CLAIMS

1. A method performed by one or more data processing apparatus, the method comprising:

obtaining at least one image depicting a reflection of light from a lens that is included in a set of eyeglasses;

determining, based on the reflection of light from the lens, a set of features characterizing the lens, comprising:

determining a geometry of the reflection of light from the lens; and

determining one or more features characterizing the lens based on the geometry of the reflection of the light from the lens; and

determining an identity of a corresponding user based at least in part on the set of features characterizing the lens.

2. The method of claim 1, wherein the light comprises a predetermined pattern of light projected from one or more light sources.

3. The method of claim 2, wherein:

at each of a plurality of time steps, the light sources project a respective pattern of light onto the lens,

obtaining the at least one image depicting the reflection of light from the lens comprises:

obtaining, at each of the plurality of time steps, a respective image depicting a reflection of the respective pattern of light projected onto the lens at the time step, and

determining the set of features characterizing the lens comprises:

determining at least a portion of the set of features characterizing the lens based on the reflection of the respective pattern of light projected onto the lens at each of the plurality of time steps.

4. The method of claim 3, wherein at each of the plurality of time steps, the light sources project onto the lens a given pattern of light that is rotated to a respective angle.

5. The method of claim 1, wherein determining the geometry of the reflection of the light from the lens comprises:

identifying: (i) a first reflection of the light from an outer surface of the lens, and (ii) a second reflection of the light from an inner surface of the lens; and

determining: (i) a first geometry of the first reflection of the light from the outer surface of the lens, and (ii) a second geometry of the second reflection of the light from the inner surface of the lens.

6. The method of claim 5, wherein determining the one or more features characterizing the lens comprises:

determining one or more features based on a difference between the first geometry and the second geometry.

7. The method of claim 6, wherein determining the one or more features based on a difference between the first geometry and the second geometry comprises:

determining the one or more features based on a measure of distortion between the first geometry and the second geometry.

8. The method of claim 6, wherein determining the one or more features based on a difference between the first geometry and the second geometry comprises:

determining the one or more features based on a difference in size between the first geometry and the second geometry.

9. The method of claim 1, wherein the set of features characterize properties of the lens comprising one or more of: a spherical power of the lens, a cylindrical power of the lens, a cylindrical angle of the lens, a coating of the lens, a tint of the lens, a curvature of an inner surface of the lens, and a curvature of an outer surface of the lens.

10. The method of claim 1, further comprising:

determining, based on a reflection of the light from a cornea of an eye of the corresponding user, an additional set of features characterizing the lens; and

determining the identity of the corresponding user based at least in part on the additional set of features characterizing the lens.

11. The method of claim 10, wherein determining the additional set of features characterizing the lens comprises:

determining a first focal length that causes the reflection of the light from the lens to be substantially in focus;

determining a second focal length that causes the reflection of the light from the cornea to be substantially in focus; and

determining the additional set of features based on a difference between the first focal length and the second focal length.

12. The method of claim 10, wherein determining the additional set of features characterizing the lens comprises:

determining a third focal length that causes the reflection of light from the cornea to be substantially in focus except along a particular axis;

determining a fourth focal length that causes the reflection of light from the cornea to be substantially out of focus except along the particular axis; and

determining the additional set of features based on a difference between the third focal length and the fourth focal length.

13. The method of claim 1, wherein determining the identity of the corresponding user based at least in part on the set of features characterizing the lens comprises:

determining that a difference between: (i) the set of features characterizing the lens, and (ii) a template set of features determined during an enrollment process, satisfies a threshold condition; and

in response to determining that the difference satisfies the threshold condition, determining the identity of the corresponding user based on one or more additional features characterizing the identity of the corresponding user.

14. A system comprising:

computer-readable memory;

a feature generation engine comprising one or more processing devices, the feature generation engine configured to perform operations comprising:

obtaining at least one image depicting a reflection of light from a lens that is included in a set of eyeglasses, and

determining, based on the reflection of light from the lens, a set of features characterizing the lens, comprising:

determining a geometry of the reflection of light from the lens; and

determining one or more features characterizing the lens based on the geometry of the reflection of the light from the lens; and

an authentication engine comprising one or more processing devices, the authentication engine configured to determine or verify an identity of a corresponding user based at least in part on the set of features characterizing the lens.

