

CLAIMS

1. A risk prediction method, comprising:
 - a) obtaining a video image of an applicant during an interview;
 - b) clustering video frames in the video image to determine a key frame video image;
wherein the key frame video image is determined by a first set or a second set of steps of clustering video frames in the video image:
 - wherein the first set of steps comprises selecting a specified number of video frames from the video image as an initial clustering center; calculating the similarity between a video frame in the video image and the initial clustering center; clustering video frames in the video image according to the calculated similarity and a preset minimum similarity; reselecting a clustering center from the clustered video frames, and repeating the clustering until the clustering center converges; and determining the final clustering center as the key frame video image of the video image;
 - wherein the second set of steps comprises obtaining an intensity value of a human facial action unit in each frame of video image according to the video frame in the video image; and classifying the video frame images according to the intensity value of the human facial action unit, and determining a key frame video image according to the classification result;
 - c) determining a fraud probability of a micro-expression corresponding to the key frame video image according to the determined key frame video image and a micro-expression fraud probability model; and
 - d) performing risk prediction of the applicant's repayment ability according to the determined fraud probability of the micro-expression corresponding to the key frame video image.
2. The method according to claim 1, wherein before the step of determining the fraud probability of the micro-expression corresponding to the key frame video image according to the determined key frame video image and the micro-expression fraud probability model, the method comprises:
 - acquiring a set number of labeled sample videos, the labels comprising fraud and non-fraud;
 - extracting a sample key frame image in each sample video, the label of the sample key frame image being the same as the label which belongs to the sample video; and

taking the extracted sample key frame image as a training sample to train a support vector machine (SVM) classifier, and determining the trained SVM classifier as a micro-expression fraud probability model.

3. The method according to any one of claims 1 to 2, wherein the step of performing risk prediction according to the determined fraud probability of the micro-expression corresponding to the key frame video image comprises:

comparing the fraud probability of the micro-expression corresponding to the key frame video image with a preset risk probability threshold;

predicting that the applicant's repayment risk exceeds a preset risk range, if the fraud probability of the micro-expression corresponding to the key frame video image is not less than the preset risk probability threshold; and

predicting that the applicant's repayment risk is within a preset risk range, if the fraud probability of the micro-expression corresponding to the key frame video image is less than the preset risk probability threshold.

4. A risk prediction apparatus, comprising:

a video image acquisition module, configured to obtain a video image of an applicant during an interview;

a key image determination module, configured to cluster video frames in the video image to determine a key frame video image,

wherein the key image determination module comprises:

a center determination submodule, configured to select a specified number of video frames from the video image as an initial clustering center;

a similarity calculation submodule, configured to calculate the similarity between a video frame in the video image and the initial clustering center;

a clustering submodule, configured to cluster video frames in the video image according to the calculated similarity and a preset minimum similarity,

wherein the clustering submodule is also configured to reselect a clustering center from the clustered video frames, and repeat the clustering until the clustering center converges;

a first image determination submodule, configured to determine the final clustering center as the key frame video image of the video image;

an intensity value determination submodule, configured to obtain an intensity value of the human facial action unit in each frame of video image according to the video frame in the video image; and

a second image determination submodule, configured to classify the video frame image according to the intensity value of the human facial action unit, and determine a key frame video image according to the classification result;

a fraud probability determination module, configured to determine a fraud probability of a micro-expression corresponding to the key frame video image according to the determined key frame video image and a micro-expression fraud probability model; and

a risk prediction module, configured to perform risk prediction of the applicant's repayment ability according to the determined fraud probability of the micro-expression corresponding to the key frame video image.

5. The risk prediction apparatus according to claim 4, wherein the risk prediction apparatus further comprises:

a sample video acquisition module, configured to acquire a set number of labeled sample videos, the labels comprising fraud and non-fraud;

a key image extraction module, configured to extract a sample key frame image in each sample video, the label of the sample key frame image being the same as the label which belongs to the sample video; and

a classification training module, configured to take the extracted sample key frame image as a training sample to train an SVM classifier, and determine the trained SVM classifier as a micro-expression fraud probability model.

6. The risk prediction apparatus according to any one of claims 4 to 5, wherein the risk prediction module comprises:

a probability comparison submodule, configured to compare the fraud probability of the micro-expression corresponding to the key frame video image with a preset risk probability threshold;

a first prediction submodule, configured to predict that the applicant's repayment risk exceeds a preset risk range if the fraud probability of the micro-expression corresponding to the key frame video image is not less than the preset risk probability threshold; and

a second prediction submodule, configured to predict that the applicant's repayment risk is within a preset risk range if the fraud probability of the micro-expression corresponding to the key frame video image is less than the preset risk probability threshold.

