WHAT IS CLAIMED IS:

1. An electronic device, comprising: a memory, a processor and a photographic device, the memory comprising an eyeball movement analysis program and the eyeball movement analysis program being executed by the processor to implement the following steps of:

a real-time facial image acquisition step: acquiring a real-time image shot by the photographic device and extracting a real-time facial image from the real-time image by use of a face recognition algorithm;

a feature point recognition step: inputting the real-time facial image into a pretrained eye mean shape and recognizing n_1 orbit feature points and n_2 eyeball feature points representative of an eye position in the real-time facial image by use of the eye mean shape;

a human eye region recognition step: determining an eye region according to the n_1 orbit feature points and the n_2 eyeball feature points, inputting the eye region into a pretrained human eye classification model and judging whether the eye region is a human eye region or not; and

an eyeball movement judgment step: if the eye region is a human eye region, calculating a movement direction and movement distance of an eyeball in the realtime facial image according to x and y coordinates of the n_1 orbit feature points and n_2 eyeball feature points in the real-time facial image, wherein the eyeball movement judgment step comprises: calculating a center coordinate of an orbit in the real-time facial image according to the x and y coordinates of the n1 orbit feature points; and calculating a positional relationship between a center of the orbit and each eyeball feature point to judge the movement direction and movement distance of the eyeball;

wherein the eyeball movement analysis program is executed by the processor to further implement a prompting step: when the human eye classification model judges that the eye region is not a human eye region, making such a prompt that no human eye region is detected in the present real-time image and no eyeball movement can be judged, and returning to the real-time image capturing step to capture a next real-time image;

wherein the training steps for the human eye classification model comprise: collecting m human eye positive sample images and m human eye negative sample images; extracting local features of each human eye positive sample image and human eye negative sample image; and training a Support Vector Machine (SVM) by use of the human eye positive sample images, the human eye negative sample images and the local features thereof to obtain the human eye classification model.

2. The electronic device of claim 1, wherein the training steps for the eye mean shape comprise:

establishing a first sample library with n facial images and marking n_1 orbit feature points and n_2 eyeball feature points in each facial image in the first sample library, the (n_1+n_2) feature points in each facial image forming a shape feature vector S to obtain n shape feature vectors S of an eye; and

training a facial feature recognition model by use of the n shape feature vectors S to obtain the eye mean shape about faces.

3. The electronic device of claim 2, wherein the facial feature recognition model is an ensemble of regression trees (ERT) algorithm and is represented by a formula as follows:

$$\hat{S}^{t+1} = \hat{S}^{t} + \tau_t(I, \hat{S}^{t}),$$

where t represents a concatenation sequence number, $\tau_t(\cdot,\cdot)$ represents a regressor of a present stage and S(t) is a shape estimate of a present model; each regressor $\tau_t(\cdot,\cdot)$ predicts an increment $\tau_t(I,\hat{S}^t)$ according to an input present image I and S(t); and in a model training process, part of feature points of all sample pictures are extracted to train a first regression tree, a second tree is trained by use of residuals between predicted values of the first regression tree and true values of the part of feature points, and so on, when predicted values of an Nth trained tree and the true values of the part of feature points are close to zero, all regression trees of the ERT algorithm are obtained, and the eye mean shape for the faces is obtained according to these regression trees.

4. The electronic device of claim 1, wherein the face recognition algorithm comprises a geometric-feature-based method, a local feature analysis method, an eigenface method, an elastic-model-based method and a neural network method.

5. An eyeball movement analysis method, comprising:

a real-time facial image acquisition step: acquiring a real-time image shot by the photographic device and extracting a real-time facial image from the real-time image by use of a face recognition algorithm;

a feature point recognition step: inputting the real-time facial image into a pretrained eye mean shape and recognizing n_1 orbit feature points and n_2 eyeball feature points representative of an eye position in the real-time facial image by use of the eye mean shape;

a human eye region recognition step: determining an eye region according to the n_1 orbit feature points and the n_2 eyeball feature points, inputting the eye region into a

pretrained human eye classification model and judging whether the eye region is a human eye region or not; and

