 12d, 12e, 12f
14	Primary battery	13a, 13b, 13c, 13d, 13e, 13f
15	Secondary battery	14a, 14b, 14c, 14d, 14e, 14f
16	Renewable power source	15a, 15b, 15c, 15d, 15e, 15f
17	GPS module	16a, 16b, 16c, 16d, 16e, 16f
18	Wireless receiver module	17
19	Display devices	18
20	Server	19

DETAILED DESCRIPTION OF THE INVENTION WITH REFERENCE TO THE ACCOMPANYING DRAWINGS

The present invention as embodied by a "A STANDALONE REMOTE SURVEILLANCE SYSTEM AND A METHOD OF OPERATION THEREOF" succinctly fulfills the above-mentioned need[s] in the art. The present invention has objective[s] arising as a result of the above-mentioned need[s], said objective[s] being enumerated below. In as much as the objective[s] of the present invention are enumerated, it will be obvious to a person skilled in the art that the enumerated objective[s] are not exhaustive of the present invention in its entirety, and are enclosed solely for the purpose of illustration. Further, the present invention encloses within its scope and purview, any structural alternative[s] and/or any functional equivalent[s] even though, such structural alternative[s] and/or any functional equivalent[s] are not mentioned explicitly herein or elsewhere, in the present disclosure. The present invention therefore encompasses also, any improvisation[s]/modification[s] applied to the structural alternative[s]/functional alternative[s] within its scope and purview. The present invention may be embodied in other specific form[s] without departing from the essential attributes thereof.

Throughout this specification, the use of the word "comprise" and variations such as "comprises" and "comprising" may imply the inclusion of an element or elements not specifically recited.

The present invention is described hereinafter by various embodiments with reference to the accompanying drawing, wherein reference numerals used in the accompanying drawing correspond to the like elements throughout the description. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiment set forth herein. Rather, the embodiment is provided so that this disclosure will be thorough and

complete and will fully convey the scope of the invention to those skilled in the art. In the following detailed description, numeric values and ranges are provided for various aspects of the implementations described. These values and ranges are to be treated as examples only and are not intended to limit the scope of the claims. In addition, several materials are identified as suitable for various facets of the implementations.

The present invention is thus directed to a standalone remote surveillance system which continuously monitor any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to a control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations wirelessly. and a method of operation thereof. The surveillance area are sensitive areas such as military bases, border areas, warehouses, residential areas or company offices.

Referring to Figures 1 to 3, in an embodiment of the present invention, the standalone remote surveillance system [100], comprising: plurality of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] fixed at a pre-defined distance from one another for monitoring anomalies in respective surveillance area; and one or more repeaters [2a, 2b] in communication with the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] connected in a mesh network as shown in Figure 1 to wirelessly communicate with each other and extend the transmission distance, in which the repeaters [2a, 2b] are configured to receive and transmit the data securely using Long Range (LoRa) communication from the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to a control station [3] positioned remotely.

In the preferred embodiment of the present invention, each of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] as shown in Figures 2 and 3 comprises: a pair of cameras [4a, 4b, 4c, 4d, 4e, 4f] [5a, 5b, 5c, 5d, 5e, 5f] are positioned on top of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] one above the other respectively, in which the first camera [4a, 4b, 4c, 4d, 4e, 4f] is configured to capture real-time visual data of the surveillance area in 360-degree directions in vertical axis and the second camera [5a, 5b, 5c, 5d, 5e, 5f] is configured to capture real-time visual data of the surveillance area in 360-degree directions in horizontal axis; at least two vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] to detect vibrations in the surveillance area, in which the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] is positioned at bottom of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] configured to detect underground vibration in the surveillance area and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] positioned below the second camera [5a, 5b, 5c, 5d, 5e, 5f] in the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] configured to detect real-time resonating sounds in the surveillance area; a controller [8a, 8b, 8c, 8d, 8e, 8f] connected with a memory unit [9a, 9b,

9c, 9d, 9e, 9f] and a Global Positioning System (GPS) module [16a, 16b, 16c, 16d, 16e, 16f], positioned within a housing of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], configured to map the topography of the surveillance area using artificial intelligence based on the surrounding visual data from the respective camera [4a, 4b, 4c, 4d, 4e, 4f] [5a, 5b, 5c, 5d, 5e, 5f] and store the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; a wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] connected with the controller [8a, 8b, 8c, 8d, 8e, 8f], configured to transmit data from the controller [8a, 8b, 8c, 8d, 8e, 8f] to the control station [3] through the repeaters [2a, 2b] at a pre-defined LoRa Frequency band; a power supply unit [11a, 11b, 11c, 11d, 11e, 11f] is connected with the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], controller [8a, 8b, 8c, 8d, 8e, 8f], memory unit [9a, 9b, 9c, 9d, 9e, 9f], GPS module [16a, 16b, 16c, 16d, 16e, 16f], and wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] for supplying power for its operation.

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to continuously compare the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively.

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send an alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area.

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to continuously compare the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with a pre-stored frequency data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f].

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to activate respective first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of the real-time resonating sound does not match with the pre-stored frequency data upon detection of anomalies in respective surveillance area and to send an alert data and transmit real-time visual data for a predefined time

period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f].

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to activate the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area and to send an alert and transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]

In the preferred embodiment of the present invention, the pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder.

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send the alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3], if both the respective first camera [4a, 4b, 4c, 4d, 4e, 4f] and second camera [5a, 5b, 5c, 5d, 5e, 5f] and the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] detect anomalies in the respective surveillance area simultaneously.

In the preferred embodiment of the present invention, the anomalies in the surveillance area are any change in the surrounding environment including visual, sound, and vibration.

In the preferred embodiment of the present invention, the predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1 hour.

In the preferred embodiment of the present invention, wherein number of repeaters [2a, 2b] required is selected based on the number of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] is 360-degree dome night vision camera and 360-degree dome infrared red.

In the preferred embodiment of the present invention, the distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] is in the range of 75 Km to 150 km.

In the preferred embodiment of the present invention, the vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] includes piezoelectric vibration sensor and optical vibration sensor.

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is ARM microcontroller.

