

CLAIMS

1. A method for controlling intelligent vehicle motion, comprising:

acquiring an image to be processed;

performing gesture recognition on the image to be processed to obtain pose information of a gesture in the image to be processed; and

controlling a motion state of an intelligent vehicle according to the pose information.

2. The method of claim 1, wherein before performing feature extraction on the image to be processed, the method further comprises:

performing pre-processing on the image to be processed,

wherein performing the pre-processing on the image to be processed comprises:

normalizing a size of the image to be processed to obtain a normalized image satisfying a predetermined size;

converting the normalized image into a gray image; and

restricting pixels of the gray image to obtain a regularized image with a pixel mean being zero.

3. The method of claim 1 or 2, wherein performing gesture recognition on the image to be processed to obtain the pose information of the gesture in the image to be processed comprises:

performing, based on a gesture recognition neural network, gesture recognition on the image to be processed to obtain the pose information of the gesture in the image to be processed.

4. The method of claim 3, wherein performing, based on the gesture recognition neural network, gesture recognition on the image to be processed to obtain the pose information of the gesture in the image to be processed comprises:

inputting the image to be processed to the gesture recognition neural network and detecting a target candidate box;

classifying, through the gesture recognition neural network, the target candidate box to determine a gesture in the target candidate box, a direction of the gesture, and a category of the gesture;

determining position information of the gesture based on a position of the target candidate box; and

determining the pose information of the gesture in the image to be processed according to the position information of the gesture, the direction of the gesture and the category of the gesture.

5. The method of claim 4, wherein the position of the target candidate box is determined by:

in a case where a center of the image to be processed is an origin, using coordinates of two diagonal corners of the target candidate box in the image to be processed as the position of the target candidate box.

6. The method of any one of claims 1 to 5, wherein controlling the motion state of the

intelligent vehicle according to the pose information comprises:

acquiring an instruction corresponding to the gesture according to the received pose information and controlling the motion state of the intelligent vehicle according to the instruction.

7. The method of any one of claims 1 to 6, wherein before controlling the motion state of the intelligent vehicle according to the pose information, the method further comprises:

adjusting a camera connected to the intelligent vehicle according to the position of the target candidate box and the category of the gesture, so that the acquired image to be processed contains the gesture.

8. The method of claim 7, wherein adjusting the camera connected to the intelligent vehicle according to the position of the target candidate box and the category of the gesture comprises:

determining a first distance between a center of the target candidate box and a center of the image to be processed according to the position of the target candidate box of the gesture; and

adjusting a distance between an image acquisition focus of the camera and the center of the image to be processed according to a negative correlation value of the first distance, to enable an image to be processed that is acquired by the camera subjected to adjustment contains the gesture.

9. The method of claim 7, wherein adjusting the camera connected to the intelligent vehicle according to the position of the target candidate box and the category of the gesture

comprises:

determining a current motion direction of the intelligent vehicle according to the category of the gesture and a direction of the gesture, wherein categories of the gesture and directions of the gesture have one-to-one correspondence with motion directions of the intelligent vehicle; and

adjusting an acquisition direction of the camera according to the current motion direction and a preset correspondence table, to enable the image to be processed that is acquired by the camera subjected to adjustment contains the gesture, wherein the preset correspondence table comprises a correspondence between the current motion direction and the acquisition direction.

10. The method of claim 9, wherein after determining the current motion direction of the intelligent vehicle according to the category of the gesture and the direction of the gesture, the method further comprises:

determining a ratio of a size of the target candidate box to a size of a preset candidate box;

updating the first distance and the current motion direction respectively according to the ratio;

adjusting a distance between a focus of the camera and a center of the image to be processed according to a negative correlation value of an updated first distance; and

adjusting the acquisition direction of the camera according to an updated current motion direction and the preset correspondence table, to enable the image to be processed that is acquired by the camera subjected to adjustment contains the gesture.

11. The method of claim 10, wherein updating the first distance and the current motion direction respectively according to the ratio comprises:

determining a first weight value corresponding to the first distance and a second weight value corresponding to the current motion direction respectively according to the ratio;

updating the first distance according to the first weight value to obtain the updated first distance; and

updating the current motion direction according to the second weight value to obtain the updated current motion direction.

12. The method of claim 10 or 11, wherein after adjusting the acquisition direction of the camera according to the updated current motion direction and the preset correspondence table, the method further comprises:

determining a pre-acquired image from the camera after the acquisition direction of the camera is adjusted;

determining a second distance between a center of a target candidate box in the pre-acquired image and a center of the pre-acquired image, wherein the target candidate box contains the gesture; and

adjusting the acquisition direction of the camera according to the second distance, so that the target candidate box is located in a central area of the pre-acquired image, to enable the image to be processed that is acquired by the camera subjected to adjustment contains the gesture.

13. An apparatus for controlling intelligent vehicle motion, comprising:

a first acquisition module, configured to acquire an image to be processed;

a first recognition module, configured to perform gesture recognition on the image to be processed to obtain pose information of a gesture in the image to be processed; and

a first control module, configured to control a motion state of an intelligent vehicle according to the pose information.

