# CLAIMS

1. A method to create a portrait image in real time with a cell phone camera, the method comprising:

   receiving an image from a camera and a depth measurement from a depth sensor, the camera and the depth sensor substantially collocated with each other;

   separating the image into an image of a foreground object and an image of a background object using the depth measurement and a neural network trained to receive the image and the depth measurement and to identify the foreground object and the background object, the neural network running on a processor optimized to execute operations associated with the neural network;

   blurring the image of the background object; and

   overlaying the image of the foreground object and the blurred image of the background object to obtain the portrait image.

2. The method of claim 1, wherein the neural network comprises a plurality of layers arranged sequentially, each layer in the plurality of layers comprising a plurality of nodes performing a plurality of computations in parallel, the method comprising:

   measuring an amount of time associated with separating the image into the image of the foreground object and the image of the background object; and

   when the amount of time exceeds a predetermined amount of time, distributing a first plurality of nodes associated with a first layer in the plurality of layers across multiple processors associated with a cell phone until the amount of time is below the predetermined amount of time.

3. A method comprising:

receiving a visual representation from a light sensor and a depth representation from a depth sensor, the light sensor and the depth sensor substantially collocated with each other;

separating the visual representation into a visual representation of a foreground object and a visual representation of a background object using the depth representation and an artificial intelligence module trained to receive the visual representation and to identify the foreground object and the background object;

modifying the visual representation of the background object; and

combining the visual representation of the foreground object and the modified visual representation of the background object to obtain a novel visual representation.

4. The method of claim 3, wherein the artificial intelligence module comprises a plurality of layers arranged sequentially, each layer in the plurality of layers comprising a plurality of nodes performing a plurality of computations in parallel.

5. The method of claim 4, the method comprising:

measuring an amount of time associated with separating the visual representation into the visual representation of the foreground object and the visual representation of the background object; and

when the amount of time exceeds a predetermined amount of time, distributing a first plurality of nodes associated with a first layer in the plurality of layers across multiple processors associated with a cell phone until the amount of time is below the predetermined amount of time.

6. The method of claim 3, said separating the visual representation comprising:

receiving the visual representation of the foreground object and the visual representation of the background object from the artificial intelligence module;

verifying a classification of an object in the visual representation into the visual representation of the foreground object and the visual representation of the background object using a second artificial intelligence module trained to receive the visual representation of the foreground object, the visual representation of the background object and the depth representation and to identify whether the classification of the object should be changed; and

when the classification of the object should be changed, reclassifying the object into one of the visual representation associated with the foreground object or the visual representation associated with the background object.

7. The method of claim 3, said separating the visual representation comprising:

receiving the visual representation of the foreground object and the visual representation of the background object from the artificial intelligence module;

verifying a classification of an object in the visual representation into the visual representation of the foreground object and the visual representation of the background object by checking whether a first depth associated with the foreground object in the depth representation and a second depth associated with the background object in the depth representation is below a predetermined threshold; and

when the classification of the object should be changed, reclassifying the object into one of the visual representation associated with the foreground object or the visual representation associated with the background object.

8. The method of claim 7, said checking comprising:

determining an average distance between the foreground object and the background object; and

when the average distance between the foreground object and the background object is below the predetermined threshold, reclassifying the background object into the visual representation of the foreground object.

9. The method of claim 7, said checking comprising:

determining a distance between a farthest point on the foreground object and a farthest point on the background object; and

when the distance is below the predetermined threshold, reclassifying the background object into the visual representation of the foreground object.

10. The method of claim 7, the predetermined threshold comprising a multiple of a difference between a closest point associated with the foreground object and a farthest point associated with the foreground object.

11. The method of claim 3, comprising:

creating the depth representation by measuring a distance from the depth sensor; and

discerning depth up to 5 meters based on the depth representation.

12. The method of claim 3, comprising creating the visual representation by recording an image or a video with the light sensor.

13. The method of claim 3, comprising:

blurring the visual representation of the background object; and

combining the visual representation of the foreground object and the blurred visual representation of the background object to obtain the novel visual representation comprising a portrait visual representation.

14. The method of claim 3, comprising:

replacing the visual representation of the background object with a second visual representation; and

creating a chroma key effect by combining the visual representation of the foreground object and the second visual representation.

