Claims

1. A method, comprising:

receiving a review request for a product that includes an identified failure related to a foam material of the product;

identifying production analysis data associated with a production process for applying the foam material to the product, wherein the production analysis data includes data captured during production of the product;

providing the production analysis data for the product to a machine learning model for producing the product to compare the production analysis data to designated data ranges for applying the foam material to the product, wherein the production analysis data includes foam-specific parameters measured during the application of the foam material, including at least one selected from a group consisting of foam deposition device data, foam deposition stream data, foam surface distance data, and foam surface bubbling data;

determining data from the production analysis data that are outside of the designated range identified by the machine learning model; and

identifying a cause of the identified failure during the production of the product based on the determined data.

2. The method of claim 1, further comprising training the machine learning model with production analysis data from a plurality of data sources that are associated with a plurality of different production sites that produce elements of the product or similar elements associated with the product.

3. The method of claim 2, wherein the production analysis data from the plurality of data sources includes data associated with depositing a foam material layer on an application surface.

4. The method of claim 3, wherein the production analysis data includes environmental data and process timing data associated with a time of depositing the foam material layer.

5. The method of claim 1, wherein the production analysis data for the product with a foam material layer includes foam deposition device data, foam deposition stream data, foam surface distance data, foam surface bubbling data, over-rolling data, formed foam edge data, and product dimensions data when the product includes a foam material.

6. The method of claim 1, further comprising training the machine learning model by identifying a first plurality of products that include corresponding production analysis data within a range of the production analysis data of the product as similar manufacturing condition products.

7. The method of claim 6, further comprising training the machine learning model by identifying a second plurality of products that include the identified failure as similar failed products.

8. The method of claim 7, further comprising training the machine learning model by:

comparing the identified failure of the product to a failure status of the first plurality of products to identify products from the first plurality of products that include a same failure type as the identified failure; and

comparing the production analysis data of the product to production analysis data corresponding to the second plurality of products to identify products from the second plurality of products that include production analysis data within the range of the production analysis data of the product.

9. A machine-readable medium, storing machine-readable instructions which, when executed by a processor of a device, cause the processor to:

train a machine learning model of a production process for applying a foam material to a type of product utilizing production analysis data captured during the production process of the type of product at a plurality of different sites, wherein the machine learning model correlates the production analysis data of applying the foam material to a quality level of the foam material for the type of product, wherein the production analysis data includes foam-specific parameters measured during the application of the foam material, including at

least one selected from a group consisting of foam deposition device data, foam deposition stream data, foam surface distance data, and foam surface bubbling data;

provide the production analysis data for a particular site to the machine learning model, wherein the production analysis data includes image data and environmental data during application of the foam material for the type of product at the particular site over a period of time;

identify data of the production analysis data for the particular site that includes a value that is outside a determined range of the machine learning model; and

generate a notification to alter a production setting of the production process for the particular site to change the value to be within the determined range of the machine learning model.

10. The machine-readable medium of claim 9, wherein the production setting of the production process includes at least one of:

a type of a foam distribution device;

a backpressure provided by the foam distribution device;

a quantity of a component of the foam material;

a flow rate of the foam distribution device;

a mixture ratio of a foam material deposited by the foam distribution device;

a rate of an application surface moving through a distribution area of the foam distribution device;

a contact time between the foam material and a top application surface; and

an operation time duration of the foam distribution device.

11. The machine-readable medium of claim 9, wherein the production analysis data captured during the production process at the plurality of different sites includes imaging data to determine a surface texture of a foam material layer of the type of product.

12. The machine-readable medium of claim 11, wherein the production analysis data captured during the production process at the plurality of different sites includes hyperspectral imaging data to determine chemical formulation data for the foam material layer.

13. The machine-readable medium of claim 9, wherein the production analysis data captured during the production process at the plurality of different sites is federated data received from the plurality of different sites.

14. The machine-readable medium of claim 9, comprising instructions to update the machine learning model utilizing production analysis data captured at the particular site.

15. A system, comprising:

an imaging device to capture image data of an application surface during an application of a foam layer on the application surface at a production site;

a device configured to:

monitor received image data of the application surface during the application of the foam layer on the application surface at the production site;

calculate production analysis data associated with applying the foam layer on the application surface based on the image data;

provide the production analysis data to a machine learning model to compare the production analysis data to threshold data of the machine learning model, wherein the production analysis data includes foam-specific parameters measured during the application of the foam material, including at least one selected from a group consisting of foam deposition device data, foam deposition stream data, foam surface distance data, and foam surface bubbling data, and wherein the machine learning model utilizes production data and quality data from a plurality of different production sites that produce a product that includes the application surface and foam layer on the application surface;

identify when production data of the production analysis data is outside a threshold range of production data identified by the machine learning model; and

generate a notification to alter a production setting of the application of the foam layer based on the identified production data.

16. The system of claim 15, wherein the device is to receive a set of instructions that indicates parameters for calculating the production analysis data.

17. The system of claim 16, wherein the set of instructions include instructions for positioning the imaging device relative to the application surface and positioning a light source relative to the application surface.

18. The system of claim 15, wherein the production data and the quality data provided to the machine learning model lacks raw data collected by the plurality of different production sites.

19. The system of claim 15, wherein the device is configured to receive a plurality of updated threshold data based on the production data and the quality data provided by the plurality of different production sites.

20. The system of claim 15, wherein the device is configured to:

monitor environmental data of the production site during the application of the foam layer; and

generate the notification when the environmental data are outside the threshold range provided by the machine learning model.