In the preferred embodiment of the present invention, the memory unit [9a, 9b, 9c, 9d, 9e, 9f] is a Non-Volatile Memory such as Solid-State Drive (SSD), memory card.

In the preferred embodiment of the present invention, the control station [3] comprising a wireless receiver module [17] for receiving the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b], plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d,1e,1f] through the wireless receiver module [17], and a server [19].

In the preferred embodiment of the present invention, the server [19] in the control station [3] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers [1a,1b,1c,1d, 1e, 1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d, 1e, 1f].

In the preferred embodiment of the present invention, the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the repeaters [2a, 2b] are wirelessly interconnected and connected to the control station [3] in the mesh network automatically based on the signal strength received respectively from each other.

In the preferred embodiment of the present invention, the pre-defined LoRa Frequency band used for communication in the range of 1100 to 1200 MHz.

In the preferred embodiment of the present invention, the alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send a malfunction alert to the control station [3] in-case of malfunctioning of components in the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the alert data includes surveillance tower identity detail along with location details of anomalies in respective surveillance area of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the surveillance tower identity detail includes unique identity number of the respective surveillance tower [1a, 1b, 1c, 1d, 1e, 1f] along

with their status of primary battery [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery [14a, 14b, 14c, 14d, 14e, 14f].

In the preferred embodiment of the present invention, the power supply unit [11a, 11b, 11c, 11d, 11e, 11f] comprises a renewable power source [15a, 15b, 15c, 15d, 15e, 15f] that is connected to a primary battery [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery [14a, 14b, 14c, 14d, 14e, 14f] for storing generated electrical energy.

In the preferred embodiment of the present invention, the renewable power source [15a, 15b, 15c, 15d, 15e, 15f] is a solar panel.

In the preferred embodiment of the present invention, the primary battery [13a, 13b, 13c, 13d, 13e, 13f] and the secondary battery [14a, 14b, 14c, 14d, 14e, 14f] connected to the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], controller [8a, 8b, 8c, 8d, 8e, 8f], memory unit [9a, 9b, 9c, 9d, 9e, 9f], GPS module [16a, 16b, 16c, 16d, 16e, 16f], and wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] through a switch [12a, 12b, 12c, 12d, 12e, 12f].

In the preferred embodiment of the present invention, the data stored in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] is automatically deleted approximately after 30 days from the date of capturing.

Referring to Figures 1 to 3, another embodiment of the present invention, a method for operating the standalone remote surveillance system [100], comprising steps: capturing surrounding visual data of the surveillance area in 360-degree directions in vertical axis through a first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through a second camera [5a, 5b, 5c, 5d, 5e, 5f]; mapping topography of the surveillance area using artificial intelligence based on the surrounding visual data from the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and store their mapped data in a memory unit [9a, 9b, 9c, 9d, 9e, 9f] by a controller [8a, 8b, 8c, 8d, 8e, 8f]; capturing real-time visual data of surveillance area in 360-degree directions in vertical axis through the first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through the second camera [5a, 5b, 5c, 5d, 5e, 5f]; comparing the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively by the controller [8a, 8b, 8c, 8d, 8e, 8f]; sending an alert data and simultaneously transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area; monitoring underground vibration in the surveillance area through a first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and resonating

sounds in the surveillance area through a second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f]; comparing the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with pre-stored frequency data stored in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of resonating sounds detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of resonating sound does not matches with the pre-stored frequency data sending an alert and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area and sending an alert data and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f].

In the preferred embodiment of the present invention, the control station [3] comprising a wireless receiver module [17] for receiving the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b], plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d, 1e, 1f] through the wireless receiver module [17], and a server [19].

In the preferred embodiment of the present invention, the server [19] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance tower [1a,1b,1c,1d, 1e, 1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d, 1e, 1f].

In the preferred embodiment of the present invention, the predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1 hour.

In the preferred embodiment of the present invention, the alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the alert data is classified as yellow alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f]

and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the alert data is classified as orange alert upon detection of anomalies from both of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] or both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

In the preferred embodiment of the present invention, the alert data is classified as red alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] and both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and both of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

For Illustration:

In reference to Figure 1, the present invention discloses a standalone remote surveillance system [100], comprises: plurality of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] fixed at approximately 120 Km distance from one another for monitoring anomalies in respective surveillance area; one or more repeaters [2a, 2b] in communication with the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] in a mesh network to wirelessly communicate with each other and extend the transmission distance as shown in Figure 1.

The repeaters [2a, 2b] in the system [100] of the present invention are configured to receive and transmit the data securely using Long Range (LoRa) communication from the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to a control station [3] positioned remotely.

In reference to Figure 2 & 3, each of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] in the system [100] of the present invention as shown in Figure 1, comprises: a pair of cameras [4a, 4b, 4c, 4d, 4e, 4f] [5a, 5b, 5c, 5d, 5e, 5f], at least two vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f], a controller [8a, 8b, 8c, 8d, 8e, 8f], a wireless transmitter module [10a, 10b, 10c, 10d, 10e, 10f] and a power supply unit [11a, 11b, 11c, 11d, 11e, 11f].

The pair of cameras [4a, 4b, 4c, 4d, 4e, 4f [5a, 5b, 5c, 5d, 5e, 5f] are positioned on top of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] one above the other respectively as shown in Figure 3. The first camera [4a, 4b, 4c, 4d, 4e, 4f] configured to capture real-time visual data of the

surveillance area in 360-degree directions in vertical axis and the second camera [5a, 5b, 5c, 5d, 5e, 5f] to capture real-time visual data of the surveillance area in 360-degree directions in horizontal axis. The first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] is 360-degree dome night vision camera and 360-degree dome infrared red.

The vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] are configured to detect vibrations in the surveillance area. The first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] is positioned at bottom of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to detect underground vibration in the surveillance area and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] positioned below the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to detect resonating sounds in the surveillance area as shown in Figure 3. The vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] includes piezoelectric vibration sensor and optical vibration sensor.

