~~CLAIMS~~

~~What is claimed is:~~

Claims

1. A method for application of a composition to a treatment surface of a user, comprising:

projecting, by an optical emitter, a plurality of fiducials to the treatment surface~~;~~, wherein the plurality of fiducials form a pattern; obtaining, by a detector arrangement, image data corresponding to an image of an area of the treatment surface marked with the fiducials;

analyzing, by a processing arrangement, the image data to determine a morphology of the area of the treatment surface based on the fiducials captured within the image~~;~~, wherein the morphology of the area of the treatment surface is determined using the fiducial points corresponding to corners of the pattern; identifying, by the processing arrangement, a region within the image ~~corresponding~~aligning to a location within the area of the treatment surface aimed for application of the composition by an applicator arrangement, the region ~~being~~aligning to the aimed location of the applicator arrangement is identified based on the morphology of the area of the treatment surface;

analyzing, by the processing arrangement, the image data to determine whether the identified region within the image corresponds to an artifact; and

selectively applying, by an applicator arrangement, the composition to the location within the area of the treatment surface when the artifact is detected from the identified region, wherein the applicator arrangement comprises a nozzle configured to deposit the composition from a pressurized reservoir to form a thin layer of the composition on the treatment surface.

2. The method of claim 1, wherein the treatment surface is a skin of a face of the user.

3. The method of claim 1, wherein at least 3 fiducials are projected to the treatment surface.

4. The method of claim 1, wherein the plurality of fiducials forms a checkerboard pattern.

5. The method of claim 4, wherein the morphology of the area of the treatment surface is determined using ~~a~~the plurality of fiducial points corresponding to corners of the checkerboard pattern.

6. The method of claim 1, wherein the morphology is determined by analyzing the image data to determine, for each fiducial, a distance between the optical emitter and a height of a position on the treatment surface marked by each fiducial.

7. The method of claim 6, wherein the distance is determined by analyzing the image data to compare a fiducial position of each fiducial within the image to calibration data, the calibration data correlating regions within calibration images of a calibration substrate captured by the detector arrangement to distances between the optical emitter and the calibration substrate.

8. The method of claim 6, wherein the morphology comprises at least one of a curvature and a tilt of the area of the treatment surface.

9. The method of claim 1, wherein the processing arrangement determines whether the identified region corresponds to the artifact based on a reflectance of the treatment surface detected in the image.

10. The method of claim 1, wherein the composition is a cosmetic composition comprising a reflectance modifying agent.

11. The method of claim 1, wherein the composition comprises an active ingredient for treating a skin condition.

12. The method of claim 1, wherein the analyzing step comprises adjusting the image data to reduce ~~data corresponding to~~ distortions to the fiducials captured within the image, and determining ~~a~~the morphology of the area of the treatment surface based on the fiducials captured within the image using the processed image data.

13. The method of claim 12, wherein the image data is adjusted using a second set of image data corresponding to at least one component of a second image of the area of the treatment surface obtained by the detector arrangement, wherein the second image is not marked with the fiducials.

14. A handheld device for applying a composition to a treatment surface, comprising:

an optical emitter configured to project a plurality of fiducials to the treatment surface~~;~~

, wherein the plurality of fiducials form a pattern; a detector arrangement configured to obtain image data corresponding to an image of an area of the treatment surface marked with the fiducials;

an applicator arrangement configured to apply the composition to a location within the area of the treatment surface~~; and~~

, wherein the applicator arrangement comprises a nozzle configured to deposit the composition from a pressurized reservoir to form a thin layer of the composition on the treatment surface; and a processing arrangement configured to receive the image data from the detector arrangement, analyze the image data to determine a morphology of the area of the treatment surface based on the fiducials captured within the image, identify a region within the image ~~corresponding~~aligning to the location the applicator arrangement is configured to apply the composition, the region ~~being~~aligning to the aimed location of the applicator arrangement is identified based on the morphology of the area of the treatment surface, wherein the morphology of the area of the treatment surface is determined using the fiducial points corresponding to corners of the pattern, analyze the image data to determine whether the identified region corresponds to an artifact, and direct the applicator arrangement to selectively apply the composition to the location when the artifact is detected from the identified region.

15. The handheld device of claim 14, wherein the plurality of fiducials comprises at least 3 fiducials.

16. The handheld device of claim 14, wherein the at least one optical emitter comprises a fiducial light source and a template through which light from the fiducial light source would pass to project the plurality of fiducials to the area of the treatment surface.

17. The handheld device of claim 14, wherein the plurality of fiducials forms a checkerboard pattern.

18. The handheld device of claim 14, wherein the detector arrangement comprises at least one light source for delivering light to the area of the treatment surface, and at least one sensor for detecting the light and the projected fiducials from the area of the treatment surface to obtain the image data.

19. The handheld device of claim 14, wherein the applicator arrangement comprises a nozzle configured to deposit the composition from a pressurized reservoir to form a thin layer of the composition on the treatment surface.

20. The handheld device of claim 14, wherein the composition comprises at least one of a reflectance modifying agent and an active ingredient for treating a skin condition.

21. The handheld device of claim 14, wherein the processing arrangement determines the morphology by analyzing the image data to determine, for each fiducial, a distance between the optical emitter and a height of a position on the treatment surface marked by each fiducial.

22. The handheld device of claim 21, further comprising a non-transitory computer-accessible medium configured to store calibration data, the calibration data correlating regions within calibration images of a calibration substrate captured by the detector arrangement to distances between the optical emitter and the calibration substrate, and wherein the processing arrangement determines the distance between the optical emitter and the height of the position on the treatment surface marked by each fiducial by comparing a fiducial position of each fiducial within the image to the calibration data.

23. The handheld device of claim 14, wherein the morphology comprises at least one of a curvature and a tilt of the area of the treatment surface.

24. The handheld device of claim 14, wherein the processing arrangement determines whether the region within the image includes the artifact based on a reflectance of the treatment surface detected in the image.