CLAIMS

1. A method of monitoring a water treatment system, the method comprising:

obtaining at least one measurement, each measurement obtained from a respective sensor positioned to measure a respective parameter of the water treatment system;

transmitting each of the at least one measurement to a treatment module, the treatment module configured to produce an aggregated signal;

transmitting the aggregated signal to a local controller, the local controller configured to determine whether any measurement is outside a predetermined range;

responsive to at least one measurement being outside the predetermined range, generating a first communication to notify a user that at least one measurement is outside the predetermined range; and

transmitting the aggregated signal to a cloud-based platform.

2. The method of claim 1, wherein determining whether any measurement is outside the predetermined range comprises decoding the aggregated signal to obtain a plurality of signal values and comparing each signal value to at least one respective reference value defining the predetermined range.

3. The method of claim 2, further comprising responsive to the at least one measurement being outside the predetermined range, generating in the first communication a recommendation to perform maintenance on the water treatment system.

4. The method of claim 2, further comprising providing the at least one reference value defining the predetermined range to the local controller.

5. The method of claim 1, comprising transmitting the aggregated signal to the cloud-based platform to determine whether the water treatment system is trending to an alarm state and generating a second communication to notify the user that the water treatment system is trending to the alarm state.

6. The method of claim 5, wherein determining whether the water treatment system is trending to the alarm state comprises decoding the aggregated signal to obtain a plurality of signal values, comparing each signal value to at least one respective reference value defining a target range;

if at least one signal value is outside the target range, providing the plurality of signal values to a transformation function trained with historical data and performing a calculation on the transformation function to obtain a plurality of predictive signal values; and

comparing the plurality of predictive signal values to at least one respective reference value defining the predetermined range to determine whether any predictive signal value is outside the predetermined range;

wherein the water treatment system is trending to an alarm state if at least one predictive signal value is outside the predetermined range.

7. The method of claim 6, wherein the water treatment system is trending to an alarm state if only one predictive value is outside the predetermined range.

8. The method of claim 6, comprising providing the plurality of signal values and concurrent data to the transformation function to obtain the plurality of predictive signal values.

9. The method of claim 6, comprising providing the at least one reference value defining the target range to the cloud-based platform, and providing the at least one reference value defining the predetermined range to the cloud-based platform.

10. The method of claim 6, further comprising responsive to determining that the water treatment system is trending to the alarm state, generating in the second communication a recommendation to perform maintenance on the water treatment system.

11. A method of retrofitting a water treatment system, the method comprising:

providing a treatment module operably connectable to at least one sensor positioned to measure a parameter of the water treatment system;

operably connecting the treatment module to the at least one sensor;

providing a local controller operably connectable to the treatment module and operably connectable to a cloud-based platform; and

operably connecting the local controller to the treatment module and the cloud-based platform.

12. The method of claim 11, wherein, responsive to the local controller receiving the measurement of the parameter, the local controller is programmed to determine whether the measurement is outside a predetermined range and generate a first communication to notify a user that the measurement is outside the predetermined range.

13. The method of claim 12, further comprising providing one or more value for the predetermined range to the local controller.

14. The method of claim 12, further comprising assessing the water treatment system to determine target measurable parameters and selecting the at least one sensor.

15. The method of claim 11, wherein the treatment module is operably connectable to a plurality of sensors, each sensor configured to measure a respective parameter of the water treatment system, the method comprising operably connecting the treatment module to each sensor.

16. The method of claim 15, comprising providing more than one treatment module selected from a pretreatment module, a processing module, a polishing module, and a distribution module, the method further comprising operably connecting each treatment module to a respective plurality of sensors.

17. The method of claim 15, wherein responsive to the local controller transmitting a plurality of measurements, each measurement of a respective parameter, to a cloud application via the cloud-based platform, the cloud application is programmed to determine whether the water treatment system is trending to an alarm state and generate a second communication to notify a user that the water treatment system is trending to the alarm state.

18. The method of claim 17, further comprising providing one or more value for a plurality of predetermined ranges to the cloud application, each predetermined range associated with a respective measurement.

19. The method of claim 11, further comprising providing the at least one sensor.

20. The method of claim 19, further comprising installing the at least one sensor within the water treatment system.