The controller [8a, 8b, 8c, 8d, 8e, 8f] is connected with a memory unit [9a, 9b, 9c, 9d, 9e, 9f] and a GPS module [16a, 16b, 16c, 16d, 16e, 16f] as shown in Figure 2, positioned within a housing of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], to map the topography of the surrounding area using artificial intelligence based on the surrounding visual data from the respective camera [4a, 4b, 4c, 4d, 4e, 4f] [5a, 5b, 5c, 5d, 5e, 5f] and store the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]. The controller [8a, 8b, 8c, 8d, 8e, 8f] is ARM microcontroller. The memory unit [9a, 9b, 9c, 9d, 9e, 9f] is a Non-Volatile Memory such as Solid-State Drive (SSD), memory card.

The controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to

- continuously compare the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively,
- send an alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area,
- continuously compare the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with a pre-stored frequency data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f],
- activate respective first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of the real-time

resonating sound does not match with the pre-stored frequency data upon detection of anomalies in respective surveillance area and to send an alert data and transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f],

- activate the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area and to send an alert and transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f],
- send the alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3], if both the respective first camera [4a, 4b, 4c, 4d, 4e, 4f] and second camera [5a, 5b, 5c, 5d, 5e, 5f] and the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] detect anomalies in the respective surveillance area simultaneously.

The anomalies in the surveillance area is any change in the surrounding environment including visual, sound, and vibration

The pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder.

The predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1 hour. The number of repeaters [2a, 2b] required is selected based on the number of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] as shown in Figure 2, connected with the controller [8a, 8b, 8c, 8d, 8e, 8f], to transmit data from the controller [8a, 8b, 8c, 8d, 8e, 8f] to the control station [3] through the repeaters [2a, 2b].

The alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send a malfunction alert to the control station [3] in-case of malfunctioning of components in the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The alert data includes surveillance tower identity detail along with location details of anomalies in respective surveillance area of the surveillance tower [1a, 1b, 1c, 1d, 1e, 1f].

The surveillance tower identity detail includes unique identity number of the respective surveillance tower [1a, 1b, 1c, 1d, 1e, 1f] along with their status of primary battery source [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery source [14a, 14b, 14c, 14d, 14e, 14f].

The power supply unit [11a, 11b, 11c, 11d, 11e, 11f] as shown in Figure 2, connected with the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], controller [8a, 8b, 8c, 8d, 8e, 8f], GPS module [16a, 16b, 16c, 16d, 16e, 16f], memory unit [9a, 9b, 9c, 9d, 9e, 9f] and the wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] for supplying power for its operation.

The power supply unit [11a, 11b, 11c, 11d, 11e, 11f] as shown in Figure 2, comprises a renewable power source [15a, 15b, 15c, 15d, 15e, 15f] that is connected to a primary battery [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery [14a, 14b, 14c, 14d, 14e, 14f] for storing generated electrical energy. The renewable power source [15a, 15b, 15c, 15d, 15e, 15f] is a solar panel

The primary battery [13a, 13b, 13c, 13d, 13e, 13f] and the secondary battery [14a, 14b, 14c, 14d, 14e, 14f] as shown in Figure 2, connected to the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], controller [8a, 8b, 8c, 8d, 8e, 8f], GPS module [16a, 16b, 16c, 16d, 16e, 16f] and the wireless transmitter module [10a, 10b, 10c, 10d, 10e, 10f] through a switch [12a, 12b, 12c, 12d, 12e, 12f].

The control station [3] as shown in Figure 2, comprising a wireless receiver module [17], plurality of display devices [18] and a server [19].

The wireless receiver module [17] receives the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b].

The plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d,1e,1f] through the wireless receiver module [17].

The server [19] in the control station [3] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers [1a,1b,1c,1d,1e,1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d,1e,1f].

The distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] is in the range of 75 Km to 150 km.

The surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the repeaters [2a, 2b] are wirelessly interconnected and connected to the control station [3] in the mesh network automatically based on the signal strength received respectively from each other.

The pre-defined LoRa Frequency band used for communication in the range of 1100 to 1200 MHz.

The present invention also discloses a method for operating a standalone remote surveillance system [100] comprising: capturing surrounding visual data of surveillance area in 360-degree directions in vertical axis through a first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through a second camera [5a, 5b, 5c, 5d, 5e, 5f]; mapping topography of the surveillance area using artificial intelligence based on the surrounding visual data from the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and store their mapped data in a memory unit [9a, 9b, 9c, 9d, 9e, 9f] by a controller [8a, 8b, 8c, 8d, 8e, 8f]; capturing real-time visual data of surveillance area in 360-degree directions in vertical axis through the first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through the second camera [5a, 5b, 5c, 5d, 5e, 5f]; comparing the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively by the controller [8a, 8b, 8c, 8d, 8e, 8f]; sending an alert data and simultaneously transmitting real-time visual data to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area; monitoring underground vibration in the surveillance area through a first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and resonating sounds in the surveillance area through a second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f]; comparing the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with pre-stored frequency data stored in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of resonating sounds detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of resonating sound does not matches with the pre-stored frequency data sending an alert and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations by the first vibration sensor [6a, 6b, 6c,

6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area sending an alert data and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f].

The control station [3] as shown in Figure 2, comprising a wireless receiver module [17], plurality of display devices [18] and a server [19].

The wireless receiver module [17] receives the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b].

The plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d,1e,1f] through the wireless receiver module [17].

The server [19] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers [1a,1b,1c,1d,1e,1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d,1e,1f].

The predefined time period of real-time visual data transmitted to the control station upon detection of anomalies is 30 minutes to 1 hour.

The alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The alert data is classified as yellow alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The alert data is classified as orange alert upon detection of anomalies from both of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] or both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The alert data is classified as red alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] and both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and both of the

first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

Case 1: When an anomaly is detected from one of the cameras (the first camera [4a, 4b, 4c, 4d, 4e, 4f] or the second camera [5a, 5b, 5c, 5d, 5e, 5f]) or one of the vibration sensors (the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] or the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f]), an alert data is generated by the controller and sent to the control station [3] along with real-time visual data for a predefined time period.

