WHAT IS CLAIMED IS:

~~1. A system (200) comprising:~~

~~one or more processors (204) configured to detect perimeter edges (306) of one or more rotor blades (234) of a turbine assembly (230) as depicted in a series (300) of image frames (302) using boundary analysis performed on the image frames,~~

~~wherein the one or more processors are configured to identify a set (400) of the image frames as key frames (402) based on positional offsets (354) between the perimeter edges that are detected in the image frames and a reference blade pose (350) such that the key frames are able to be inspected for objects-of-interest without inspecting the image frames that are not the key frames.~~

~~2. The system (200) of claim 1, wherein the one or more processors (204) are configured to perform the boundary analysis by individually examining the image frames (302) one at a time as input images (106) in a forward propagation direction through layers (314) of artificial neurons in an artificial neural network (304).~~

~~3. The system (200) of claim 1, wherein the one or more processors (204) are configured to inspect the key frames (402) for objects-of-interest by individually examining each of the key frames one at a time as input images (106) in a forward propagation direction through layers (406) of artificial neurons in an artificial neural network (404).~~

~~4. The system (200) of claim 1, wherein the one or more processors (204) are further configured to apply a mask image (502) on the key frames (402) to define an exposed region (504) on the key frames that is not concealed by the mask image, wherein the one or more processors are further configured to inspect the exposed regions of the key frames to detect objects-of-interest within the exposed regions without inspecting regions of the key frames outside of the exposed regions and without inspecting the image frames (302) that are not the key frames.~~

5. The system (200) of claim 1, wherein the one or more processors (204) are further configured to superimpose a mask image (502) on the key frames (402) based on the perimeter edges (306) that are detected in the image frames (302) identified as the key frames, the mask image defining an exposed region (504) on each of the key frames that is not concealed by the mask image, the exposed region representing a surface area of a primary rotor blade (506) of the one or more rotor blades (234) in the corresponding key frame.

6. The system (200) of claim 5, wherein the one or more processors (204) are further configured to compare a template blade image (604) to the perimeter edges (306) of the one or more rotor blades (234) in each of the key frames (402), the template blade image depicting a sample rotor blade (606), the one or more processors also configured to deform a template mask image (602) associated with the template blade image to generate the mask image (502) that is superimposed on the key frames based on the comparison between the template blade image and the perimeter edges.

7. The system (200) of claim 1, wherein the one or more processors (204) are configured to identify a corresponding image frame (302) in the series (300) as one of the key frames (402) in response to the positional offset (354) between the perimeter edges (306) that are detected in the corresponding image frame and the reference blade pose (350) being less than a designated threshold value.

8. The system (200) of claim 1, wherein the one or more processors (204) are configured to identify a corresponding image frame (302) in the series (300) as one of the key frames (402) in response to the positional offset (354) in the corresponding image frame being less than the respective positional offsets in each of the image frames acquired immediately before and after the corresponding image frame in the series.

9. The system (200) of claim 1, wherein the objects-of-interest include one or more of spalling or cracks in the rotor blades (234), and, responsive to detecting one or more of the objects-of-interest, the one or more processors (204) are configured to one or

more of automatically schedule maintenance for the turbine assembly (230), automatically alert an operator, automatically generate an inspection report, or automatically stop rotation of the turbine assembly.

10. The system (200) of claim 1, wherein each of the image frames (302) depicts a plurality of the rotor blades (234) of the turbine assembly (230) while the turbine assembly rotates, and each of the key frames (402) depicts a primary rotor blade (506) of the respective plurality of rotor blades in a centralized position within the key frame, the one or more processors (204) further configured to mask regions of the key frames outside of the respective primary rotor blades.

11. A method (700) comprising:

obtaining a series (300) of image frames (302) depicting multiple rotor blades (234) of a turbine assembly (230) while the turbine assembly rotates, each of the image frames depicting one or more of the rotor blades;

detecting perimeter edges (306) of the one or more rotor blades depicted in each of the image frames using boundary analysis performed on the image frames by one or more processors (204);

identifying, via the one or more processors, a set (400) of the image frames as key frames (402) based on positional offsets (354) between the perimeter edges that are detected in the image frames and a reference blade pose (350); and

inspecting the key frames for objects-of-interest without inspecting the image frames that are not in the set of the key frames.

12. The method (700) of claim 11, wherein a corresponding image frame (302) in the series (300) is identified as one of the key frames (402) in response to the positional offset (354) between the perimeter edges (306) that are detected in the corresponding image frame and the reference blade pose (350) being less than a designated threshold value.

~~13. The method (700) of claim 11, wherein a corresponding image frame (302) in the series (300) is identified as one of the key frames (402) in response to the positional offset (354) in the corresponding image frame being less than the respective positional offsets in each of the image frames acquired immediately before and after the corresponding image frame in the series.~~

~~14. The method (700) of claim 11, wherein each of the key frames (402) depicts a different one of the rotor blades (234) of the turbine assembly (230) disposed in alignment with the reference blade pose (350).~~

~~15. The method (700) of claim 11, wherein the detecting of the perimeter edges (306) of the one or more rotor blades (234) comprises individually examining the image frames (302) one at a time as input images (106) in a forward propagation direction through layers (314) of artificial neurons in an artificial neural network (304).~~

1. A system comprising:

one or more processors configured to detect perimeter edges of one or more rotor blades of a turbine assembly as depicted in a series of image frames using boundary analysis performed on the image frames,

wherein the one or more processors are configured to identify a set of the image frames as key frames based on positional offsets between the perimeter edges that are detected in the image frames and a reference blade pose such that the key frames are able to be inspected for objects-of-interest without inspecting the image frames that are not the key frames,

wherein the one or more processors are further configured to superimpose a mask image on the key frames based on the perimeter edges that are detected in the

image frames identified as the key frames, the mask image defining an exposed region on each of the key frames that is not concealed by the mask image, the exposed region representing a surface area of a primary rotor blade of the one or more rotor blades in the corresponding key frame.