7. A computer readable storage medium which stores computer readable instructions, wherein when the computer readable instructions are executed by a processor, the following steps are implemented:

- a) obtaining a video image of an applicant during an interview;
- b) clustering video frames in the video image to determine a key frame video image, wherein the key frame video image is determined by a first set or a second set of steps of clustering video frames in the video image:

- wherein the first set of steps comprises selecting a specified number of video frames from the video image as an initial clustering center; calculating the similarity between a video frame in the video image and the initial clustering center; clustering video frames in the video image according to the calculated similarity and a preset minimum similarity; reselecting a clustering center from the clustered video frames, and repeating the clustering until the clustering center converges; and determining the final clustering center as the key frame video image of the video image;

- wherein the second set of steps comprises obtaining an intensity value of a human facial action unit in each frame of video image according to the video frame in the video image; and classifying the video frame images according to the intensity value of the human facial action unit, and determining a key frame video image according to the classification result;

- c) determining a fraud probability of a micro-expression corresponding to the key frame video image according to the determined key frame video image and a micro-expression fraud probability model; and

- d) performing risk prediction of the applicant's repayment ability according to the determined fraud probability of the micro-expression corresponding to the key frame video image.

8. The computer readable storage medium according to claim 7, wherein before the step of determining the fraud probability of the micro-expression corresponding to the key frame

video image according to the determined key frame video image and the micro-expression fraud probability model, the method comprises:

acquiring a set number of labeled sample videos, the labels comprising fraud and non-fraud;

extracting a sample key frame image in each sample video, the label of the sample key frame image being the same as the label which belongs to the sample video;

taking the extracted sample key frame image as a training sample to train a support vector machine (SVM) classifier, and determining the trained SVM classifier as a micro-expression fraud probability model.

9. The computer readable storage medium according to any one of claims 7 to 8, wherein the step of performing risk prediction according to the determined fraud probability of the micro-expression corresponding to the key frame video image comprises:

comparing the fraud probability of the micro-expression corresponding to the key frame video image with a preset risk probability threshold;

predicting that the applicant's repayment risk exceeds a preset risk range, if the fraud probability of the micro-expression corresponding to the key frame video image is not less than the preset risk probability threshold; and

predicting that the applicant's repayment risk is within a preset risk range, if the fraud probability of the micro-expression corresponding to the key frame video image is less than the preset risk probability threshold.

10. A server, comprising a storage, a processor, and computer readable instructions stored in the storage and executable on the processor, wherein the processor implements the following steps when executing the computer readable instructions:

a) obtaining a video image of an applicant during an interview;

b) clustering video frames in the video image to determine a key frame video image, wherein the key frame video image is determined by a first set or a second set of steps of clustering video frames in the video image:

wherein the first set of steps comprises selecting a specified number of video frames from the video image as an initial clustering center; calculating the similarity between a video frame in the video image and the initial clustering center; clustering video frames in the video image according to the calculated similarity and a preset minimum similarity; reselecting a clustering center from the clustered video frames,

and repeating the clustering until the clustering center converges; and determining the final clustering center as the key frame video image of the video image;

wherein the second set of steps comprises obtaining an intensity value of a human facial action unit in each frame of video image according to the video frame in the video image; and classifying the video frame images according to the intensity value of the human facial action unit, and determining a key frame video image according to the classification result;

c) determining a fraud probability of a micro-expression corresponding to the key frame video image according to the determined key frame video image and a micro-expression fraud probability model; and

d) performing risk prediction of the applicant's repayment ability according to the determined fraud probability of the micro-expression corresponding to the key frame video image.

11. The server according to claim 10, wherein before the step of determining the fraud probability of the micro-expression corresponding to the key frame video image according to the determined key frame video image and the micro-expression fraud probability model, the method comprises:

acquiring a set number of labeled sample videos, the labels comprising fraud and non-fraud;

extracting a sample key frame image in each sample video, the label of the sample key frame image being the same as the label which belongs to the sample video; and

taking the extracted sample key frame image as a training sample to train a support vector machine (SVM) classifier, and determining the trained SVM classifier as a micro-expression fraud probability model.

12. The server according to any one of claims 10 to 11, wherein the step of performing risk prediction according to the determined fraud probability of the micro-expression corresponding to the key frame video image comprises:

comparing the fraud probability of the micro-expression corresponding to the key frame video image with a preset risk probability threshold;

predicting that the applicant's repayment risk exceeds a preset risk range, if the fraud

probability of the micro-expression corresponding to the key frame video image is not less than the preset risk probability threshold; and

predicting that the applicant's repayment risk is within a preset risk range, if the fraud probability of the micro-expression corresponding to the key frame video image is less than the preset risk probability threshold.