Illustration: Initially, the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] in any of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] upon fixing in respective surveillance area maps topography of the surrounding area using artificial intelligence followed by storing the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

The first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] captures real-time visual data in 360-degree direction in vertical axis and in 360-degree direction in horizontal axis. The controller [8a, 8b, 8c, 8d, 8e, 8f] compares the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e] and the second camera [5a, 5b, 5c, 5d, 5e] with their respective mapped data to detect anomaly. Also, the controller [8a, 8b, 8c, 8d, 8e, 8f] compares the real-time resonating sounds detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with pre-stored frequency data to detect anomaly. The pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder. If any vibration is detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], the detected vibration is sent to the controller [8a, 8b, 8c, 8d, 8e, 8f].

If the real-time visual data of the first camera [4a, 4b, 4c, 4d, 4e, 4f] orthe second camera [5a, 5b, 5c, 5d, 5e, 5f] does not match with their respective mapped data or the real-time resonating sound detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] does not match with the pre-stored frequency data or any vibration is detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], a color coded alert data is generated by the controller [8a, 8b, 8c, 8d, 8e, 8f] based on the severity of the event. The controller activates the first cameras [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] accordingly to focus towards direction of vibrations if any detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] or to focus towards direction of resonating sounds detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area upon detection of anomaly by the any of the first vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] or the second vibration sensors [7a, 7b, 7c, 7d, 7e, 7f] of

the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f]. The controller [8a, 8b, 8c, 8d, 8e, 8f] then transmits the color coded alert data comprising surveillance tower identity detail along with location details of anomalies in respective surveillance area of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to the control station [3] along with real-time visual data of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] for a time period of 30 minutes to 1 hour approximately via repeaters [2a, 2b] employing wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f].

The control station [3] receives the alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the alert data of the anomalies in respective surveillance area of the particular surveillance towers [1a,1b,1c,1d,1e,1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d,1e,1f] is stored and logged in the server [19] in the control station [3] for future reference.

Case 2: Pathway of transmission of data from surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to the control station [3] via the repeaters [2a, 2b] as shown in Figure 1.

Each of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] in the system of the present invention is wirelessly connected to control station [3] through respective repeaters [2a, 2b] via LoRa mesh network for transfer of alert data and real-time visual data to the control station [3]. Also, each of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] in the system of the present invention are wirelessly interconnected in the LoRa mesh network automatically based on the signal strength received respectively from each other for transfer of data for transfer of alert data and real-time visual data to the control station [3] if any of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] is not working at the moment.

Illustration 2a: Normally, upon detection of anomaly in the surveillance tower [1f], the controller [8f] transfers the alert data along with real-time visual data for a time period of 30 minutes to 1 hour approximately to the control station [3] via the repeater [2b]. However, if the surveillance tower [1f] losts its connection to the control station, automatic switching occurs between the surveillance tower [1f] to the nearby surveillance tower [1c] based on signal strength for capturing the anomaly detected area and simultaneously sending real-time video of the anomaly detected area directly to the control station [3] for a time period of 30 minutes-1hour approximately from the surveillance tower [1c].

Case 3: If there is occurrence of any malfunction in components of any of the of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], an alert is generated by the controller [8a, 8b, 8c, 8d, 8e, 8f] and sent to the control station [3].

Illustration 3a: If the first camera [4e] of the surveillance tower [1e] is not working but the real-time visual data from the second camera [5e] is transmitted to the controller without any delay, a malfunction alert data comprising surveillance tower identity detail along with details of the malfunction is generated by the controller [8e] and transmitting the same to the control station [3] via the repeater [2a] employing wireless transceiver module [10e].

Case 4: If there is any occurrence of natural changes in the surrounding of the respective surveillance area, the system of the present invention excludes such changes using artificial intelligence assisted mapped data of topography of that particular surveillance area and generate alert only when there is occurrence of actual changes.

Illustration 4a: The first camera [4c] and the second camera [5c] of the surveillance tower [1c] maps topography of the surrounding area using artificial intelligence. The mapped data of the first camera [4c] has trees, sky and mountains. The mapped data of the second camera [5c] has stone, river and trees.

After mapping the surveillance area, the first camera [4c] and the second camera [5c] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the first camera [4c] has trees, sky and mountains. The trees in the real-time visual data of the first camera [4c] is grown little taller with flowers and fruits. However, while comparing the mapped data of the first camera [4c] with the real-time data, the controller excludes this change and does not generate any alert to the control station [3] as these changes are natural.

The real-time visual data of the surveillance area captured by the second camera [5a] has foot print, trees, mountains and stone. The stone in the real-time visual data is moved from its original position and the real-time visual data has foot print. While comparing the mapped data of the second camera [5a] with the real-time visual data by the controller, an alert is generated and sent to the control station [3] along with real-time visual data of the anomaly detected area.

Case 5: In case an anomaly is detected by one of the first camera [4a, 4b, 4c, 4d, 4e, 4f]or the second camera [4a, 4b, 4c, 4d, 4e, 4f] /one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] or the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] of any of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], the controller [8a, 8b, 8c, 8d, 8e, 8f] send a yellow alert along with real-time visual data for a predefined time period to the control station [3].

Illustration 5a: After fixing the surveillance tower [1a] in respective surveillance area, the first camera [4a] and the second camera [5a] of the surveillance tower [1a] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9a].

The mapped data of the first camera [4a] has sky, trees, mountains and stone and the mapped data of the second camera [5a] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4a] and the second camera [5a] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the surveillance area captured by the first camera [4a] has drone flying, sky, trees, mountains and stone. The real-time visual data of the surveillance area captured by the second camera [5a] has trees, mountains and stone.

The controller [8a] compares the real-time visual data of the first camera [4a] and the second camera [5a] with their respective mapped data in the memory unit [9a]. Upon comparison, detecting an anomaly from the first camera [4a] as the real-time visual data does not match with the mapped data.

Also, the controller [8a] compares the real-time resonating sounds detected by the second vibration sensor [7a] with pre-stored frequency data to detect anomaly. The pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder. If any vibration is detected by the first vibration sensor [6a], the detected vibration is sent to the controller [8a]. The first vibration sensor [6a] did not detect any vibration and the real-time resonating sounds detected by the second vibration sensor [7a] match with the pre-stored frequency data.

The controller [8a] sends a yellow alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1a] and simultaneously transmits real-time visual data of the surveillance area from the respective surveillance tower [1a] for a time period of 30 minutes to 1 hour approximately to the control station [3] via repeater [2a].

