



CLAIMS

What is claimed is:

1. A method of producing a desired digital image of at least one desired face, said method comprising the steps of:
 - (a) providing an original digital image of at least one original face.
 - (b) processing the said original digital image to obtain a set of digital representations defining each said original face within the said original digital image.
 - (c) providing at least one face image from external sources.
 - (d) for each said original face within the said original digital image, selecting a corresponding face image from among the said face images from external sources, dependence upon the said set of digital representations defining the said original face within the said original digital image.
 - (e) for each said original face within the said original digital image, modifying the selected corresponding face image, dependence upon the said set of digital representations defining the said original face within the said original digital image.
 - (f) replacing each said original face within the said original digital image with the selected and modified corresponding face image at the desired position and the desired size within the said original digital image, to produce the desired digital image of at least one desired face.
2. The method according to claim 1, wherein the said desired face comprises a portion of a head, viewed from any possible angle.
3. The method according to claim 1, wherein each said original face comprises a foreground region drawn according to a set of guidelines.
4. The method according to claim 1, wherein the said original digital image comprises at least one said original face and other foreground and/or background regions.



5. The method according to claim 4, wherein the background of the said original digital image may be a redundant region replaceable by the corresponding region of a user-provided image.
6. The method according to claim 1, wherein each said set of digital representations includes the position and size of a said original face within the said original digital image.
7. The method according to claim 6, wherein each said set of digital representations further includes the facial colour of the said original face within the said original digital image.
8. The method according to claim 6, wherein each said set of digital representations further includes the facial expression of the said original face within the said original digital image.
9. The method according to claim 6, wherein each said set of digital representations further includes the rotation of the said original face within the said original digital image.
10. The method according to claim 6, wherein each said set of digital representations further includes the clipping of the said original face within the said original digital image.
11. The method according to claim 10, wherein the clipping of a said original face comprises the partial blocking and/or covering up of the said original face by any other objects.
12. The method according to claim 1, wherein each said face image from external source is a digital image with a single said desired face as the foreground, and the background is a redundant region to be clipped away and discarded.
13. The method according to claim 12, wherein the said face image may comprise a single said desired face without a background instead.
14. The method according to claim 12, wherein each said face image from external source may be further provided with a facial colour.

15. The method according to claim 14, wherein each said face image from external source not provided with a facial colour is assigned a default facial colour.

16. The method according to claim 12, wherein each said face image from external source may be further provided with a facial expression.

17. The method according to claim 16, wherein each said face image from external source not provided with a facial expression is assigned a default facial expression.

18. The method according to claim 1, wherein the selection of the said corresponding face image for each said original face comprises the steps of:

(a) selecting from among all the said face images from external sources, the face images with the most similar facial colour to the facial colour of the said original face.

(b) selecting from among all the said face images from external sources with the most similar facial colour to the facial colour of the said original face, the face image with the most similar facial expression to the facial expression of the said original face.

19. The method according to claim 1, wherein each selected corresponding face image of a said original face is modified by being digitally resized, dependence upon the said set of digital representations defining the said original face.

20. The method according to claim 1, wherein each selected corresponding face image of a said original face is modified by being digitally rotated, dependence upon the said set of digital representations defining the said original face.

21. The method according to claim 1, wherein each selected corresponding face image of a said original face is modified by being digitally clipped, dependence upon the said set of digital representations defining the said original face and the redundant background of the selected corresponding face image.

22. The method according to claim 1, wherein the replacement of each said original face with the selected and modified corresponding face image comprises the steps of:

(a) digitally resizing the selected and modified corresponding face image to a size big enough to cover the entire said original face to be replaced.

(b) superimposing the resized, selected and modified corresponding face image onto the said original face within the said original digital image, at the position to cover the entire said original face.

23. The method according to claim 22, wherein the replacement of each said original face with the selected and modified corresponding face image may instead comprise the steps of:

(a) replacing the entire said original face with the surrounding background colour or the corresponding region from an available user-provided background image.

(b) superimposing the selected and modified corresponding face image onto the said original digital image, at the position dependence upon the said set of digital representations defining the said original face.

