

WHAT IS CLAIMED IS:

1. A building management system (BMS) comprising:
 - a sensor array structured to provide sensor data indicative of temperature, pressure, and humidity in an interior space; and
 - one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:
 - receive the sensor data from the sensor array,
 - generate, based on the sensor data, trend data indicative of the temperature, pressure, and humidity of the interior space over a period of time,
 - generate, based on the trend data, a prediction of future trend data for the interior space,
 - compare at least one of the sensor data or the prediction to a compliance standard, and
 - initiate an automated response process in response to a determining that at least one of the sensor data or the prediction does not meet the compliance standard.
2. The BMS of claim 1, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:
 - determine a confidence level for the prediction, and
 - compare the confidence level to a predetermined threshold, and
 - wherein the automated response process is initiated when the confidence level is greater than or equal to the predetermined threshold.
3. The BMS of claim 1, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to generate a report summarizing the trend data and providing a time range when the sensor data is predicted to not meet the compliance standard.

4. The BMS of claim 1, wherein the automated response process includes controlling one or more primary building devices to affect at least one of the temperature, pressure, or humidity of the interior space based on the compliance standard.
5. The BMS of claim 1, wherein the automated response process includes:
 - generating a notification that indicates at least one building device associated with the at least one of the sensor data or the prediction that does not meet the compliance standard, and
 - transmitting the notification to a user device.
6. The BMS of claim 1, wherein the automated response process includes:
 - generating a work order for at least one building device associated with the at least one of the sensor data or the prediction that does not meet the compliance standard, and
 - transmitting the work order to at least one of a remote system or a user device.
7. The BMS of claim 1, wherein generating the prediction includes:
 - executing a predictive model to generate a first prediction of future trend data, and
 - determining, based on the first prediction of future trend data, a second prediction indicating a future compliance issue for a building device.
8. The BMS of claim 7, wherein the sensor data is first sensor data, and wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:
 - control one or more primary building devices based on at least one of the sensor data or the prediction,
 - receive second sensor data from the sensor array,
 - compare the second sensor data to the compliance standard to determine a reward value, and
 - update the predictive model based on the reward value.

9. The BMS of claim 7, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to train the predictive model using historical temperature, pressure, and humidity data for the interior space.
10. A method for maintaining compliance of building equipment, the method comprising:
receiving sensor data from a sensor array located in an area of a building;
generating, based on the sensor data, trend data indicative of the temperature, pressure, and humidity of the area over a period of time;
generating, based on the trend data, a prediction of future trend data for the area;
comparing at least one of the sensor data or the prediction to a compliance standard;
and
initiating an automated response process in response to a determining that at least one of the sensor data or the prediction does not meet the compliance standard, the automated response including a preemptive action that controls a heating, ventilation, or air conditioning system based on the trend data to maintain the temperature, pressure, and humidity within the compliance standard.
11. The method of claim 10, further comprising:
determining a confidence level for the prediction; and
comparing the confidence level to a predetermined threshold;
wherein the preemptive action is initiated when the confidence level is greater than or equal to the predetermined threshold.
12. The method of claim 10, further comprising generating a report summarizing the trend data and providing a time range when the sensor data is predicted to not meet the compliance standard.
13. The method of claim 10, wherein the preemptive action includes controlling one or more primary building devices to alter operation before the temperature, pressure, or humidity of the area is outside the compliance standard.
14. The method of claim 10, wherein the automated response process includes:

generating a notification that indicates at least one building device associated with the at least one of the sensor data or the prediction that does not meet the compliance standard; and

transmitting the notification to a user device.

15. The method of claim 10, wherein the automated response process includes:
generating a work order for at least one building device associated with the at least one of the sensor data or the prediction that does not meet the compliance standard; and
transmitting the work order to at least one of a remote system or a user device.

16. The method of claim 10, wherein generating the prediction includes:
executing a predictive model to generate a first prediction of future trend data; and
determining, based on the first prediction of future trend data, a second prediction indicating a future compliance issue for a building device.

17. The method of claim 16, wherein the sensor data is first sensor data, the method further including:
controlling one or more primary building devices based on at least one of the sensor data or the prediction;
receiving second sensor data from the sensor array after controlling the one or more primary building devices;
comparing the second sensor data to the compliance standard to determine a reward value; and
updating the predictive model based on the reward value.

18. The method of claim 16, further comprising training the predictive model using historical temperature, pressure, and humidity data for the area.

19. A non-transitory computer-readable storage media having computer-executable instructions stored thereon that, when executed by one or more processors, cause the one or more processors to perform operations comprising:
receiving sensor information over time from a sensor array located in an interior space of a building;
receiving operational parameters from one or more primary building devices;

generating trend data indicative of the temperature, pressure, and humidity of the interior space over a period of time using a machine learning engine that receives the sensor information and the operational parameters;

generating a future trend prediction of future trend data for the interior space using the machine learning engine;

comparing the future trend prediction to a compliance standard;

generating a predicted future compliance issue based on the comparison of the future trend prediction to the compliance standard;

determining a confidence level for the predicted future compliance issue; and

in response to a determination that the confidence level is greater than or equal to a predetermined threshold, initiating an automated response process.