The control station [3] receives the alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the alert data of the anomalies in the surveillance area of the surveillance tower [1a] along with the time stamp is stored and logged in the server [19] in the control station [3] for future reference.

Illustration 5b: After fixing the surveillance tower [1f] in respective surveillance area, the first camera [4f] and the second camera [5f] of the surveillance tower [1f] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9f]. The mapped data of the first camera [4f] has sky, trees, mountains and stone and the mapped data of the second camera [5f] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4f] and the second camera [5f] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the surveillance area captured by the first camera [4f] has sky, trees, mountains and stone. The real-time visual data of the surveillance area captured by the second camera [5f] has trees, mountains and stone.

The controller [8f] compares the real-time visual data of the first camera [4f] and the second camera [5f] with their respective mapped data in the memory unit [9f]. Upon comparison, the real-time visual data of the first camera [4f] and the second camera [5f] matches with the mapped data. No anomaly is detected from real-time visual data of the first camera [4f] or the second camera [5f].

The first vibration [6f] and the second vibration [7f] of the surveillance tower [1f] checks for any vibration/sound is occurring in the surveillance area.

No vibration is detected by the first vibration sensor [6f]. The second vibration sensor [7f] detects the real-time resonating sound of a human voice and gun firing sound at a far distance.

The controller [8f] compares the real-time resonating sound of the second vibration sensor [7f] with the pre-stored frequency data in the memory unit [9f]. The pre-stored frequency data includes natural sound data of animals, birds, wind, rain, and thunder.

An anomaly detected as the real-time resonating sound of the second vibration sensor [7f] does not match with the pre-stored frequency data. The controller activates the first camera [4f] or the second camera [5f] accordingly to focus on direction of anomaly detected area.

The controller [8f] sends a yellow alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1f] and simultaneously transmits real-time visual data of the surveillance area for a time period of 30 minutes to 1 hour approximately to the control station [3] via the repeater [2b].

The control station [3] receives the yellow alert data along with real-time visual data via wireless receiver module [17] and displays the received visual data in plurality of display devices [18]. The real-time visual data and the alert data of the anomalies in the surveillance area of the surveillance tower [1f] along with the time stamp is stored and logged in the server [19] in the control station [3] for future reference.

Case 6: In case anomalies detected by both of the first cameras [4a, 4b, 4c, 4d, 4e, 4f] and the second cameras [5a, 5b, 5c, 5d, 5e, 5f] or both of the first vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensors [7a, 7b, 7c, 7d, 7e, 7f] of any of the surveillance towers [1a, 1b,

1c, 1d, 1e, 1f], the controller [8a, 8b, 8c, 8d, 8e, 8f] send an orange alert along with real-time visual data to the control station [3].

Illustration 6a: After fixing the surveillance tower [1d] in respective surveillance area, the first camera [4d] and the second camera [5d] of the surveillance tower [1d] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9d]. The mapped data of the first camera [4d] has sky, sand, trees, mountains and stone and the mapped data of the second camera [5d] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4d] and the second camera [5d] starts capturing the visual data of the surrounding area in real-time. The real-time visual data of the surveillance area captured by the first camera [4d] has foot print of a vehicle tyre in the sand, sky, trees, mountains and stone the real-time visual data of the surveillance area captured by the second camera [5d] has drone, trees, mountains and stone.

The controller [8d] compares the real-time visual data of the first camera [4d] and the second camera [5d] with their respective mapped data in the memory unit [9d]. Upon comparison, detecting anomalies as the real-time visual data of the first camera [4d] and the second camera [5d] does not match with the mapped data.

Also, the controller [8d] compares the real-time resonating sounds detected by the second vibration sensor [7d] with pre-stored frequency data to detect anomaly. The pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder. If any vibration is detected by the first vibration sensor [6d], the detected vibration is sent to the controller [8d]. The first vibration sensor [6d] did not detect any vibration and the real-time resonating sounds detected by the second vibration sensor [7d] match with the pre-stored frequency data.

The controller [8d] sends an orange alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1d] and simultaneously transmits real-time visual data of the surveillance area from the respective surveillance tower [1d] for a time period of 30 minutes to 1 hour to the control station [3] via the repeater [2a].

The control station [3] receives the orange alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the orange alert data of the anomalies in the surveillance area of the surveillance tower [1d] along with the time stamp is stored and logged in the server [19] in the control station [3] for future reference.

Illustration 6b: After fixing the surveillance tower [1e] in respective surveillance area, the first camera [4e] and the second camera [5e] of the surveillance tower [1e] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9e]. The mapped data of the first camera [4e] has sky, trees, mountains and stone and the mapped data of the second camera [5e] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4e] and the second camera [5e] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the surveillance area captured by the first camera [4e] has sky, trees, mountains and stone. The real-time visual data of the surveillance area captured by the second camera [5e] has trees, mountains and stone.

The controller [8e] compares the real-time visual data of the first camera [4e] and the second camera [5e] with their respective mapped data in the memory unit [9e]. Upon comparison, the real-time visual data of the first camera [4e] and the second camera [5e] matches with the mapped data. No anomaly is detected from real-time visual data of the first camera [4e] or the second camera [5e].

The first vibration [6e] and the second vibration [7e] of the surveillance tower [1e] checks for any vibration/sound is occurring in the surveillance area.

The first vibration sensor [6e] detects anonymous underground vibration caused by digging. The second vibration detects the human walking sound approaching the surveillance tower [1e].

The controller [8e] compares the real-time resonating sound of the second vibration sensor [7e] with the pre-stored frequency data in the memory unit [9e]. The pre-stored frequency data includes natural sound data of animals, birds, wind, rain, and thunder.

Anomalies detected as the real-time resonating sound of the second vibration sensor [7e] does not match with the pre-stored frequency data and also vibration is detected by the first vibration sensor [6e]. The controller [8e] activates the first camera [4e], the second camera [5e] accordingly to focus the direction of anomalies detected.

The controller [8e] sends an orange alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1e] and simultaneously transmits real-time visual data of the surveillance area from the respective surveillance tower [1e] for a time period 30 minutes to 1 hour to the control station [3] via the repeater [2b].

