

Claim

1. A method of generating an image recognition model for recognising an input image, comprising:
 - appending at least one feature extraction layer to the image recognition model;
 - extracting a plurality of feature vectors from a set of predetermined images;
 - grouping the plurality of feature vectors into a plurality of categories;
 - clustering the plurality of feature vectors of each of the plurality of categories into at least one cluster;
 - determining at least one centroid for each of the at least one cluster, wherein each of the at least one cluster comprises at least one centroid, wherein each of the at least one centroid is represented by a feature vector;
 - generating a classification layer based on the feature vector of the at least one centroid of the plurality of categories; and
 - appending the classification layer to the image recognition model.
2. The method according to claim 1, comprising varying the number of clusters of each of the plurality of categories into a new number of clusters, re-clustering the plurality of feature vectors of each of the plurality of categories into the new number of clusters, re-determining at least one centroid for each of the new number of clusters wherein each of the at least one centroid is represented by a feature vector, and re-generating the classification layer of the image recognition model based on the feature vector of the at least one centroid of each of the new number of clusters.
3. The method according to claim 1 or 2, further comprising receiving a plurality of images for a new category, extracting a plurality of new feature vectors from the plurality of images by the feature extraction module, clustering the plurality of new feature vectors into at least one new cluster, generating at least one centroid for each of the at least one new cluster, wherein each of the at least one centroid is represented by a feature vector, and appending the feature vector of each of the at least one centroid for each of the at least one new cluster to the classification layer of the image recognition model.

4. The method according to any one of claim 1 to 3, further comprising receiving a plurality of selected images in one of the plurality of categories, extracting a plurality of new feature vectors of the plurality of selected images, adding the plurality of new feature vectors to the plurality of feature vectors of the one of the plurality of categories to form a new set of feature vectors, re-clustering the new set of feature vectors into at least one cluster, re-generating at least one centroid for each of the at least one cluster, wherein each of the at least one centroid is represented by a feature vector, and appending the feature vector of each of the at least one centroid for each of the at least one cluster to the classification layer of the image recognition model.
5. The method according to any one of claims 1 to 4, wherein the plurality of feature vectors are clustered using the k-mean algorithm.
6. A method for classifying an input image, the method comprising:
 - receiving the input image;
 - inputting the image to the generated image recognition model as claimed in any one of claims 1 to 5 to classify the input image into one of the plurality of categories;
 - and
 - outputting a category name of the one of the plurality of categories of the input image from the image recognition model.
7. The method according to claim 6, wherein the method comprises:
 - extracting a feature vector of the input image;
 - comparing the feature vector to the plurality of centroids in the classification layer;
 - determining one of the plurality of centroids that is nearest to the feature vector;
 - identifying the category of the one of the plurality of centroids; and
 - retrieving a category name of the category of the one of the plurality of centroids.
8. The method according to claim 7, wherein comparing the feature vector to the plurality of centroids comprises calculating the distances between the feature vector and each of the feature vector of the at least one centroid of the plurality of categories.

9. A system for generating an image recognition model for recognising an input image, the system comprising:

a processor; and

a memory in communication to the processor for storing instructions executable by the processor,

wherein the processor is configured to:

append at least one feature extraction layer to an image recognition model;

extract a plurality of feature vectors from a set of pre-determined images;

group the plurality of feature vectors into a plurality of categories;

cluster the plurality of feature vectors of each of the plurality of categories into at least one cluster;

determine at least one centroid for each of the at least one cluster, wherein each of the at least one cluster comprises at least one centroid, wherein each of the at least one centroid is represented by a feature vector;

generate the classification layer based on the feature vector of the at least one centroid of the plurality of categories; and

append the classification layer to the image recognition model.

10. The system according to claim 9, wherein the processor is configured to vary the number of clusters of each of the plurality of categories into a new number of clusters, re-cluster the plurality of feature vectors of each of the plurality of categories into the new number of clusters, re-determine at least one centroid for each of the new number of clusters wherein each of the at least one centroid is represented by a feature vector, re-generate the classification layer in the recognition model based on the feature vector of the at least one centroid of each of the new number of clusters.

11. The system according to claim 9 or 10, wherein the processor is configured to receive a plurality of selected images in one of the plurality of categories, extract a plurality of new

feature vectors of the plurality of selected images, add the plurality of new feature vectors to the plurality of feature vectors of one of the plurality of categories to form a new set of feature vectors, re-cluster the new set of feature vectors into at least one cluster, re-generate at least one centroid for each of the at least one cluster, wherein each of the at least one centroid is represented by a feature vector, and append the feature vector of each of the at least one centroid for each of the at least one cluster to the classification layer to the image recognition model.

12. The system according to any one of claims 9 to 11, wherein the plurality of feature vectors are clustered using k-mean algorithm.

13. A system for classifying an input image, the system comprising:
a processor; and
a memory in communication to the processor for storing instructions executable by the processor,
wherein the processor is configured to:
receive the input image;
input the input image to the generated image recognition model as claimed in any one of claims 9 to 11 to classify the input image into one of the plurality of categories; and
output a category name of the one of the plurality of categories of the input image from the image recognition model.

14. The system according to claim 13, wherein the processor is configured to extract a feature vector of the input image, compare the feature vector to the plurality of centroids in the classification layer, determine one of the plurality of centroids that is nearest to the feature vector, identify the category of the one of the plurality of centroids and retrieve the category name of the category of the one of the plurality of centroids.

15. A non-transitory computer readable storage medium comprising instructions, wherein the instructions, when executed by a processor in a system, cause the system to:
append at least one feature extraction layer to an image recognition model;
extract a plurality of feature vectors from a set of pre-determined images;

group the plurality of feature vectors into a plurality of categories;
cluster the plurality of feature vectors of each of the plurality of categories into at least one cluster;
determine at least one centroid for each of the at least one cluster, wherein each of the at least one cluster comprises at least one centroid, wherein each of the at least one centroid is represented by a feature vector;
generate the classification layer based on the feature vector of the at least one centroid of the plurality of categories; and
append the classification layer to the image recognition model.

16. A non-transitory computer readable storage medium comprising instructions, wherein the instructions, when executed by a processor in a system, cause the system to:

receive an input image;
input the input image to the generated image recognition model as claimed in any one of claims 9 to 11 to classify the input image into one of the plurality of categories; and
output a category name of the one of the plurality of categories of the input image from the image recognition model.