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(54) Title: SURVEILLANCE SYSTEMS AND METHODS

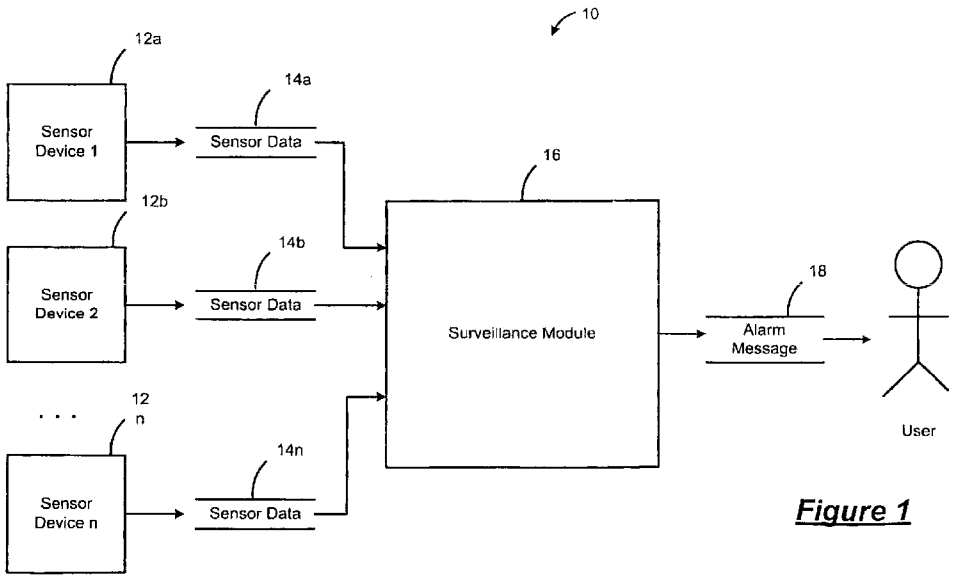

Figure 1

(57) Abstract: A surveillance system generally includes a data capture module that collects sensor data. A scoring engine module receives the sensor data and computes at least one of an abnormality score and a normalcy score based on the sensor data, at least one dynamically loaded learned data model, and a learned scoring method. A decision making module receives the at least one of the abnormality score and the normalcy score and generates an alert message based on the at least one of the abnormality score and the normalcy score and a learned decision making method to produce progressive behavior and threat detection.

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AMENDED CLAIMS
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1. A surveillance system, comprising:

a data capture module residing on a given camera that collects sensor data;

a scoring engine module residing on the given camera that receives the sensor data and computes at least one of an abnormality score and a normalcy score for on the sensor data in accordance with a scoring method and one or more data models residing on the given camera,

a decision making module residing on the given camera that receives the at least one of the abnormality score and the normalcy score and generates an alert message based on the at least one of the abnormality score and the normalcy score and in accordance with a decision making method to produce progressive behavior and threat detection;

a model builder remotely located from the given camera that receives the sensor data from the given camera and adapts the data models for the given camera using the sensor data; and

a system configuration module remotely located from the given camera that accesses the data models adapted by the model builder and configures the given camera with adapted data models for the given camera.

2. cancel

3. cancel

4. The surveillance system of claim 1 further comprising a model builder module that builds the data models based on at least one of a simulation of the sensor data and accumulated sensor data.

5. The surveillance system of claim 1 wherein the scoring method calculates an observed property of objects in motion against the data models

stored in a data cube to obtain a set of scores that represent at least one of similarity and difference scores between an object in motion and the data models.

6. The surveillance system of claim 5 wherein the at least one of the similarity and difference scores are accumulated and normalized for the object in motion, to represent the at least on of normalcy and abnormality scores.

7. The surveillance system of claim 4 further comprising a graphical user interface that accepts parameters from a user to generate the simulation.

8. The surveillance system of claim 1 further comprising a learning module that adaptively learns at least one of the scoring methods, the decision making methods, and the learned model.

9. The surveillance system of claim 1 further comprising an alarm handling module that receives the alert message and generates an alarm message based on a further examination of the alert message.

10. The surveillance system of claim 1 wherein the data capture module collects sensor data from an image sensor and extracts object data from the sensor data, and wherein the scoring engine module computes the at least one of the abnormality score and the normalcy score based on the object data.

11. The surveillance system of claim 1 wherein the decision making module receives at least one of an abnormality score and a normalcy score generated from other sensor data and generates an alert message based on the at least one of the abnormality score and the normalcy score generated from the other sensor data.

12. A surveillance system, comprising:

a plurality of image sensing devices, wherein the image sensing devices each include:

a data capture module that collects sensor data;

a scoring engine module that receives the sensor data and computes at least one of an abnormality score and a normalcy score based on the sensor data in accordance with a scoring method and one or more data models residing on the image sensing device; and

a decision making module that receives the at least one of the abnormality score and the normalcy score and generates an alert message based on the at least one of the abnormality score and the normalcy score and in accordance with a learned decision making method to produce progressive behavior and threat detection

a model builder remotely located from the plurality of image sensing devices that receive sensor data from a given image sensing device and adapts the data models for the given image sensing device using the sensor data from the given image sensing device; and

a system configuration module remotely located from the plurality of image sensing devices that access the data models adapted by the model builder and configures the given image sensing device with the adapted data models for the given image sensing device.

13. The surveillance system of claim 12 wherein the decision making module of a first image sensing device receives the at least one of the abnormality score and the normalcy score from a second image sensing device, and wherein the decision making module of the first image sensing device generates the alert message based on the at least one of the abnormality score and the normalcy score from the second image sensing device.

14. (cancel)

15. The surveillance system of claim 12 wherein the image sensing devices each further include a device configuration module that automatically

loads updated scoring methods, decision making methods, and the data models to the image sensing device.

16. The surveillance system of claim 12 wherein the model builder module builds data models based on a simulation of the sensor data and accumulated real sensor data.

17. The surveillance system of claim 16 further comprising a graphical user interface that accepts motion parameters from a user to generate the simulation.

18. The surveillance system of claim 12 further comprising a learning module that adaptively learns a decision making method and wherein the decision making method is selectively loaded to at least one of the plurality of image sensing devices.

19. The surveillance system of claim 12 further comprising an alarm handling module that receives the alert messages from the plurality of image sensing devices and generates an alarm message based on a further examination of the alert messages.

20. – 27. (cancel)