The control station [3] receives the orange alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the orange alert data of the anomalies in the surveillance area of the surveillance tower [1e] along with the time stamp in a network of surveillance towers [1e] is stored and logged in the server [19] in the control station [3] for future reference.

Case 7: In case anomalies detected by both of the first cameras [4a, 4b, 4c, 4d, 4e, 4f] and the second cameras [5a, 5b, 5c, 5d, 5e, 5f] and one of the first vibration sensors[6a, 6b, 6c, 6d, 6e, 6f] orsecond vibration sensors [7a, 7b, 7c, 7d, 7e, 7f] or both of the first vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensors [7a, 7b, 7c, 7d, 7e, 7f] and one of the first cameras [4a, 4b, 4c, 4d, 4e, 4f]/second cameras [5a, 5b, 5c, 5d, 5e, 5f] of any of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], the controller [8a, 8b, 8c, 8d, 8e, 8f] send a red alert along with real-time visual data to the control station [3] for a predefined time period.

Illustration 7a: After fixing the surveillance tower [1d] in respective surveillance area, the first camera [4d] and the second camera [5d] of the surveillance tower [1d] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9d]. The mapped data of the first camera [4d] has sand, sky, trees, mountains and stone and the mapped data of the second camera [5d] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4d] and the second camera [5d] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the surveillance area captured by the first camera [4d] has foot print in the sand, sky, trees, mountains and stone the real-time visual data of the surveillance area captured by the second camera [5d] has drone, trees, mountains and stone.

The controller [8d] compares the real-time visual data of the first camera [4d] and the second camera [5d] with their respective mapped data in the memory unit [9d]. Anomalies detected from the first camera [4d] and the second camera [5d] as the real-time visual data of the both the camera [4d] [5d] does not match with the mapped data.

Also, the controller [8d] compares the real-time resonating sounds detected by the second vibration sensor [7d] with pre-stored frequency data to detect anomaly. The pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder. If any vibration is detected by the first vibration sensor [6d], the detected vibration is sent to the controller [8d]. The first vibration sensor [6d] detects anonymous digging vibration. The real-time resonating sounds detected by the second vibration sensor [7d] is bird sound and match with the pre-stored frequency data.

The controller [8d] sends a red alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1d] and simultaneously transmits real-time visual data of the surveillance area from the respective surveillance tower [1d] to the control station [3] via repeater [2a].

The control station [3] receives the red alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the red alert data of the anomalies in the surveillance area of the surveillance tower [1d] along with the time stamp in a network of surveillance towers [1d] is stored and logged in the server [19] in the control station [3] for future reference.

Illustration 7b: After fixing the surveillance tower [1b] in respective surveillance area, the first camera [4b] and the second camera [5b] of the surveillance tower [1b] maps topography of the surrounding area using artificial intelligence and stores the mapped data in the memory unit [9b]. The mapped data of the first camera [4b] has sky, trees, mountains and stone and the mapped data of the second camera [5b] has trees, stone, mountains.

After mapping the surveillance area, the first camera [4b] and the second camera [5b] starts capturing the visual data of the surveillance area in real-time. The real-time visual data of the surveillance area captured by the first camera [4b] has sky, trees, mountains and stone. The real-time visual data of the surveillance area captured by the second camera [5b] has human, trees, mountains and stone.

The controller [8b] compares the real-time visual data of the first camera [4b] and the second camera [5b] with their respective mapped data in the memory unit [9b]. Upon comparison, the real-time visual data of the first camera [4b] matches with the mapped data and anomaly detected as the real-time visual data of the second camera [5b] does not match with the mapped data.

The first vibration [6b] and the second vibration [7b] of the surveillance tower [1b] checks for any vibration/sound is occurring in the surveillance area.

The first vibration sensor [6b] detects anonymous underground vibration caused by digging. The second vibration detects the human walking sound approaching the surveillance tower [1b].

The controller [8b] compares the real-time sound data of the second vibration sensor [7b] with the pre-stored frequency data in the memory unit [9b]. The pre-stored frequency data includes natural sound data of animals, birds, wind, rain, and thunder.

Upon comparison, detecting anomalies from the second vibration sensor [7b] as the real-time sound does not match with the pre-stored frequency data and also vibration is detected by the first vibration sensor [6b]. The controller [8b] activates the first camera [4b] accordingly to focus the direction of anomalies detected.

The controller [8b] sends a red alert data comprising surveillance tower identity detail along with location details of anomalies in the surveillance area of the surveillance towers [1b] and simultaneously transmits real-time visual data of the surveillance area from the respective surveillance tower [1b] for a time period 30 minutes to 1 hour to the control station [3] via the repeater [2a].

The control station [3] receives the red alert data and real-time visual data via wireless receiver module [17] and displaying the received visual data in plurality of display devices [18]. The real-time visual data and the red alert data of the anomalies in the surveillance area of the surveillance tower [1e] along with the time stamp in a network of surveillance towers [1e] is stored and logged in the server [19] in the control station [3] for future reference.

Advantages of the present invention:

- The system continuously monitors any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to the control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations wirelessly.
- Secured transmission of alert data and real-time visual data to the control station using LoRa communication.
- The surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] transmits alert data and real-time visual data to the control station without any interruption in power supply as it is self-powered renewal power source connected with primary battery and secondary battery.
- The system of the present invention stores all the daily data in memory unit of respective towers and only the anomaly data that is the alert data and real-time visual data is transferred to the control station which reduces burden on storing the data in the control station.
- Color code-based alerts are generated by the system of the present invention which in turn benefit in prioritizing the action to be taken on to the respective surveillance area.
- Does not required man power to control the camera focusing towards anomaly detected area.

- Applicable for border protection of sensitive sites, such as military bases, warehouses, commercial areas, residential areas or company offices.

Thus, from the above it is concluded that features of the standalone remote surveillance system of the present invention are found to be advantageous when compared to the conventional system as it continuously monitors any change in the surrounding environment including visual, sound, and vibration surrounding the surveillance area in 360-degree directions and transmit real-time visual data along with alert data to the control station only upon detection of anomalies in respective surveillance area with a network of surveillance towers connected in different locations wirelessly eliminating the burden on storing all data in the control station. Further, the system of the present invention reduces false alerts by comparing real-time visual data with mapped area and real-time sounds with pre-stored frequency thereby increasing the achieving maximum efficiency of the system. Furthermore, the present system is able to transmit alert data to control station without any interruption in network and power supply.