15. The method of claim 3, comprising:

comparing a magnitude of motion associated with a plurality of objects in the visual representation; and

associating a first object in the plurality of objects having a higher magnitude of motion with the visual representation of the foreground object, and a second object in the plurality of objects having a lower magnitude of motion with the visual representation of the background object.

16. The method of claim 3, comprising:

determining a location associated with the light sensor and the depth sensor;

retrieving a three-dimensional map from memory representing a first plurality of objects surrounding the light sensor and the depth sensor;

establishing a correspondence between the first plurality of objects associated with the three-dimensional map and a second plurality of objects associated with the visual representation; and

separating the visual representation into the visual representation of the foreground object and the visual representation of the background object based on the correspondence.

17. A system comprising:

a light sensor to record a visual representation of an environment surrounding the light sensor;

a depth sensor to record a depth representation of the environment surrounding the depth sensor, the light sensor and the depth sensor substantially collocated with each other;

an artificial intelligence module trained to receive the visual representation and the depth representation, to identify a foreground object and a background object and to separate the visual representation into a visual representation of the foreground object and a visual representation of the background object; and

a processor to modify the visual representation of the background object and to combine the visual representation of the foreground object and the modified visual presentation of the background object to obtain a novel visual representation.

18. The system of claim 17, the artificial intelligence module comprising a plurality of layers arranged sequentially, each layer in the plurality of layers comprising a plurality of nodes performing a plurality of computations in parallel.

19. The system of claim 18, the system comprising:

the processor to measure an amount of time associated with said separating the visual representation into the visual representation of the foreground object and the visual representation of the background object; and

when the amount of time exceeds a predetermined amount of time, the processor to distribute a first plurality of nodes associated with a first layer in the plurality of layers across multiple processors associated with a cell phone until the amount of time is below the predetermined amount of time.

20. The system of claim 17, comprising:

the processor to receive the visual representation of the foreground object and the visual representation of the background object from the artificial intelligence module;

the processor to verify a classification of an object in the visual representation into the visual representation of the foreground object and the visual representation of the background object by checking whether a first depth associated with the foreground object in the depth representation and a second depth associated with the background object in the depth representation is below a predetermined threshold; and

when the classification of the object should be changed, the processor to reclassify the object into one of the visual representation associated with the foreground object or the visual representation associated with the background object.

21. The system of claim 20, the processor to check comprising:

the processor to determine an average distance between the foreground object and the background object; and

when the average distance between the foreground object and the background object is below the predetermined threshold, the processor to reclassify the background object into the visual representation of the foreground object.

22. The system of claim 20, the processor to check comprising:

the processor to determine a distance between a farthest point on the foreground object and a farthest point on the background object; and

when the distance is below the predetermined threshold, the processor to reclassify the background object into the visual representation of the foreground object.

23. The system of claim 20, the predetermined threshold comprising a fraction of a difference between a closest point associated with the foreground object and a farthest point associated with the foreground object.

24. The system of claim 17, comprising:

the depth sensor to measure depth up to 5 meters away from the depth sensor.

25. The system of claim 17, comprising:

the processor to blur the visual representation of the background object; and

the processor to combine the visual representation of the foreground object and the blurred visual representation of the background object to obtain the novel visual representation comprising a portrait visual representation.

26. The system of claim 17, comprising:

the processor to replace the visual representation of the background object with a second visual representation; and

the processor to create a chroma key effect by combining the visual representation of the foreground object and the second visual representation.

27. The system of claim 17, comprising:

the processor to compare a magnitude of motion associated with a plurality of objects in the visual representation; and

the processor to associate a first object in the plurality of objects having a higher magnitude of motion with the visual representation of the foreground object, and a second object in the plurality of objects having a lower magnitude of motion with the visual representation of the background object.

28. The system of claim 17, comprising:

a locator to determine a location associated with the light sensor and the depth sensor;

the processor to retrieve a three-dimensional map from a memory representing a first plurality of objects surrounding the light sensor and the depth sensor;

the processor to establish a correspondence between the first plurality of objects associated with the three-dimensional map and a second plurality of objects associated with the visual representation; and

the processor to separate the visual representation into the visual representation of the foreground object and the visual representation of the background object based on the correspondence.