24. The method according to claim 3, wherein the said set of guidelines for drawing each said original face comprises the specifications of:

(a) defining the said original face as a foreground region drawn within the said original digital image to resemble and represent a said desired face.

(b) defining the said original face as a foreground region surrounded by other (foreground and/or background) regions and/or edges within the said original digital image.

(c) defining the said original face as a foreground region with distinctive edge wherein the said distinctive edge separates the said original face from the other regions within the said original digital image.

(d) defining the position of the said original face drawn within the said original digital image as the desired position of the said desired face.

(e) defining the size of the said original face drawn within the said original digital image as the default desired size of the said desired face.

25. The method according to claim 24, wherein the said set of guidelines further defines the said original face as a foreground region with majority of the area in a unanimous colour.

26. The method according to claim 24, wherein the said set of guidelines further defines the said original face as a foreground region containing other facial features.

27. The method according to claim 26, wherein the said facial features and the said foreground region of the said original face are separated by different colours or edges.

28. The method according to claim 24, wherein the said set of guidelines for drawing each said original face further comprises the specifications of:

(f) defining the facial colour of the said original face as dependence upon one of the colours of the said original face.

(g) defining said original faces with the same facial colour as belonging to the same subject.

(h) defining said original faces with different facial colours as belonging to different subjects.

29. The method according to claim 28, wherein the facial colour of a said original face is defined dependence upon the colour of the said unanimously-coloured foreground region of the said original face.

30. The method according to claim 29, wherein the facial colour of a said original face may be defined dependence upon the colour of one of the said facial features of the said original face instead.

31. The method according to claim 24, wherein the said set of guidelines for drawing each said original face further comprises the specifications of:

(i) defining an original shape for the said original face.

(j) defining any said clipping of the said original shape (of the said original face) as representing a similar clipping of the said original face.

32. The method according to claim 24, wherein the said set of guidelines for drawing each said original face further comprises the specifications of:

(k) defining the upright position of the said original face as dependence upon the orientation of the shape of the said original face within the said digital image.

(l) defining the rotation of the said original face as the angular difference between the said original face and the said upright position of the said original face.

33. The method according to claim 32, wherein the upright position of the said original face may be defined as dependence upon the arrangement of the facial features within the said original face instead.

34. The method according to claim 26, wherein different shapes of the facial features within the said original face are defined to represent different facial expressions of the said original face.

35. The method according to claim 34, wherein different colours of the facial features within the said original face may be defined to represent different facial expressions of the said original face instead.

36. The method according to claim 26, wherein the said set of guidelines for drawing the said facial features of the said original face comprises the specifications of:

(a) defining the said facial features as comprising of two eyes and one mouth.

(b) defining the two said eyes as similar in size to each other.

(c) defining each of the two said eyes to be in a unanimous colour.

- (d) defining the said mouth as bigger in size than each of the two said eyes.
- (e) defining the said mouth to be in a unanimous colour.
- (f) defining the arrangement of the two said eyes and the said mouth within the said original face, as similar to the arrangement of the eyes and the mouth of a real human face.
- (g) defining the sizes of the two said eyes and the said mouth relative to the size of the said original face, as similar to the sizes of the eyes and mouth of a real human face relative to the size of the real human face.
- (h) defining the upright position of a said original face as the position where the two said eyes are lying horizontally, with the said mouth lying below the two said eyes.

37. A system, using the method as claimed in claim 1, for producing an output video containing a sequence of desired digital images of at least one desired face, wherein the inputs of the said system comprise of:

- (a) An input video containing a sequence of the said original digital images of at least one said original face as claimed in claim 1.
- (b) At least one said face image as claimed in claim 1.

38. A system as claimed in claim 37, wherein the inputs of the said system further comprise of at least one user-provided background image to be used for replacing the redundant background regions of the said original digital images of the said input video.

39. A system as claimed in claim 37, wherein the inputs of the said system further comprise of user-provided audio.

40. A system as claimed in claim 37, wherein the said output video produced by the said system further includes user-provided audio.