It will be apparent to a person skilled in the art that the above description is for illustrative purposes only and should not be considered as limiting. Various modifications, additions, alterations, and improvements without deviating from the scope of the invention may be made by a person skilled in the art.

The figures and the foregoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, order of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts need to be necessarily performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples.

WE CLAIM:

1. A standalone remote surveillance system [100], comprising :
    a. plurality of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] fixed at a pre-defined distance from one another for monitoring anomalies in respective surveillance area; and
    b. one or more repeaters [2a, 2b] in communication with the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] in a mesh network to wirelessly communicate with each other and extend the transmission distance, wherein the repeaters [2a, 2b] are configured to receive and transmit the data securely using Long Range (LoRa) communication from the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] to a control station [3] positioned remotely,

    wherein each of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] comprises:

    - a pair of cameras [4a, 4b, 4c, 4d, 4e, 4f] [5a, 5b, 5c, 5d, 5e, 5f] are positioned on top of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] one above the other respectively, wherein the first camera [4a, 4b, 4c, 4d, 4e, 4f] is configured to capture real-time visual data of the surveillance area in 360-degree directions in vertical axis and the second camera [5a, 5b, 5c, 5d, 5e, 5f] is configured to capture real-time visual data of the surveillance area in 360-degree directions in horizontal axis;
    - at least two vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] to detect vibrations in the surveillance area, wherein the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] is positioned at bottom of the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] configured to detect underground vibration in the surveillance area and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] positioned below the second camera [5a, 5b, 5c, 5d, 5e, 5f] in the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] configured to detect real-time resonating sounds in the surveillance area;
    - a controller [8a, 8b, 8c, 8d, 8e, 8f] connected with a memory unit [9a, 9b, 9c, 9d, 9e, 9f] and a Global Positioning System (GPS) module [16a, 16b, 16c, 16d, 16e, 16f], positioned within a housing of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f], configured to map the topography of the surveillance area using artificial intelligence based on the surrounding visual data from the respective camera [4a, 4b, 4c, 4d, 4e, 4f]

[5a, 5b, 5c, 5d, 5e, 5f] and store the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f];

- a wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] connected with the controller [8a, 8b, 8c, 8d, 8e, 8f], configured to transmit data from the controller [8a, 8b, 8c, 8d, 8e, 8f] to the control station [3] through the repeaters [2a, 2b] at a pre-defined LoRa Frequency band; and
- a power supply unit [11a, 11b, 11c, 11d, 11e, 11f] is connected with the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], controller [8a, 8b, 8c, 8d, 8e, 8f], memory unit [9a, 9b, 9c, 9d, 9e, 9f], GPS module [16a, 16b, 16c, 16d, 16e, 16f], and wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] for supplying power for its operation, wherein
    - the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to continuously compare the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively,
    - the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send an alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area,
    - the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to continuously compare the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with a pre-stored frequency data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f],
    - the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to activate respective first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of the real-time

resonating sound does not match with the pre-stored frequency data upon detection of anomalies in respective surveillance area and to send an alert data and transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f],

- the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to activate the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations detected by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area and to send an alert data and transmit real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], and
- the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send the alert data and simultaneously transmit real-time visual data for a predefined time period to the control station [3], if both the respective first camera [4a, 4b, 4c, 4d, 4e, 4f] and second camera [5a, 5b, 5c, 5d, 5e, 5f] and the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] detect anomalies in the respective surveillance area simultaneously.

2. The standalone remote surveillance system [100] as claimed in claim 1, wherein the anomalies in the surveillance area is any change in the surrounding environment including visual, sound, and vibration.

3. The standalone remote surveillance system [100] as claimed in claim 1, wherein the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] is a 360-degree dome night vision camera, 360-degree dome infrared red.

4. The standalone remote surveillance system [100] as claimed in claim 1, wherein the distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] is in the range of 75 Km to 150 km.

5. The standalone remote surveillance system [100] as claimed in claim 1, wherein number of repeaters [2a, 2b] required is selected based on the number of surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the distance between each surveillance towers [1a, 1b, 1c, 1d, 1e, 1f]

6. The standalone remote surveillance system [100] as claimed in claim 1, wherein the control station [3] comprising a wireless receiver module [17] for receiving the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b], plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d,1e,1f] through the wireless receiver module [17], and a server [19].

7. The standalone remote surveillance system [100] as claimed in claim 6, wherein the server [19] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance towers [1a,1b,1c,1d, 1e,1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d, 1e,1f].

8. The standalone remote surveillance system [100] as claimed in claim 1, wherein the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f] and the repeaters [2a, 2b] are wirelessly interconnected and connected to the control station [3] in the mesh network automatically based on the signal strength received respectively from each other.

9. The standalone remote surveillance system [100] as claimed in claim 1, wherein the pre-defined LoRa Frequency band used for communication in the range of 1100 to 1200 MHz.

10. The standalone remote surveillance system [100] as claimed in claim 1, wherein the vibration sensors [6a, 6b, 6c, 6d, 6e, 6f] [7a, 7b, 7c, 7d, 7e, 7f] includes piezoelectric vibration sensor and optical vibration sensor.

11. The standalone remote surveillance system [100] as claimed in claim 1, wherein the controller [8a, 8b, 8c, 8d, 8e, 8f] is ARM microcontroller.

12. The standalone remote surveillance system [100] as claimed in claim 1, wherein a power supply unit [11a, 11b, 11c, 11d, 11e, 11f] comprises a renewable power source [15a, 15b, 15c, 15d, 15e, 15f] that is connected to a primary battery [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery [14a, 14b, 14c, 14d, 14e, 14f] for storing generated electrical energy.

13. The standalone remote surveillance system [100] as claimed in claim 1, wherein the renewable power source [15a, 15b, 15c, 15d, 15e, 15f] is a solar panel.

