Claims

1. A method for constructing under-the-canopy terrain imagery, the method comprising the steps:

a. capturing overlapping images to cover an area-of-interest from an imaging sensor on an aerial platform;

b. performing bundle adjustment utilizing parameters of said imaging sensor at any given point of capturing the images;

c. training a neural network model for implicit volumetric rendering, wherein said model is configured to generate simulated views from any point of said area-of-interest; and

d. generating terrain images by discarding occluding objects above ground level from the scene.

2. The method of claim 1, characterized by one of the following:

the overlapping images are captured using high overlap and density, wherein the density of the images is dependent on the density of the canopy;

the overlapping images are captured using a wide angular range of pixels from the nadir and oblique angles;

the overlapping images are captured during the twilight hours or under full cloud cover;

the overlapping images are captured using a high ground sample distance;

the overlapping images are captured under the same lighting conditions.

3. The method of claim 1, characterized by one of the following:

at least some of the overlapping images are captured at different altitudes;

at least some of the overlapping images are captured using different cameras;

at least some of the overlapping images are captured using cameras operating in different wavelength bands, selected from middle infrared, near infrared, and visible.

4. The method of claim 1, wherein at least some of the overlapping images are captured by two or more aerial platforms on the same day.

5. The method of claim 1, wherein the overlapping images are captured by one or more aerial platforms on different days.

6. The method of claim 1, wherein the aerial platform is a drone.

7. The method of claim 1, wherein the parameters used in the bundle adjustment step include at least one of the following:

a) location of the aerial platform including: longitude, latitude, and altitude;

b) angles of the camera including: azimuth, pitch, and roll;

c) properties of the camera and lens including: focal length and image center; and

d) scene parameters including the three dimensional coordinates of objects in the scene that are observed in the images.

8. The method of claim 1, wherein bundle adjustment is an iterative optimization process that involves refining the estimates of camera and scene parameters by minimizing the re-projection error, selected from Levenberg-Marquardt algorithm or the Gauss-Newton algorithm.

9. The method of claim 1, wherein training the model is done using implicit volumetric rendering.

10. The method of claim 1, wherein the trained model is queried for views of the terrain below the canopy by invoking the rendering process only below a certain altitude.

11. The method of claim 1, wherein the trained model is queried for views of the terrain below the canopy by a two-stage approach of obtaining a mask of the object/s to be removed followed by deletion of the object/s based on the mask.

12. The method of claim 11, wherein the mask is obtained by usage of infrared channels in conjunction with the visible spectrum.

13. The method of claim 12, wherein the model is trained on multiple color channels originating from different cameras.

14. The method of claim 1, wherein the canopy is formed by trees in a forest, wood, or orchard.

15. The method of claim 1, wherein the canopy is formed by agricultural crops, or by a camouflaging or shade cover.