2. The system of claim 1, wherein the one or more processors are configured to perform the boundary analysis by individually examining the image frames one at a time as input images in a forward propagation direction through layers of artificial neurons in an artificial neural network.

3. The system of claim 1, wherein the one or more processors are configured to inspect the key frames for objects-of-interest by individually examining each of the key frames one at a time as input images in a forward propagation direction through layers of artificial neurons in an artificial neural network.

4. The system of claim 1, wherein the one or more processors are further configured to inspect the exposed regions of the key frames to detect objects-of-interest within the exposed regions without inspecting regions of the key frames outside of the exposed regions and without inspecting the image frames that are not the key frames.

5. The system of claim 1, wherein the one or more processors are further configured to compare a template blade image to the perimeter edges of the one or more rotor blades in each of the key frames, the template blade image depicting a sample rotor blade, the one or more processors also configured to deform a template mask image associated with the template blade image to generate the mask image that is superimposed on the key frames based on the comparison between the template blade image and the perimeter edges.

6. The system of claim 1, wherein the one or more processors are configured to identify a corresponding image frame in the series as one of the key frames in response to the positional offset between the perimeter edges that are detected in the corresponding image frame and the reference blade pose being less than a designated threshold value.

7. The system of claim 1, wherein the one or more processors are configured to identify a corresponding image frame in the series as one of the key frames in response to the positional offset in the corresponding image frame being less than the respective positional offsets in each of the image frames acquired immediately before and after the corresponding image frame in the series.

8. The system of claim 1, wherein the objects-of-interest include one or more of spalling or cracks in the rotor blades, and, responsive to detecting one or more of the objects-of-interest, the one or more processors are configured to one or more of automatically schedule maintenance for the turbine assembly, automatically alert an operator, automatically generate an inspection report, or automatically stop rotation of the turbine assembly.

9. The system of claim 1, wherein each of the image frames depicts a plurality of the rotor blades of the turbine assembly while the turbine assembly rotates, and each of the key frames depicts a primary rotor blade of the respective plurality of rotor blades in a centralized position within the key frame, the one or more processors further configured to mask regions of the key frames outside of the respective primary rotor blades.

10. A method comprising:

obtaining a series of image frames depicting multiple rotor blades of a turbine assembly while the turbine assembly rotates, each of the image frames depicting one or more of the rotor blades;

detecting perimeter edges of the one or more rotor blades depicted in each of the image frames using boundary analysis performed on the image frames by one or more processors;

identifying, via the one or more processors, a set of the image frames as key frames based on positional offsets between the perimeter edges that are detected in the image frames and a reference blade pose;

superimposing a mask image on the key frames based on the perimeter edges that are detected, the mask image defining an exposed region on each of the key frames that is not concealed by the mask image, the exposed region representing a surface area of a primary rotor blade of the one or more rotor blades in the key frame; and

inspecting the key frames for objects-of-interest without inspecting the image frames that are not in the set of the key frames.

11. The method of claim 10, wherein a corresponding image frame in the series is identified as one of the key frames in response to the positional offset between the perimeter edges that are detected in the corresponding image frame and the reference blade pose being less than a designated threshold value.

12. The method of claim 10, wherein a corresponding image frame in the series is identified as one of the key frames in response to the positional offset in the corresponding image frame being less than the respective positional offsets in each

of the image frames acquired immediately before and after the corresponding image frame in the series.

13. The method of claim 10, wherein each of the key frames depicts a different one of the rotor blades of the turbine assembly disposed in alignment with the reference blade pose.

14. The method of claim 10, wherein the detecting of the perimeter edges of the one or more rotor blades comprises individually examining the image frames one at a time as input images in a forward propagation direction through layers of artificial neurons in an artificial neural network.

15. The method of claim 10, wherein the objects-of-interest include one or more of spalling or cracks in the rotor blades, and, responsive to detecting one or more of the objects-of- interest while inspecting the key frames, the method includes one or more of automatically scheduling maintenance for the turbine assembly, automatically alerting an operator, automatically generating an inspection report, or automatically stopping rotation of the turbine assembly.

16. The method of claim 10, wherein inspecting the key frames for the objects-of-interest includes inspecting the exposed regions of the key frames for detecting the objects-of-interest on the respective primary rotor blades of the key frames without inspecting regions of the key frames outside of the exposed regions.

17. The method of claim 10, further comprising comparing a template blade image to the perimeter edges of the one or more rotor blades in each of the key frames, the template blade image depicting a sample rotor blade, the method further comprising deforming a template mask image associated with the template blade image to

generate the mask image for each of the key frames based on the comparison between the template blade image and the perimeter edges.

18. A method comprising:

detecting perimeter edges of one or more rotor blades of a turbine assembly as depicted in a series of image frames using boundary analysis performed on the image frames by one or more processors;

identifying, via the one or more processors, a set of the image frames as key frames based on positional offsets between the perimeter edges that are detected in the image frames and a reference blade pose;

applying a mask image on the key frames to define an exposed region on the key frames, the exposed region representing a surface area of a primary rotor blade in the respective key frame; and

inspecting the exposed regions of the key frames to detect objects-of-interest on the respective primary rotor blades without inspecting regions of the key frames outside of the exposed regions.

19. The method of claim 18, wherein applying the mask image includes deforming a template mask image to generate a deformed mask image that is superimposed on the key frames to define the respective exposed regions of the key frames, the template mask image being deformed based on the perimeter edges that are detected in each of the key frames.