14. The standalone remote surveillance system [100] as claimed in claim 1, wherein the primary battery [13a, 13b, 13c, 13d, 13e, 13f] and the secondary battery [14a, 14b, 14c, 14d, 14e, 14f] is connected to the first camera [4a, 4b, 4c, 4d, 4e, 4f], second camera [5a, 5b, 5c, 5d, 5e, 5f], first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f], second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f], and the controller [8a, 8b, 8c, 8d, 8e, 8f], memory unit [9a, 9b, 9c, 9d, 9e, 9f], GPS module [16a, 16b, 16c, 16d, 16e, 16f], and wireless transceiver module [10a, 10b, 10c, 10d, 10e, 10f] through a switch [12a, 12b, 12c, 12d, 12e, 12f].

15. The standalone remote surveillance system [100] as claimed in claim 1, wherein the pre-stored frequency data includes natural and mimic sound data of animals, birds, wind, rain, and thunder.

16. The standalone remote surveillance system [100] as claimed in claim 1, wherein the predefined time period of real-time visual data transmitted to the control station [3] upon detection of anomalies is 30 minutes to 1 hour.

17. The standalone surveillance system [100] as claimed in claim 1, wherein the alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

18. The standalone remote surveillance system [100] as claimed in claim 1, wherein the controller [8a, 8b, 8c, 8d, 8e, 8f] is configured to send a malfunction alert to the control station [3] in-case of malfunctioning of any components in the surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

19. The standalone remote surveillance system [100] as claimed in claim 1, wherein the alert data includes surveillance tower identity detail along with location details of anomalies in respective surveillance area of the surveillance tower [1a, 1b, 1c, 1d, 1e, 1f].

20. The standalone remote surveillance system [100] as claimed in claim 19, wherein the surveillance tower identity detail includes unique identity number of the respective

surveillance tower [1a, 1b, 1c, 1d, 1e, 1f] along with their status of primary battery [13a, 13b, 13c, 13d, 13e, 13f] and a secondary battery [14a, 14b, 14c, 14d, 14e, 14f].

21. A method of operation of the standalone remote surveillance system [100] as claimed in claim 1 comprising steps:

a) capturing surrounding visual data of surveillance area in 360-degree directions in vertical axis through a first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through a second camera [5a, 5b, 5c, 5d, 5e, 5f];

b) mapping topography of the surveillance area using artificial intelligence based on the surrounding visual data from the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and store their mapped data in a memory unit [9a, 9b, 9c, 9d, 9e, 9f] by a controller [8a, 8b, 8c, 8d, 8e, 8f];

c) capturing real-time visual data of surveillance area in 360-degree directions in vertical axis through the first camera [4a, 4b, 4c, 4d, 4e, 4f] and in horizontal axis through the second camera [5a, 5b, 5c, 5d, 5e, 5f];

d) comparing the real-time visual data captured by the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] with their mapped data respectively by the controller [8a, 8b, 8c, 8d, 8e, 8f];

e) sending an alert data and simultaneously transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f], if the real-time visual data of the surveillance area does not match with the mapped data in the memory unit [9a, 9b, 9c, 9d, 9e, 9f] upon detection of anomalies in respective surveillance area;

f) monitoring underground vibration in the surveillance area through a first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and resonating sounds in the surveillance area through a second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f];

g) comparing the real-time resonating sounds in the surveillance area detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] with pre-stored frequency data stored in the memory unit [9a, 9b, 9c, 9d, 9e, 9f];

h) activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of resonating sounds detected by the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] in the surveillance area, if the frequency of resonating sound does not matches with the pre-stored

frequency data and sending an alert and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and store the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f]; and

i) activating the respective first camera [4a, 4b, 4c, 4d, 4e, 4f], the second camera [5a, 5b, 5c, 5d, 5e, 5f] accordingly to focus towards direction of vibrations by the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] in the surveillance area, upon detection of underground vibration in the respective surveillance area and sending an alert data and transmitting real-time visual data for a predefined time period to the control station [3] through the repeaters [2a, 2b] and storing the same in the memory unit [9a, 9b, 9c, 9d, 9e, 9f].

22. The method of operation of the standalone remote surveillance system [100] as claimed in claim 21, wherein the control station [3] comprising a wireless receiver module [17] for receiving the real-time visual data and alert data from the controller [8a, 8b, 8c, 8d, 8e, 8f] through the repeaters [2a, 2b], plurality of display devices [18] for viewing real-time visual data and alert data received from the respective surveillance towers [1a,1b,1c,1d, 1e, 1f] through the wireless receiver module [17], and a server [19].

23. The method of operation of the standalone remote surveillance system [100] as claimed in claim 22, wherein the server [19] stores and logs the real-time visual data and alert data of the anomalies in respective surveillance area of the particular surveillance tower [1a,1b,1c,1d, 1e, 1f] along with the time stamp in a network of surveillance towers [1a,1b,1c,1d, 1e, 1f].

24. The method of operation of the standalone remote surveillance system [100] as claimed in claim 21, wherein the predefined time period is 30 minutes to 1 hour.

25. The method of operation of the standalone remote surveillance system [100] as claimed in claim 21, wherein the alert data is classified by the controller [8a, 8b, 8c, 8d, 8e, 8f] as yellow, orange and red based on severity of the anomalies detected in the surveillance area of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

26. The method of operation of the standalone remote surveillance system [100] as claimed in claim 25, wherein the alert data is classified as yellow alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor

[7a, 7b, 7c, 7d, 7e, 7f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

27. The method of operation of the standalone remote surveillance system [100] as claimed in claim 25, wherein the alert data is classified as orange alert upon detection of anomalies from both of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] or both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].

28. The method of operation of the standalone remote surveillance system [100] as claimed in claim 25, wherein the alert data is classified as red alert upon detection of anomalies from one of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] and both of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] or one of the first camera [4a, 4b, 4c, 4d, 4e, 4f] and the second camera [5a, 5b, 5c, 5d, 5e, 5f] and both of the first vibration sensor [6a, 6b, 6c, 6d, 6e, 6e, 6f] and the second vibration sensor [7a, 7b, 7c, 7d, 7e, 7f] of the respective surveillance towers [1a, 1b, 1c, 1d, 1e, 1f].