CLAIMS

1. An oral hygiene system for monitoring compliance with an oral hygiene regimen, the system comprising:

an oral hygiene device comprising a handle and a head, the head including a first visual pattern;

an attachment that is configured to be attachable to the handle of the oral hygiene device, the attachment including a second visual pattern that is different from the first visual pattern;

an optical sensor for detecting visual data related to the first and second visual patterns; and

a control system configured to determine a relative distance and a direction of positional movement of the oral hygiene device based on at least the visual data output by the optical sensor.

2. The oral hygiene system according to claim 1, wherein the control system is further configured to determine an orientation of the oral hygiene device based on at least an analysis of the first and second visual patterns in the visual data output by the optical sensor.

3. The oral hygiene system according to claim 1, wherein the attachment is on an add-on attachment to the oral hygiene device.

4. The oral hygiene system according to claim 1, wherein the oral hygiene device is a toothbrush.

5. The oral hygiene system according to claim 1, configured for the position of the oral hygiene device to be determined with respect to a mouth of a user of the oral hygiene device.

6. The oral hygiene system according to claim 1, configured for the position of the oral hygiene device to be determined by determining one or more of a position of the head, a position of the handle, a position of the first visual pattern, and a position of the second visual pattern.

7. The oral hygiene system according to claim 1, configured for an orientation of the oral hygiene device to be determined by the control system based on at least the visual data output by the optical sensor.

8. The oral hygiene system according to claim 7, wherein the oral hygiene device further includes a motion sensor that is configured to output motion data relating to an orientation of the oral hygiene device and wherein the control system is further configured to determine the orientation of the oral hygiene device in space additionally based on the motion data output from the motion sensor.

9. The oral hygiene system according to claim 1, wherein the control system is further configured to determine relative positional changes of the oral hygiene device using the visual data output from the optical sensor.

10. The oral hygiene system according to claim 9, wherein the control system is further configured to utilize the visual data output from the optical sensor to determine an estimated distance window within which the oral hygiene device has changed position.

11. The oral hygiene system according to claim 1, wherein the control system is further configured to determine an orientation of the oral hygiene device by analyzing motion data from a motion sensor representing strength and direction of the earth's magnetic field.

12. The oral hygiene system according to claim 8, wherein the motion sensor is a gyroscope or accelerometer.

13. An electronic oral hygiene device system for monitoring brushing and compliance with a tooth brush regimen, the system comprising:

an oral hygiene device including a handle and a head, the head including a first visual pattern;

an attachment that is configured to be attachable to the handle of the oral hygiene device, the attachment including a second visual pattern,

wherein the second visual pattern is different from the first visual pattern;

an optical sensor for detecting visual data related to the first and second visual patterns;

a memory for storing the visual data output by the optical sensor and in data communication with a control system; and

the control system being configured to determine a relative distance and direction of positional movement of the oral hygiene device based on at least the visual data output by the optical sensor.

14. The electronic oral hygiene device system according to claim 13, wherein the oral hygiene device is a toothbrush.

15. The electronic oral hygiene device system according to claim 13, configured for the control system to utilize the visual data output from the optical sensor to determine an estimated distance window within which the oral hygiene device has changed position.

16. The electronic oral hygiene device system according to claim 13, wherein the oral hygiene device further includes a motion sensor that is configured to output motion data relating to orientation of the oral hygiene device.

17. An electronic oral hygiene device system for monitoring brushing and compliance with a tooth brush regimen, the system comprising:

an oral hygiene device including a handle and a head, the head including a first a visual pattern;

an attachment that is configured to be attachable to the handle of the oral hygiene device, the attachment including a second visual pattern that is different from the first visual pattern;

a base station including an optical sensor, wherein the optical sensor is configured to detect visual data related to the first and second visual patterns;

a motion sensor configured to output motion data related to motion of the oral hygiene device;

a memory for storing the visual data output by the optical sensor and the motion data output by the motion sensor, the memory being in data communication with a control system; and

the control system being configured to determine a relative distance and direction of positional movement of the oral hygiene device based on at least the visual data output from the optical sensor and the motion data output by the motion sensor.

18. An oral hygiene system for monitoring brushing and compliance with a tooth brush regimen, the system comprising:

a toothbrush including a handle and a head, the head including a first visual pattern;

an attachment that is configured to be attachable to the handle of the toothbrush, the attachment including a second visual pattern that is different from the first visual pattern;

an optical sensor for detecting visual data related to the first and second visual patterns;

a memory containing a machine readable medium comprising machine executable code having stored thereon instructions for performing a method of determining a position and an orientation of the toothbrush;

a control system including a processor coupled to the memory, the processor being configured to execute the machine executable code to cause the control system to determine the orientation and the position of the toothbrush based on at least the visual data output by the optical sensor.

19. The oral hygiene system according to claim 18~~180~~, wherein the toothbrush further includes a gyroscope that is configured to output motion data relating to orientation changes of the toothbrush and wherein the control system is configured to determine the orientation of the oral hygiene device additionally based on the motion data output from the gyroscope.

20. The oral hygiene system according to claim 18, wherein the control system is also configured to determine relative positional changes of the toothbrush using the visual data output from the optical sensor.

21. The oral hygiene system according to claim 20 wherein the control system is configured to utilize the visual data output from the optical sensor to determine an estimated distance window within which the toothbrush has changed position.

22. The oral hygiene system according to claim 18, configured for the control system additionally to determine the orientation of the toothbrush by analyzing motion data from a magnetometer representing the strength and direction of the earth's magnetic field.

23. The oral hygiene system according to claim 18, configured for the control system additionally to determine the orientation of the toothbrush by analyzing motion data from a motion sensor connected to the toothbrush.

24. The oral hygiene system according to claim 18, configured for the control system to determine the position of the toothbrush by identifying an orientation of a longitudinal axis of the toothbrush relative to a mouth of the user based on the representation the toothbrush included in the visual data.

25. The oral hygiene system according to claim 24, wherein the visual data further includes a representation of the mouth of the user, and wherein the control system is configured:

to determine the position of the toothbrush with respect to the mouth of the user based on the representation of the toothbrush included in the visual data and the representation of the mouth of the user included in the visual data; and

to combine the determined position of the toothbrush with the orientation information determined from motion data output by a gyrometer to identify which of the user's teeth are being brushed.

26. The oral hygiene system according to claim 23, wherein the motion data from the motion sensor is at least one of acceleration data or orientation data.

27. An oral hygiene system for monitoring compliance with an oral hygiene regimen, the system comprising:

an optical sensor for detecting visual data related to a first visual pattern and a second visual pattern~~two or more patterns~~ on an oral hygiene device and an attachment, the oral hygiene device also comprising a handle and a head, wherein the head includes ~~a~~the first visual pattern and the attachment includes ~~a~~the second visual pattern that is different from the first visual pattern, wherein the attachment is configured to be attached to the handle; and

a control system configured to determine a position of the oral hygiene device based on data output by the optical sensor.

~~28. The oral hygiene system of claim 1, wherein the control system is further configured to:~~

~~determine, based on a portion of the visual data output by the optical sensor associated with the first visual pattern, a position of the head; and~~

~~determine, based on a portion of the visual data output by the optical sensor associated with the second visual pattern, a position of the handle;~~

~~wherein the relative distance and a direction of position movement of the oral hygiene device is further based on the position of the head and the position of the handle.~~