

CLAIMS

1. A method of actively looking for a passenger as a vehicle is approaching a pickup location, the method comprising:

maneuvering, by one or more processors, the vehicle in order to pick up an assigned passenger at a pickup location; receiving, by the one or more processors, sensor data from a perception system of the vehicle identifying objects in an environment of the vehicle;

prior to reaching the pickup location, using the sensor data to determine whether a pedestrian is within a first area defined by a first threshold distance from the vehicle;

if the pedestrian is determined to be within the first area, and while the vehicle is stopped, determining whether the pedestrian is within a second area, the second area being defined by a second threshold distance from the vehicle, the second threshold distance being determined based on an expected walking speed of a hypothetical pedestrian, and the first threshold distance being greater than the second threshold distance; and

based on the determination that the pedestrian is within the second area, causing, by the one or more processors, the vehicle to wait for the pedestrian to enter the vehicle.

2. The method of claim 1, further comprising:

based on the determination that the pedestrian is within the second area, determining whether the pedestrian is within a third area, the third area being defined by a third threshold distance from the vehicle, the third threshold distance being determined based on the expected walking speed of the hypothetical pedestrian, the second threshold distance being greater than the third threshold distance.

3. The method of claim 2, further comprising,

if the pedestrian is determined to be not within the third area, causing, by the one or more processors, the vehicle to continue to the pickup location; and

determining whether the pedestrian or a different pedestrian is in a fourth area defined by the first threshold distance from the vehicle.

4. The method of claim 3, further comprising:

after determining that the pedestrian or the different pedestrian is within the fourth area,

stopping, by the one or more processors, the vehicle again prior to reaching the pickup location and tracking movements of the pedestrian or the different pedestrian over time by determining whether the pedestrian or the different pedestrian is in a fifth area defined by the second threshold distance from the vehicle, and thereafter determining that the pedestrian or the different pedestrian is within the fifth area, and based on the determination that the pedestrian or the different pedestrian is within the fifth area, causing, by the one or more processors, the vehicle to wait for the pedestrian or the different pedestrian to enter the vehicle.

5. The method of claim 4, wherein determining whether the pedestrian is within the fourth area is performed only after the vehicle has traveled a minimum distance since initially using the sensor data to determine whether the pedestrian is within the first area.

6. The method of claim 1, wherein using the sensor data to determine whether the pedestrian is within the first area is performed only when the vehicle is traveling below a predetermined maximum speed limit.

7. The method of claim 1, wherein using the sensor data to determine whether the pedestrian is within the first area is performed only when the vehicle is in a particular lane of a roadway.

8. The method of claim 1, wherein using the sensor data to determine whether the pedestrian is within the first area is performed only when the vehicle is traveling on a roadway that meets a particular maximum speed limit.

9. The method of claim 1, wherein stopping the vehicle includes stopping the vehicle in a current lane of the vehicle.

10. The method of claim 1, further comprising, controlling the vehicle to a destination with the pedestrian as a passenger of the vehicle.

11. A system of actively looking for a passenger as a vehicle is approaching a pickup location, the system comprising one or more processors configured to:

maneuver the vehicle in order to pick up an assigned passenger at a pickup location;
receive sensor data from a perception system of the vehicle identifying objects in an

environment of the vehicle;

prior to reaching the pickup location, use the sensor data to determine whether a pedestrian is within a first area defined by a first threshold distance from the vehicle;

if the pedestrian is determined to be within the first area, and while the vehicle is stopped, determine whether the pedestrian is within a second area, the second area being defined by a second threshold distance from the vehicle, the second threshold distance being determined based on an expected walking speed of a hypothetical pedestrian, and the first threshold distance being greater than the second threshold distance; and

based on the determination that the pedestrian is within the second area, cause the vehicle to wait for the pedestrian to enter the vehicle.

12. The system of claim 11, wherein the one or more processors are further configured to:

based on the determination that the pedestrian is within the second area, determine whether the pedestrian is within a third area, the third area being defined by a third threshold distance from the vehicle, the third threshold distance being determined based on the expected walking speed of the hypothetical pedestrian, the second threshold distance being greater than the third threshold distance.

13. The system of claim 12, wherein the one or more processors are further configured to,

if the pedestrian is determined to be not within the third area, cause the vehicle to continue to the pickup location; and

determine whether the pedestrian or a different pedestrian is in a fourth area defined by the first threshold distance from the vehicle.

14. The system of claim 13, wherein the one or more processors are further configured to:

after determining that the pedestrian or the different pedestrian is within the fourth area, stop the vehicle again prior to reaching the pickup location and track movements of the pedestrian or the different pedestrian over time by determining whether the pedestrian or the different pedestrian is in a fifth area defined by the second threshold distance from the vehicle, and thereafter determine that the pedestrian or the different pedestrian is within the fifth area, and cause the vehicle to wait further for the pedestrian or the different pedestrian to enter the vehicle based on the determination that the pedestrian or the different pedestrian is within the fifth area.

15. The system of claim 14, wherein the one or more processors are further configured to determine whether the pedestrian is within the fourth area only after the vehicle has traveled a minimum distance since initially using the sensor data to determine whether the pedestrian is within the first area.
16. The system of claim 11, wherein the one or more processors are further configured to use the sensor data to determine whether the pedestrian is within the first area only when the vehicle is traveling below a predetermined maximum speed limit.
17. The system of claim 11, wherein the one or more processors are further configured to use the sensor data to determine whether the pedestrian is within the first area only when the vehicle is in a particular lane of a roadway.
18. The system of claim 11, wherein the one or more processors are further configured to use the sensor data to determine whether the pedestrian is within the first area only when the vehicle is traveling on a roadway that meets a particular maximum speed limit.
19. The system of claim 11, wherein the one or more processors are further configured to stop the vehicle by stopping the vehicle in a current lane of the vehicle.
20. The system of claim 11, further comprising the vehicle.