15. The system of claim 14, wherein the light is a predetermined pattern of light projected from one or more light sources.

16. The system of claim 15, wherein:

at each of a plurality of time steps, the light sources project a respective pattern of light onto the lens,

obtaining the at least one image depicting the reflection of light from the lens comprises:

obtaining, at each of the plurality of time steps, a respective image depicting a reflection of the respective pattern of light projected onto the lens at the time step, and

determining the set of features characterizing the lens comprises:

determining at least a portion of the set of features characterizing the lens based on the reflection of the respective pattern of light projected onto the lens at each of the plurality of time steps.

17. The system of claim 16, wherein at each of the plurality of time steps, the light sources project onto the lens a given pattern of light that is rotated to a respective angle.

18. The system of claim 14, wherein determining the geometry of the reflection of the light from the lens comprises:

identifying: (i) a first reflection of the light from an outer surface of the lens, and (ii) a second reflection of the light from an inner surface of the lens; and

determining: (i) a first geometry of the first reflection of the light from the outer surface of the lens, and (ii) a second geometry of the second reflection of the light from the

inner surface of the lens.

19. The system of claim 18, wherein determining the one or more features characterizing the lens comprises:

determining one or more features based on a difference between the first geometry and the second geometry.

20. The system of claim 19, wherein determining the one or more features based on a difference between the first geometry and the second geometry comprises:

determining the one or more features based on a measure of distortion between the first geometry and the second geometry.

21. The system of claim 19, wherein determining the one or more features based on a difference between the first geometry and the second geometry comprises:

determining the one or more features based on a difference in size between the first geometry and the second geometry.

22. The system of claim 14, wherein the set of features characterize properties of the lens comprising one or more of: a spherical power of the lens, a cylindrical power of the lens, a cylindrical angle of the lens, a coating of the lens, a tint of the lens, a curvature of an inner surface of the lens, and a curvature of an outer surface of the lens.

23. The system of claim 15, wherein the one or more processing devices are configured to:

determine, based on a reflection of the light from a cornea of an eye of the corresponding user, an additional set of features characterizing the lens; and

determine the identity of the corresponding user based at least in part on the additional set of features characterizing the lens.

24. The system of claim 23, wherein determining the additional set of features characterizing the lens comprises:

determining a first focal length that causes the reflection of the light from the lens to be substantially in focus;

determining a second focal length that causes the reflection of the light from the

cornea to be substantially in focus; and

determining the additional set of features based on a difference between the first focal length and the second focal length.

25. The system of claim 23, wherein determining the additional set of features characterizing the lens comprises:

determining a third focal length that causes the reflection of light from the cornea to be substantially in focus except along a particular axis;

determining a fourth focal length that causes the reflection of light from the cornea to be substantially out of focus except along the particular axis; and

determining the additional set of features based on a difference between the third focal length and the fourth focal length.

26. The system of claim 14, wherein determining the identity of the corresponding user based at least in part on the set of features characterizing the lens comprises:

determining that a difference between: (i) the set of features characterizing the lens, and (ii) a template set of features determined during an enrollment process, satisfies a threshold condition; and

in response to determining that the difference satisfies the threshold condition, determining the identity of the corresponding user based on one or more additional features characterizing the identity of the corresponding user.

27. One or more non-transitory computer-readable storage devices storing instructions that upon execution cause one or more processing devices to perform operations comprising:

obtaining at least one image depicting a reflection of light from a lens that is included in a set of eyeglasses;

determining, based on the reflection of light from the lens, a set of features characterizing the lens, comprising:

determining a geometry of the reflection of light from the lens; and

determining one or more features characterizing the lens based on the geometry of the reflection of the light from the lens; and

determining an identity of a corresponding user based at least in part on the set of features characterizing the lens.

28. A method performed by one or more data processing apparatus, the method comprising:

obtaining at least one image depicting a reflection of light from a lens that is included in a set of eyeglasses;

determining, based on the reflection of light from the lens, a set of features characterizing the lens, wherein the set of features characterize properties of the lens comprising one or more of: a spherical power of the lens, a cylindrical power of the lens, a cylindrical angle of the lens, a coating of the lens, a tint of the lens, a curvature of an inner surface of the lens, and a curvature of an outer surface of the lens; and

determining an identity of a corresponding user based at least in part on the set of features characterizing the lens.