Claims

1. A fingerboard latch assembly comprising:

a latch bracket;

a latch rotatably mounted on the latch bracket,

a sensor unit mounted on the latch, the sensor unit comprising:

a sensor arranged to sense the orientation of the latch; and

a wireless communication unit arranged to wirelessly communicate the orientation of the latch sensed by the sensor.

2. A fingerboard latch assembly according to claim 1, wherein the wireless communication unit comprises a radio communication interface.

3. A fingerboard latch assembly according to claim 2, wherein the radio communication interface is arranged to provide radio communication at a radio frequency wavelength that is less than a minimum spacing between plural fingerboard latch assemblies mounted on a fingerboard.

4. A fingerboard latch assembly according to claim 1, wherein the wireless communication unit comprises a light source, the sensor unit being arranged to modulate the light output by the light source to represent the orientation of the latch sensed by the sensor.

5. A fingerboard latch assembly according to claim 4, wherein the sensor unit is arranged to modulate the light output by the light source by changing the illumination timing of the light source.

6. A fingerboard latch assembly according to claim 5, wherein the sensor unit is arranged to modulate the light output by the light source by flashing the light source and varying the period.

7. A fingerboard latch assembly according to claim 6, wherein the time for which light source is flashed on in each period is sufficiently long to be detected by a

human observer or camera system.

8. A fingerboard latch assembly according to claim 6 or 7, wherein the time for which light source is flashed on in each period is at least 5ms, at least 8ms, at least 10ms, or at least 20ms.

9. A fingerboard latch assembly according to any one of claims 6 to 8, wherein the time for which light source is flashed on in each period is the same for each variation of the period.

10. A fingerboard latch assembly according to any one of claims 4 to 9, wherein the sensor unit is arranged to modulate the light output by the light source by changing the colour of the light.

11. A fingerboard latch assembly according to any one of claims 4 to 10, wherein the sensor unit is arranged to further modulate the light output by the light source to represent additional information to the position of the latch, optionally maintenance information or the spatial location of the latch.

12. A fingerboard latch assembly according to any one of the preceding claims, wherein the sensor is an orientation sensor arranged to take measurements that are dependent on the orientation of the sensor unit; and

the sensor unit further comprises a processor arranged to derive an orientation signal representing the orientation of the latch from the measurements, the wireless communication unit being arranged to communicate the orientation signal.

13. A fingerboard latch assembly according to claim 12, wherein the processor is further arranged to associate metadata with the orientation signal.

14. A fingerboard latch assembly according to claim 13, wherein the metadata includes one or more of: time information, sensor identity, latch identity, number of

latch cycles, count of latch being in open position, count of latch being in closed position, latch speed, latch acceleration, battery level, orientation sensor signal level.

15. A fingerboard latch assembly according to any one of claims 13 to 14, wherein the sensor unit further comprises a geolocation unit arranged to detect the location of the sensor unit, and the metadata includes the location detected by the geolocation unit.

16. A fingerboard latch assembly according to any one of the claims 12 to 15, wherein the orientation signal represents the value of the present orientation of the latch across its range of movement.

17. A fingerboard latch assembly according to any one of claims 12 to 15, wherein the orientation signal represents that the present orientation of the latch is an open position, a closed position or an intermediate position.

18. A fingerboard latch assembly according to any one of the preceding claims, wherein latch has an aperture and the sensor unit fits within the aperture in the latch.

19. A fingerboard latch assembly according to claim 18, wherein the sensor unit comprises a housing that houses electronic components and a retaining member that engages with the housing and retains the sensor unit in the aperture.

20. A fingerboard latch assembly according to claim 19, wherein the housing and the retaining member comprise screw threads that are screwed together to engage the retaining member with the housing.

21. A fingerboard latch assembly according to claim 19 or 20, wherein the housing and the retaining member comprise a ratchet arrangement configured to permit screwing of the retaining member onto the housing and to prevent unscrewing.

22. A fingerboard latch assembly according to claim 21, wherein the ratchet arrangement comprises teeth and at least one flexible ratchet arm.

23. A fingerboard latch assembly according to claim 22, wherein the teeth are provided on the housing and the flexible ratchet arm is provided on the retaining member.

24. A fingerboard latch assembly according to any one of claims 19 to 23, wherein the housing comprises a pin that fits within the aperture, and the retaining member engages with the pin within the aperture.

25. A fingerboard latch assembly according to claim 24, wherein the pin comprises a proximal portion that fits within the aperture and a distal portion that is recessed relative to the proximal portion, the retaining member engaging with the proximal portion of the pin within the aperture.

26. A fingerboard latch assembly according to claim 24 or 25, wherein the retaining member further comprises a flange extending laterally for engaging the latch.

27. A fingerboard latch assembly according to claim 26, wherein the flange is shaped to fit within a bevel formed on the rim of the aperture.

28. A fingerboard latch assembly according to claim 26 or 27, wherein the flange has a cut-out arranged to accommodate a retaining wire, and the flange is rotatable on the retaining member.

29. A fingerboard latch assembly according to any one of claims 24 to 28, wherein the housing comprises a head that extends laterally of the pin and engages the latch, the head containing the electronic components.

30. A fingerboard latch assembly according to claim 29, wherein the sensor unit

further comprises a light source that comprises a light emitter contained in the head and a light guide extending along the pin from the light emitter, the pin and the retaining member being configured to allow output of light transmitted along the light guide.

31. A fingerboard latch assembly according to any one of claims 19 to 30, wherein the housing and the retaining member are made from non-metallic material.

32. A fingerboard latch assembly according to any one of claims 18 to 31, further comprising at least one resilient liner arranged between the sensor unit and the aperture in the latch.

33. A fingerboard latch assembly according to any one of claims 1 to 17, wherein the sensor unit is encapsulated in the latch.

34. A fingerboard latch assembly according to claim 33, wherein the latch is made of a non-metallic material.

35. A fingerboard latch assembly according to claim 33 or 34, wherein the latch has a recess and the sensor unit is arranged in the recess within the latch and is sealed by a lid or by a body of material within the end of the recess.

36. A fingerboard latch assembly according to any one of the preceding claims, wherein the sensor unit further comprises a power source that is configured to harvest ambient energy.

37. A fingerboard latch assembly according to claim 36, wherein the power source is configured to harvest energy from motion of the latch or to harvest electromagnetic energy.

38. A sensor system comprising:

a plurality of fingerboard latch assemblies according to any one of the

preceding claims; and

a monitoring system arranged to receive the orientation sensed communicated from the sensor units.

39. A sensor system according to claim 38, wherein the wireless communication unit comprises a radio communication interface and the monitoring system comprises at least one radio communication transceiver arranged to receive the orientation signals from the sensor units.

40. A sensor system according to claim 39, wherein the monitoring system comprises plural, distributed radio communication transceivers and a central unit, the radio communication transceivers being further arranged to communicate with the central unit for relaying the orientation signals to the central unit.

41. A sensor system according to claim 40, wherein the radio communication transceiver includes plural antennae arranged with a spatial diversity.

42. A sensor system according to any one of claims 38 to 41, wherein the monitoring system is arranged to compare orientation signals from different sensor units and to detect anomalies therein.