20. The storage media of claim 19, wherein the automated response process includes at least one of:

transmitting a notification to a user device;

generating a work order for one or more building devices associated with the predicted future compliance issue; or

controlling the one or more building devices to prevent the predicted future compliance issue.

21. A building management system (BMS) for heating, ventilation, or air conditioning (HVAC) parameters in a building, the BMS comprising:

one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

institute a policy with a machine learning engine and train the policy using training data,

receive temperature, pressure, and humidity (TPH) sensor data from one or more sensors,

determine a fault based on the TPH sensor data,

provide the TPH sensor data and the fault to the policy of the machine learning engine and output a corrective action to resolve the fault, and

generate a work order for a user based on the TPH sensor data, the determined fault, and the corrective action, and.

22. The BMS of claim 21, wherein the user interface includes a first user profile and a second user profile, and

wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

generate a first dashboard associated with the first user profile and a second dashboard associated with the second user profile,

provide a first subset of information from the work order to the first dashboard, and

provide a second subset of information from the work order to the second dashboard.

23. The BMS of claim 22, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

update the second dashboard based on an action entered on the first dashboard.

24. The BMS of claim 22, wherein the work order is stored within the one or more memory devices, and

wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

update the work order from either the first dashboard or the second dashboard.

25. The BMS of claim 22, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

assign the work order to the second dashboard from the first dashboard.

26. The BMS of claim 22, further comprising an application structured to access one of the first user profile or the second user profile and display the associated dashboard on a human machine interface, the associated dashboard displaying at least one of the TPH sensor data or the work order.

27. The BMS of claim 26, wherein the human machine interface includes a mobile device, a wall mounted panel, a monitor, a tablet, a kiosk, an augmented reality device, a virtual reality device, or a wearable device.

28. The BMS of claim 21, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- retrieve a fault causation template,
- map a plurality of operational parameters relating to an associated HVAC device to the fault causation template,
- map the corrective action to the fault causation template, and
- provide a populated fault causation template to the user interface.

29. The BMS of claim 21, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- receive a notification that the work order has been completed, the notification comprising the determined fault and a fault solution, wherein the fault solution is either the corrective action or a different action, and
- train the policy with the machine learning engine by providing the determined fault and the fault solution to the machine learning engine.

30. The BMS of claim 21, wherein the machine learning engine includes at least one of a neural network, a reinforcement learning scheme, a model-based control scheme, a linear regression algorithm, a decision tree, a logistic regression algorithm, and a Naïve Bayes algorithm.

31. The BMS of claim 21, wherein the user is one of a chief compliance officer, a facilities manager, an operating room administrator, a health care professional or a facilities technician.

32. The BMS of claim 21, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- provide the work order to a user interface,
- receive an indication that the work order has been completed, and
- updating the user interface to indicate that the work order has been completed.

33. The BMS of claim 21, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- provide assistance functionality to the user interface,
- receive a request for assistance from the user interface via the assistance functionality, and
- provide additional information related to the corrective action to the user interface.

34. The BMS of claim 21, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- provide an alert in the building in response to determining the fault, wherein the alert includes at least one of a visual alert, an audible alert, a fault indication, and corrective action indication.

35. A building management system (BMS) for heating, ventilation, or air conditioning (HVAC) parameters in a building, the BMS comprising:

- one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- receive temperature, pressure, and humidity (TPH) sensor data from one or more sensors,

generate a work order using a machine learning engine that receives the TPH sensor data and fault information and outputs a recommended action,

receive first credentials for a first user and grant access to a first user profile including a first dashboard including first information based at least in part on the TPH sensor data and the work order,

receive second credentials for a second user and grant access to a second user profile including a second dashboard including second information based at least in part on the TPH sensor data and the work order, and

provide communication between the first dashboard and the second dashboard.

36. The BMS of claim 35, wherein the first dashboard is configured to:

display one or more customizable features to satisfy a first set of preferences of the first user, and

selectively display the first information according to a type of the first user profile, the type of the first user profile indicating a first amount of detail regarding the TPH sensor data and the work order that can be provided to the first dashboard, and

wherein the second dashboard is configured to:

display the customizable features to satisfy a second set of preferences of the second user, and

selectively display the second information according to a type of the second user profile, the type of the second user profile indicating a second amount of detail regarding the TPH sensor data and the work order that can be provided to the second dashboard.

37. The BMS of claim 35, wherein providing communication between the first dashboard and the second dashboard comprises at least one of:

updating the second dashboard based on an action entered on the first dashboard,

updating the work order from either the first dashboard or the second dashboard, and

assigning the work order to the second dashboard from the first dashboard.

38. The BMS of claim 35, wherein the first dashboard or the second dashboard or both are configured to:

operate within a heads up display (HUD), and

provide a list of inventory parts currently available for addressing the work order.

39. The BMS of claim 35, wherein the first dashboard or the second dashboard or both are configured to:

display regulations and codes related to TPH compliance,

display information related to an interrelation of TPH of one or more building zones in the building, and

display the TPH sensor data and the work order at least in part with color-coded formatting to indicate an intensity of the work order.