14. The apparatus of claim 13, wherein the apparatus further comprises a first pre-processing module, configured to perform pre-processing on the image to be processed;

wherein the first pre-processing module comprises:

a first processing submodule, configured to normalize a size of the image to be processed to obtain a normalized image satisfying a predetermined size;

a first conversion submodule, configured to convert the normalized image into a gray image; and

a first regularization submodule, configured to restrict pixels of the gray image to obtain a regularized image with a pixel mean being zero.

15. The apparatus of claim 13 or 14, wherein the first recognition module comprises:

a first recognition submodule, configured to perform, based on a gesture recognition neural network, gesture recognition on the image to be processed to obtain the pose information of the gesture in the image to be processed.

16. The apparatus of claim 15, wherein the first recognition submodule comprises:

a first detection unit, configured to input the image to be processed to the gesture recognition neural network and detect a target candidate box;

a first classification unit, configured to classify, through the gesture recognition neural network, the target candidate box to determine a gesture in the target candidate box, a direction of the gesture and a category of the gesture;

a first determining unit, configured to determine position information of the gesture based on a position of the target candidate box; and

a second determining unit, configured to determine the pose information of the gesture in the image to be processed according to the position information of the gesture, the direction of the gesture and the category of the gesture.

17. The apparatus of claim 16, wherein the position of the target candidate box is determined by:

in a case where a center of the image to be processed is an origin, using coordinates of two diagonal corners of the target candidate box in the image to be processed as the position of the target candidate box.

~~18. The apparatus of any one of claims 13 to 17, wherein the first control module comprises:~~

~~a first control submodule, configured to acquire an instruction corresponding to the gesture according to the received pose information and control the motion state of the intelligent vehicle according to the instruction.~~

~~19. The apparatus of any one of claims 13 to 18, wherein the apparatus further comprises:~~

~~a first adjustment module, configured to adjust a camera connected to the intelligent vehicle according to the position of the target candidate box and the category of the gesture, so that the acquired image to be processed contains the gesture.—~~

20. The apparatus of claim 19, wherein the first adjustment module comprises:

~~a first determining submodule, configured to determine a first distance between a center of the target candidate box and a center of the image to be processed according to the position of the target candidate box of the gesture; and~~

~~a first adjustment submodule, configured to adjust a distance between an image acquisition focus of the camera and the center of the image to be processed according to a negative correlation value of the first distance, to enable an image to be processed that is acquired by the camera subjected to adjustment contains the gesture.—~~

21. The apparatus of claim 19, wherein the first adjustment module comprises:

~~a second determining submodule, configured to determine a current motion direction of the intelligent vehicle according to the category of the gesture and a direction of the gesture, wherein categories of the gesture and directions of the gesture have one-to-one correspondence with motion directions of the intelligent vehicle; and~~

~~a second adjustment submodule, configured to adjust an acquisition direction of the camera according to the current motion direction and a preset correspondence table, to enable an image to be processed that is acquired by the camera subjected to adjustment contains the gesture, wherein the preset correspondence table comprises a correspondence between the current motion direction and the acquisition direction.—~~

22. The apparatus of claim 21, further comprising:

~~a first determining module, configured to determine a ratio of a size of the target candidate box to a size of a preset candidate box;~~

~~a first updating module, configured to update the first distance and the current motion direction respectively according to the ratio;~~

~~a second adjustment module, configured to adjust a distance between a focus of the camera and a center of the image to be processed according to a negative correlation value of an updated first distance ; and~~

~~a third adjustment module, configured to adjust the acquisition direction of the camera according to an updated current motion direction and the preset correspondence table, to enable an image to be processed that is acquired by the camera subjected to adjustment contains the gesture.—~~

23. The apparatus of claim 22, wherein the first updating module comprises:

~~a third determining submodule, configured to determine a first weight value corresponding to the first distance and a second weight value corresponding to the current motion direction respectively according to the ratio;~~

~~a first updating submodule, configured to update the first distance according to the first weight value to obtain the updated first distance; and~~

~~a second updating submodule, configured to update the current motion direction according to the second weight value to obtain the updated current motion direction.—~~

24. The apparatus of claim 22 or 23, wherein the apparatus further comprises:

~~a second determining module, configured to determine a pre-acquired image from the camera after the acquisition direction of the camera is adjusted;~~

~~a third determining module, configured to determine a second distance between a center of a target candidate box in the pre-acquired image and a center of the pre-acquired image, wherein the target candidate box contains the gesture; and~~

~~a fourth adjustment module, configured to adjust the acquisition direction of the camera according to the second distance, so that the target candidate box is located in a central area of the pre-acquired image, to enable an image to be processed that is acquired by the camera subjected to adjustment contains the gesture.~~

2518. A computer storage medium, having stored thereon computer executable instructions that, when being executed, enable to implement the method of any one of claims 1 to 12.

2619. A computer device, comprising a memory and a processor, wherein the memory is configured to store computer-executable instructions; and the processor is configured to, upon execution of the computer executable instructions on the memory, implement the method of any one of claims 1 to 12.

2720. A computer program product, comprising computer executable instructions that, when being executed, enable to implement the method for controlling intelligent vehicle motion of any one of claims 1 to 12.