Claims

1. An edge device for image capture and processing, the edge device comprising:

one or more processors (processor(s));

one or more cameras (camera(s));

a GPS device;

an inertial measurement unit (IMU);

a network interface for enabling communication between the edge device and a remote server; and

a memory accessible to the processor(s), the memory comprising program code executable by the processor(s) to:

in response to a signal from the IMU or the GPS device indicating movement of the edge device, trigger the capture of images by the camera(s);

process the captured images to determine a quality metric for each of the captured images;

discard images with a quality metric below a predefined image quality threshold to obtain a first refined image set;

perform object detection on the first refined image set to detect one or more location markers in the images of the first refined image set;

discard images not including location markers in the first refined image set to obtain a second refined image set;

perform similarity analysis of the images in the second refined image set to identify clusters of similar images;

select a representative image from each cluster of similar images to obtain a location representative image set; and

transmit the location representative image set and GPS data associated with the representative images to the remote server.

2. An edge device for image capture and processing, the edge device comprising:

one or more cameras (camera(s));

a GPS device;

one or more processors (processor(s));

a network interface for enabling communication between the edge device and a remote server; and

a memory accessible to the processor(s), the memory comprising program code executable by the processor(s) to:

trigger capture of images by the camera(s);

process the captured images to obtain location representative image set; and

transmit the location representative image set and GPS location data associated with the location representative image set to the remote server through the network interface;

wherein processing the captured images comprises performing object detection on the images to detect one or more location markers;

the location representative image set is based on the images where the one or more location markers are detected; and

the edge device further comprises an inertial measurement unit (IMU) and the capturing of images is triggered on detection of motion by the IMU or the GPS device.

3. The edge device of claim 2, wherein processing the captured images comprises:

determination of a quality metric for each of the images; and

processing only the images with a quality metric above a predefined quality threshold to obtain the location representative image set.

4. The edge device of claim 1 or claim 3, wherein the location markers comprise one or more of: traffic signs, named storefronts, street signs, landmarks.

5. The edge device of any one of claims 2 to 4, wherein processing the captured images comprises:

performing a similarity analysis of the captured images to identify clusters of similar images; and

selecting a representative image from each cluster of similar images; wherein the location representative image set is obtained based on a representative image from each cluster of similar images.

6. The edge device of claim 1 or claim 5, wherein the similarity analysis is performed for images captured over a predefined time window;

optionally wherein the predefined time window is any one of: 15 seconds, or 30 seconds, or 45 seconds, or 60 seconds, or 75 seconds, or 90 seconds, or 105 seconds, or 120 seconds.

7. The edge device of any one of claims 1 to 6, wherein the location representative image set is compressed before transmission.

8. The edge device of any one of claims 1 to 6, wherein the location representative image set is transformed into a compressed video before transmission.

9. The edge device of any one of claims 1 to 8, wherein the edge device is mounted on a helmet to capture the images as a wearer of the helmet navigates an area.

10. The edge device of any one of claims 1 to 9, wherein the network interface comprises a cellular network radio device for transmission of signals over a cellular network.

11. The edge device of any one of claims 1 to 10, wherein the memory comprises geo-fence data and the processor(s) is configured to:

determine presence of the edge device in a geo-fenced area based on the geo-fence data and data from the GPS device; and

trigger the capture of images in response to determining that the edge device is present in the geo-fenced area.

12. A method for image capture and processing, the method comprising

providing an edge device for image capture and processing, the edge device comprising: one or more processors (processor(s)), one or more cameras (camera(s)), a GPS device, an inertial measurement unit (IMU), a network interface for enabling communication between the edge device and a remote server; a memory accessible to the processor(s);

in response to a signal from the IMU or the GPS device indicating movement of the edge device, triggering the capture of images by the camera(s);

processing the captured images to determine a quality metric for the images; discarding images with a quality metric below a predefined image quality threshold to obtain a first refined image set;

performing object detection on the first refined image set to detect one or more location markers in the images of the first refined image set;

discarding images not including location markers in the first refined image set to obtain a second refined image set;

performing similarity analysis of the images in the second refined image set to identify clusters of similar images;

selecting a representative image from each cluster of similar images to obtain a location representative image set; and

transmitting the location representative image set and GPS data associated with the representative images to the remote server.

13. A method of image capture and processing, the method comprising:

providing an edge device comprising: one or more cameras (camera(s)), a GPS device, one or more processors (processor(s)), network interface device;

triggering capturing one or more images (image(s)) by the camera(s);

processing the captured image(s) to obtain location representative image set; and

transmitting the location representative image set and location data captured by the GPS data to a remote server through the network interface device;

wherein processing the captured images comprises performing object detection on the images to detect one or more location markers;

the location representative image set is based on the images where the one or more location markers are detected; and

the capturing of images is triggered on a signal from an IMU or the GPS device indicating movement of the edge device.

14. The method of claim 13, wherein processing the captured images comprises:

determination of a quality metric for each of the images; and

processing only the images with a quality metric above a predefined quality threshold to obtain the location representative image set.

15. The method of any one of claims 12 to 14, wherein the location markers comprise one or more of: traffic signs, named storefronts, street signs, landmarks.

16. The method of any one of claims 12 to 15, wherein processing the captured images comprises:

performing a similarity analysis of the captured images to identify clusters of similar images; and

selecting a representative image from each cluster of similar images;

wherein the location representative image set is obtained based on a representative image from each cluster of similar images.

17. The method of any one of claims 12 or 16, wherein the similarity analysis is performed for images captured over a predefined time window;

optionally wherein the predefined time window is any one of: 15 seconds, or 30 seconds, or 45 seconds, or 60 seconds, or 75 seconds, or 90 seconds, or 105 seconds, or 120 seconds.

18. One or more non-transitory computer-readable storage media storing instructions that when executed by one or more processors cause the one or more processors to perform the method of any one of claim 12 to 17.