an eyeball movement judgment step: if the eye region is a human eye region, calculating a movement direction and movement distance of an eyeball in the realtime facial image according to x and y coordinates of the n_1 orbit feature points and n_2 eyeball feature points in the real-time facial image, wherein the eyeball movement judgment step comprises: calculating a center coordinate of an orbit in the real-time facial image according to the x and y coordinates of the n1 orbit feature points; and calculating a positional relationship between a center of the orbit and each eyeball feature point to judge the movement direction and movement distance of the eyeball;

a prompting step: when the human eye classification model judges that the eye region is not a human eye region, making such a prompt that no human eye region is detected in the present real-time image and no eyeball movement can be judged, and returning to the real-time image capturing step to capture a next real-time image;

wherein the training steps for the human eye classification model comprise: collecting m human eye positive sample images and m human eye negative sample images; extracting local features of each human eye positive sample image and human eye negative sample image; and training a Support Vector Machine (SVM) by use of the human eye positive sample images, the human eye negative sample images and the local features thereof to obtain the human eye classification model.

6. The eyeball movement analysis method of claim 5, wherein the training steps for the eye mean shape comprise:

establishing a first sample library with n facial images and marking n_1 orbit feature points and n_2 eyeball feature points in each facial image in the first sample

library, the (n_1+n_2) feature points in each facial image forming a shape feature vector S to obtain n shape feature vectors S of an eye; and

training a facial feature recognition model by use of the n shape feature vectors S to obtain the eye mean shape about faces.

7. The eyeball movement analysis method of claim 6, wherein the facial feature recognition model is an ensemble of regression trees (ERT) algorithm and is represented by a formula as follows:

$$\hat{S}^{t+1} = \hat{S}^{t} + \tau_t(I, \hat{S}^{t}),$$

where t represents a concatenation sequence number, $\tau_t(\cdot,\cdot)$ represents a regressor of a present stage and S(t) is a shape estimate of a present model; each regressor $\tau_t(\cdot,\cdot)$ predicts an increment $\tau_t(I, \hat{S}^{t})$ according to an input present image I and S(t); and in a model training process, part of feature points of all sample pictures are extracted to train a first regression tree, a second tree is trained by use of residuals between predicted values of the first regression tree and true values of the part of feature points, and so on, when predicted values of an Nth trained tree and the true values of the part of feature points are close to zero, all regression trees of the ERT algorithm are obtained, and the eye mean shape for the faces is obtained according to these regression trees.

8. The eyeball movement analysis method of claim 5, wherein the face recognition algorithm comprises a geometric-feature-based method, a local feature analysis method, an eigenface method, an elastic-model-based method and a neural network method.

9. A computer-readable storage medium, comprising an eyeball movement analysis program, the eyeball movement analysis program being executed by a processor to implement the following steps of:

a real-time facial image acquisition step: acquiring a real-time image shot by the photographic device and extracting a real-time facial image from the real-time image by use of a face recognition algorithm;

a feature point recognition step: inputting the real-time facial image into a pretrained eye mean shape and recognizing n_1 orbit feature points and n_2 eyeball feature points representative of an eye position in the real-time facial image by use of the eye mean shape;

a human eye region recognition step: determining an eye region according to the n_1 orbit feature points and the n_2 eyeball feature points, inputting the eye region into a pretrained human eye classification model and judging whether the eye region is a human eye region or not; and

an eyeball movement judgment step: if the eye region is a human eye region, calculating a movement direction and movement distance of an eyeball in the realtime facial image according to x and y coordinates of the n_1 orbit feature points and n_2 eyeball feature points in the real-time facial image, wherein the eyeball movement judgment step comprises: calculating a center coordinate of an orbit in the real-time facial image according to the x and y coordinates of the n1 orbit feature points; and calculating a positional relationship between a center of the orbit and each eyeball feature point to judge the movement direction and movement distance of the eyeball;

wherein the eyeball movement analysis program is executed by the processor to further implement the following step: a prompting step: when the human eye

classification model judges that the eye region is not a human eye region, making such a prompt that no human eye region is detected in the present real-time image and no eyeball movement can be judged, and returning to the real-time image capturing step to capture a next real-time image;

wherein training steps for the human eye classification model comprise: collecting m human eye positive sample images and m human eye negative sample images; extracting local features of each human eye positive sample image and human eye negative sample image; and training a Support Vector Machine (SVM) by use of the human eye positive sample images, the human eye negative sample images and the local features thereof to obtain the human eye classification model.