CLAIMS

1. A method of vehicle collision avoidance, comprising:

receiving camera data comprising one or more points, wherein each point corresponds to a pixel in an image;

determining a distance and a direction from a vehicle to the one or more points;

determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points;

determining one or more velocity solutions that satisfy the determined velocity constraints based on a vehicle navigation instruction;

selecting a velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction; and

adjusting a vehicle velocity based on the selected velocity solution.

2. The method of claim 1, wherein receiving camera data comprises receiving unprocessed camera data.

3. The method of claim 1, wherein the velocity constraint for each of the one or more points comprises a velocity inequality constraint.

4. The method of claim 3, wherein determining the distance and the direction from the vehicle to the one or more points comprises:

determining a distance and a direction from the vehicle to an obstacle.

5. The method of claim 4, wherein the obstacle comprises an obstacle represented by the one or more points.

6. The method of claim 1, wherein determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points comprises:

determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to an obstacle represented by the one or more points.

7. The method of claim 1,

wherein the vehicle navigation instruction includes a direction component, and

wherein selecting the velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction comprises selecting the velocity solution having a direction component that most closely matches the direction component of the vehicle navigation instruction.

8. The method of claim 1,

wherein the vehicle navigation instruction includes a speed component, and

wherein selecting the velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction comprises selecting the velocity solution having a speed component that most closely matches the speed component of the vehicle navigation instruction.

9. A vehicle, comprising:

a processor configured with processor-executable instructions to:

receive camera data comprising one or more points, wherein each point corresponds to a pixel in an image;

determine a distance and a direction from the vehicle to the one or more points;

determine a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points;

determine one or more velocity solutions that satisfy the determined velocity constraints based on a vehicle navigation instruction;

select a velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction; and

adjust a vehicle velocity based on the selected velocity solution.

10. The vehicle of claim 9, wherein the processor is further configured with processor-executable instructions to receive camera-data comprising unprocessed camera data.

11. The vehicle of claim 9, wherein the processor is further configured with processor-executable instructions such that the velocity constraint for each of the one or more points comprises a velocity inequality constraint.

12. The vehicle of claim 11, wherein the processor is further configured with processor-executable instructions to:

determine a distance and a direction from the vehicle to an obstacle.

13. The vehicle of claim 12, wherein the processor is further configured with processor-executable instructions such that the obstacle comprises an obstacle represented by the one or more points.

14. The vehicle of claim 9, wherein the processor is further configured with processor-executable instructions to:

determine a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to an obstacle represented by the one or more points.

15. The vehicle of claim 9, wherein the processor is further configured with processor-executable instructions such that the vehicle navigation instruction includes a direction component, and

wherein the processor is further configured with processor-executable instructions to select the velocity solution having a direction component that most closely matches the direction component of the vehicle navigation instruction.

16. The vehicle of claim 9, wherein the processor is further configured with processor-executable instructions such that the vehicle navigation instruction includes a speed component, and

wherein the processor is further configured with processor-executable instructions to select the velocity solution based on the vehicle navigation instruction by selecting the velocity solution having a speed component that most closely matches the speed component of the vehicle navigation instruction.

17. A vehicle, comprising:

means for receiving camera data comprising one or more points, wherein each point corresponds to a pixel in an image;

means for determining a distance and a direction from the vehicle to the one or more points;

means for determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points;

means for determining one or more velocity solutions that satisfy the determined velocity constraints based on a vehicle navigation instruction;

means for selecting a velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction; and

means for adjusting a vehicle velocity based on the selected velocity solution.

18. A non-transitory processor readable storage medium having stored thereon processor-executable instructions configured to cause a processor of a vehicle to perform operations comprising:

receiving camera data comprising one or more points, wherein each point corresponds to a pixel in an image;

determining a distance and a direction from the vehicle to the one or more points;

determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points;

determining one or more velocity solutions that satisfy the determined velocity constraints based on a vehicle navigation instruction;

selecting a velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction; and

adjusting a vehicle velocity based on the selected velocity solution.

19. The non-transitory processor readable storage medium of claim 18, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that receiving camera data comprises receiving unprocessed camera data.

20. The non-transitory processor readable storage medium of claim 18, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that the velocity constraint for each of the one or more points comprises a velocity inequality constraint.

21. The non-transitory processor readable storage medium of claim 20, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that determining the distance and the direction from the vehicle to the one or more points comprises:

determining a distance and a direction from the vehicle to an obstacle.

22. The non-transitory processor readable storage medium of claim 21, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that the obstacle comprises an obstacle represented by the one or more points.

23. The non-transitory processor readable storage medium of claim 18, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to each of the one or more points comprises:

determining a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to an obstacle represented by the one or more points.

24. The non-transitory processor readable storage medium of claim 18, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that:

the vehicle navigation instruction includes a direction component, and

selecting the velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction comprises selecting the velocity solution having a direction

component that most closely matches the direction component of the vehicle navigation instruction.

25. The non-transitory processor readable storage medium of claim 18, wherein the stored processor-executable software instructions are configured to cause the processor of the vehicle to perform operations such that:

the vehicle navigation instruction includes a speed component, and

selecting the velocity solution from the determined one or more velocity solutions based on the vehicle navigation instruction comprises selecting the velocity solution having a speed component that most closely matches the speed component of the vehicle navigation instruction.