CLAIMS

1. A vehicle-mounted camera pose estimation method, comprising:

performing lane line detection of a road on which a vehicle drives on the basis of a video stream of the road for the vehicle acquired by a vehicle-mounted camera;

obtaining horizon information of the road according to a lane line detection result; and

obtaining pose information of the vehicle-mounted camera according to the horizon information,

wherein the pose information of the vehicle-mounted camera comprises a horizontal deviation angle of the vehicle-mounted camera; and the obtaining the pose information of the vehicle-mounted camera according to the horizon information comprises:

obtaining the way-points information of the vehicle according to the horizon information and a vanishing-point of the vehicle-mounted camera; and

obtaining the horizontal deviation angle of the vehicle-mounted camera according to the way-points information.

2. The method according to claim 1, wherein the road is a structured road; and/or the vehicle-mounted camera is mounted at any position on front windshield glass of the vehicle.

3. The method according to claim 1 or 2, wherein the pose information of the vehicle-mounted camera comprises a rotation angle of the vehicle-mounted camera, and the obtaining the pose information of the vehicle-mounted camera according to the horizon information comprises

determining the rotation angle of the vehicle-mounted camera according to slope information of the horizon.

4. The method according to claim 3, wherein the obtaining the horizontal deviation angle of the vehicle-mounted camera according to the way-points information comprises:

obtaining the horizontal deviation angle of the vehicle-mounted camera according to the way-points information and a focal length of the vehicle-mounted camera.

5. The method according to any one of claims 1 to 4, wherein the pose information of the vehicle-mounted camera comprises a pitch angle of the vehicle-mounted camera.

6. The method according to claim 5, wherein the obtaining the pose information of the vehicle-mounted camera according to the horizon information comprises:

obtaining the pitch angle of the vehicle-mounted camera according to the horizon information and the focal length of the vehicle-mounted camera.

7. The method according to any one of claims 1 to 6, wherein the obtaining the horizon information of the road according to the lane line detection result comprises:

performing lane lines fitting according to the lane line detection result to obtain lane line information of at least two lane lines of the road;

obtaining a vanishing-point of the at least two lane lines according to the lane line information of the at least two lane lines; and

obtaining the horizon information according to the vanishing-point of the at least two lane lines.

8. The method according to claim 7, wherein the performing lane lines fitting according to the lane line detection result to obtain lane line information of at least two lane lines of the road comprises:

obtaining lane line pixel points belonging to lane lines of the road according to the lane line detection result; and

performing the lane lines fitting according to the lane line pixel points to obtain the lane line information of the at least two lane lines.

9. The method according to claim 7 or 8, wherein the obtaining the horizon information according to the vanishing-point of the at least two lane lines comprises:

obtaining a vanishing-point probabilistic graphic according to a vanishing-point of lane lines within each of multiple frames of images comprised in the video stream;

obtaining a vanishing-point belonging to the horizon according to the vanishing-point probabilistic graphic; and

obtaining the horizon information according to the obtained vanishing-point belonging to the horizon.

10. The method according to claim 1, wherein the method further comprises:

obtaining a vanishing-point belonging to a horizon within each of multiple frames of images comprised in the video stream according to a vanishing-point of at least two lane lines within each of multiple frames of images comprised in the video stream; and

obtaining the visual vanishing-point of the vehicle-mounted camera by performing averaging processing on the obtained vanishing-point belonging to the horizon within each of multiple frames of images comprised in the video stream.

11. The method according to claim 1, wherein the method further comprises:

obtaining a probabilistic graphic of lane lines according to at least two frames of images in the video stream, wherein the value of each pixel point in the probabilistic graphic indicates a probability of the pixel point belonging to a lane line;

obtaining lane line information of at least two lane lines according to the probabilistic graphic; and

obtaining the vanishing-point of the vehicle-mounted camera according to the lane line information of the at least two lane lines.

12. The method according to any one of claims 1 to 11, wherein the method further comprises:

calibrating the vehicle-mounted camera according to the pose information; and/or,

determining positioning information of the vehicle according to the pose information.

13. A vehicle-mounted camera pose estimation apparatus, comprising:

a lane line detection module, configured to perform lane line detection of a road on which a vehicle drives on the basis of a video stream of the road for the vehicle acquired by a vehicle-mounted camera;

a horizon information obtaining module, configured to obtain horizon information of the road according to a lane line detection result; and

a pose information obtaining module, configured to obtain pose information of the vehicle-mounted camera according to the horizon information,

wherein the pose information of the vehicle-mounted camera comprises a horizontal deviation angle of the vehicle-mounted camera; the apparatus further comprises: a way-points information obtaining module, configured to obtain the way-points information of the vehicle according to the horizon information and a vanishing-point of the vehicle-mounted camera; and

the pose information obtaining module comprises: a horizontal deviation angle obtaining unit, configured to obtain a horizontal deviation angle of the vehicle-mounted camera according to the way-points information.

14. An electronic device, comprising:

a memory, configured to store program instructions; and

a processor, configured to call and execute the program instructions in the memory to execute operations of the method according to any one of claims 1 to 12.

15. A readable storage medium, in which computer programs are stored, wherein the computer programs are configured to execute the operations of the method according to any one of claims 1 to 12.

16. A vehicle-mounted camera pose estimation system, applied to a vehicle, wherein the system comprises a camera mounted on the vehicle and the vehicle-mounted camera pose estimation apparatus according to claim 13 communicatively connected to the camera.

17. A computer program, comprising computer instructions, wherein when the computer instructions are run in a processor of a device, the operations in the vehicle-

mounted camera pose estimation method according to any one of claims 1 to 12 are implemented.