

CLAIMS

1. A method of stopping a vehicle without a driver, the method comprising:

after a passenger has entered the vehicle, maneuvering, by one or more processors, the vehicle in an autonomous driving mode towards a destination location along a route, the route being divided into two or more stages in which the two or more stages include a late stage, wherein the late stage is within a predetermined distance, in time or space, from the destination location;

receiving, by the one or more processors, a signal indicating that the passenger is requesting that the vehicle stop or pull over immediately;

in response to receiving the signal, determining, by the one or more processors, a current stage of the route based on (1) a current distance, in time or space, of the vehicle from a pickup location where the passenger entered the vehicle or (2) a current distance, in time or space, of the vehicle from the destination location; and

stopping, by the one or more processors, the vehicle in accordance with the determined current stage; wherein when the determined current stage corresponds to the late stage, stopping the vehicle includes determining whether the vehicle has already identified a pull over location, and if the vehicle has already identified a pull over location, continuing the maneuvering to the pull over location and ignoring the signal to stop or pull over immediately.

2. The method of claim 1, wherein the determined current stage corresponds to the vehicle being in a parking lot where the passenger entered the vehicle, and stopping the vehicle includes stopping the vehicle at a current location of the vehicle when the signal is received.

3. The method of claim 2, further comprising, while the vehicle is stopped, waiting for the passenger to exit and reenter the vehicle.

4. The method of claim 1, wherein the determined current stage corresponds to the vehicle being within a predetermined threshold from the pickup location, and stopping the vehicle includes stopping the vehicle at a current location of the vehicle when the signal is received.

5. The method of claim 4, further comprising, while the vehicle is stopped, waiting for the passenger to exit and reenter the vehicle.

6. The method of claim 1, wherein the determined current stage corresponds to the vehicle being more than a predetermined threshold from the destination location, and stopping the vehicle includes:

accessing map information identifying pull over spots where the vehicle is able to stop and allow passengers to exit the vehicle;

identifying an available one of the pull over spots; and

stopping the vehicle in the available one of the pull over spots.

7. The method of claim 1, wherein the determined current stage corresponds to the vehicle being more than a predetermined threshold from the destination location, and the method further comprises:

prior to maneuvering the vehicle towards the destination, setting the destination location as a destination goal for the vehicle; and

setting a current location of the vehicle when the signal is received as a new destination goal for the vehicle, and wherein stopping the vehicle is further based on the new destination goal.

8. The method of claim 1, wherein the determined current stage corresponds to the vehicle being within a predetermined threshold from the destination location, and stopping the vehicle includes stopping the vehicle at a current location of the vehicle when the signal is received.

9. A system for stopping a vehicle without a driver, the system comprising one or more computing devices having one or more processors configured to:

after a passenger has entered the vehicle, maneuvering the vehicle in an autonomous driving mode towards a destination location along a route, the route being divided into two or more stages in which the two or more stages includes a late stage, wherein the late stage is within a predetermined distance, in time or space, from the destination location;

receive a signal indicating that the passenger is requesting that the vehicle stop or pull over immediately;

in response to receiving the signal, determine a current stage of the route based on (1) a current distance, in time or space, of the vehicle from a pickup location where the passenger

entered the vehicle or (2) a current distance, in time or space, of the vehicle from the destination location; and

stop the vehicle in accordance with the determined current stage; wherein when the determined current stage corresponds to the late stage, to stop the vehicle, the processor is further configured to determine whether the vehicle has already identified a pull over location, and if the vehicle has already identified a pull over location, continue the maneuvering to the pull over location and ignore the signal to stop or pull over immediately.

10. The system of claim 9, wherein the determined current stage corresponds to the vehicle being in a parking lot where the passenger entered the vehicle, and the one or more processors are further configured to stop the vehicle by stopping the vehicle at a current location of the vehicle when the signal is received.

11. The system of claim 10, the one or more processors are further configured to, while the vehicle is stopped, waiting for the passenger to exit and reenter the vehicle.

12. The system of claim 9, wherein the determined current stage corresponds to the vehicle being within a predetermined threshold from the pickup location, and the one or more processors are further configured to stop the vehicle by stopping the vehicle at a current location of the vehicle when the signal is received.

13. The system of claim 12, the one or more processors are further configured to, while the vehicle is stopped, wait for the passenger to exit and reenter the vehicle.

14. The system of claim 9, wherein the determined current stage corresponds to the vehicle being more than a predetermined threshold from the destination location, and the one or more processors are further configured to stop the vehicle by:

accessing map information identifying pull over spots where the vehicle is able to stop and allow passengers to exit the vehicle;

identifying an available one of the pull over spots; and

stopping the vehicle in the available one of the pull over spots.

15. The system of claim 9, wherein the determined current stage corresponds to the vehicle being more than a predetermined threshold from the destination location, and the one or more processors are further configured to:

prior to maneuvering the vehicle towards the destination, set the destination location as a destination goal for the vehicle; and

set a current location of the vehicle when the signal is received as a new destination goal for the vehicle, and wherein stopping the vehicle is further based on the new destination goal.

16. The system of claim 9, wherein the determined current stage corresponds to the vehicle being within a predetermined threshold from the destination location, and the one or more processors are further configured to stop the vehicle by stopping the vehicle at a current location of the vehicle when the signal is received.

17. The system of claim 9, further comprising the vehicle.

18. A non-transitory computer-readable medium on which instructions are stored, the instructions, when executed by one or more processors cause the one or more processors to perform a method of stopping a vehicle without a driver, the method comprising:

after a passenger has entered the vehicle, maneuvering the vehicle in an autonomous driving mode towards a destination location along a route, the route being divided into two or more stages in which the two or more stages includes a late stage, wherein the late stage is within a predetermined distance, in time or space, from the destination location;

receiving a signal indicating that the passenger is requesting that the vehicle stop or pull over immediately;

in response to receiving the signal, determining a current stage of the route based on (1) a current distance, in time or space, of the vehicle from a pickup location where the passenger entered the vehicle or (2) a current distance, in time or space, of the vehicle from the destination location; and

stopping the vehicle in accordance with the determined current stage; wherein when the determined current stage corresponds to the late stage, stopping the vehicle includes determining whether the vehicle has already identified a pull over location, and if the vehicle

has already identified a pull over location, continuing the maneuvering to the pull over location and ignoring the signal to stop or pull over immediately.