40. The BMS of claim 35, wherein the first dashboard or the second dashboard or both include:

at least one of an audio interface, a visual interface, a touch screen interface, or a holographic interface, and

a visual indicator proximate to the first dashboard or the second dashboard or both configured to indicate a compliance level of the TPH sensor data.

41. A building management system (BMS) for monitoring and controlling heating, ventilation, or air conditioning (HVAC) parameters in a building, the BMS comprising:

one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

initialize a predictive model for predicting temperature, pressure, and humidity within a target area and an adjacent area of the building,

receive target area data from a target area sensor array configured to measure temperature, pressure, and humidity of the target area,

receive adjacent area data from an adjacent area sensor array configured to measure temperature, pressure, and humidity of the adjacent area,

execute the predictive model based on the target area data and the adjacent area data to generate a prediction of future temperature, pressure, and humidity within the target area, and

control operation of HVAC equipment to maintain the temperature, pressure, and humidity of the target area within a compliance standard.

42. The BMS of claim 41, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- receive updated target area data from the target area sensor array,
- receive updated adjacent area data from the adjacent area sensor array, and
- prior to executing the predictive model, update the predictive model based on the updated target area data and the updated adjacent area data.

43. The BMS of claim 41, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- train the predictive model using historical data including at least temperature, pressure, and humidity for the target area and the adjacent area.

44. The BMS of claim 41, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- identify compliance issues by comparing the predicted future temperature, pressure, and humidity of the target area with the compliance standard.

45. The BMS of claim 44, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- generate a notification in response to identifying compliance issues, the notification indicating one of the predicted future temperature, pressure, or humidity of the target area that is non-compliant, and
- transmit the notification to a user device.

46. The BMS of claim 41, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

receive access control data from one or more door sensor associated with the target area or the adjacent area, wherein the predictive model is executed based on the access control data in addition to the target area data and the adjacent area data.

47. The BMS of claim 41, wherein at least one of the target area sensor array or the adjacent area sensor array are calibrated by comparing the target area data or the adjacent area data with corresponding sensor data from a calibration unit.

48. A building management system (BMS) for monitoring and controlling heating, ventilation, or air conditioning (HVAC) parameters in a building, the BMS comprising:
one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

receive door sensor data for a space within the building, the door sensor data indicating a position of one or more doors located in the space,

receive temperature, pressure, and humidity data from a sensor array positioned within the space,

execute a predictive model using the door sensor data and the temperature, pressure, and humidity data to predict future temperature, pressure, and humidity data for the space, and

control operation of HVAC equipment associated with the space based on the predicted future temperature, pressure, and humidity data.

49. The BMS of claim 48, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

receive updated temperature, pressure, and humidity data and updated door data from the sensor array, and

prior to executing the predictive model, update the predictive model based on the updated temperature, pressure, and humidity data or the updated door data.

50. The BMS of claim 48, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

train the predictive model using historical temperature, pressure, and humidity data or door sensor data for the space.

51. The BMS of claim 48, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

identify compliance issues by comparing the predicted future temperature, pressure, and humidity with a compliance standard.

52. The BMS of claim 51, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

generate a notification in response to identifying compliance issues, the notification indicating one of the predicted future temperature, pressure, or humidity of the space that is non-compliant, and

transmit the notification to a user device.

53. The BMS of claim 48, wherein the sensor array is calibrated by comparing the received temperature, pressure, and humidity data with corresponding sensor data from a calibration unit.

54. The BMS of claim 48, wherein the sensor array is removably coupled to the BMS such that the sensor array can be removed and replaced with a calibrated sensor array.

55. A system comprising:

a room sensor positioned in a room and structured to measure temperature, pressure, or humidity within the room;

a calibration system including a calibrated sensor corresponding to the room sensor;
and

one or more processing circuits comprising one or more memory devices coupled to one or more processors, the one or more memory devices configured to store instructions

thereon that, when executed by the one or more processors, cause the one or more processors to:

- communicate with the room sensor and control operation of a heating/cooling system,
- receive information from the calibration system, and
- automatically recalibrate the room sensor based on the information received from the calibration system.

56. The system of claim 55, wherein the calibration system includes a calibration schedule set by a manufacturer of the room sensor.

57. The system of claim 55, further comprising an interface associated with the room, wherein the one or more memory devices are further configured to store instructions thereon that, when executed by the one or more processors, cause the one or more processors to:

- communicate wirelessly with the calibration system, and
- send display information to the interface regarding calibration of the room sensor.

58. The system of claim 55, wherein the calibration system wirelessly communicates with the one or more processing circuits, and wherein the calibration system automatically initiates a calibration routine.

59. The system of claim 55, wherein the calibration system is structured to communicate with a mobile device, and wherein the mobile device is structured to communicate with the one or more processing circuits and the calibration system to execute a calibration routine.

60. The system of claim 55, further comprising a second sensor positioned in the room, wherein the calibration system is in communication with the second sensor and uses measurements obtained by the second sensor to calibrate the room sensor.