CLAIMS

What is claimed is:

1. A system for predicting values for building parameters, the system comprising:

an input device configured to receive an input comprising an image of an exterior of a building;

processing circuitry and memory for executing a machine learning system, wherein the memory stores a machine learning model comprising a plurality of building information modeling (BIM) data models corresponding to respective building types, each BIM data model of the BIM data models trained using images of buildings that conform to the building type corresponding to the BIM data model and corresponding values for building parameters for the buildings,

wherein the machine learning system is configured to:

determine a building type for the building in the image;

select the corresponding BIM data model of the plurality of BIM data models for the building type for the building in the image; and

apply the corresponding BIM data model to the image of the exterior of the building to generate values for a plurality of new building parameters for a new building having the building type for the building in the image, wherein the values for the plurality of new building parameters are configured for use as input values for parameters to a BIM data generation system to generate BIM data for the new building; and

an output device configured to output the values for the plurality of new building parameters for the new building.

2. The system of claim 1,

wherein the machine learning model comprises an image processing model,

wherein the machine learning system is configured to apply the image processing model to the image of the exterior of the building to generate an image of a frontal view of the building, and

wherein to apply the corresponding BIM data model to the image of the

exterior of the building, the machine learning system is configured to apply the corresponding BIM data model to the generated image of the frontal view of the building to generate the values for the plurality of new building parameters for the new building.

3. The system of claim 2,

wherein the image processing model is trained to transform an orientation of the received image of the exterior of the building to generate the image of the frontal view of the building.

4. The system of claim 2,

wherein to determine the building type for the building in the image the machine learning system is configured to apply the image processing model to the generated image of the frontal view of the building to identify the building type of the building, and

wherein to apply the corresponding BIM data model to the image of the exterior of the building the machine learning system is configured to apply the corresponding BIM data model for the identified building type to the generated image of the frontal view.

5. The system of claim 1,

wherein to determine the building type for the building in the image the machine learning system is configured to:

apply the machine learning model to the received image of the exterior of the building to identify the building type of the building.

6. The system of claim 1,

wherein the machine learning system is configured to process the images of buildings and corresponding values for the building parameters for the buildings to train the machine learning model.

7. The system of claim 6,

wherein the images of the buildings are synthetic images of buildings, and

wherein each of the synthetic images of buildings is generated by inputting, to a program, different values for each of the building parameters to cause the program to generate a synthetic image of a building for each combination of values for the building parameters.

8. The system of claim 6,

wherein each image of the images of buildings has a label identifying a type of the building in the image, and

wherein to process the images of buildings and corresponding values for the building parameters for the buildings to train the machine learning model, the machine learning system is configured to, for each image of the images of buildings:

select the BIM data model of the plurality of BIM data models that corresponds to the label identifying the type of the building in the image; and

process the image and the corresponding values for the building parameters for the building to train the selected BIM data model.

9. A method comprising:

receiving, by a machine learning system, an image of an exterior of a building, wherein the machine learning system comprises a machine learning model that includes a plurality of building information modeling (BIM) data models corresponding to respective building types, each BIM data model of the BIM data models trained using images of buildings that conform to the building type corresponding to the BIM data model and corresponding values for building parameters for the buildings;

determining, by the machine learning system, a building type for the building in the image;

selecting, by the machine learning system, the corresponding BIM data model of the plurality of BIM data models for the building type for the building in the image;

applying, by the machine learning system, the corresponding BIM data model to the image of the exterior of the building to generate values for a plurality of new

building parameters for a new building having the building type for the building in the image, wherein the values for the plurality of new building parameters are configured for use as input values for parameters to a BIM data generation system to generate BIM data for the new building; and

outputting, by the machine learning system, the values for the plurality of new building parameters for the new building.

10. The method of claim 9, further comprising:

applying, by the machine learning system, an image processing model to the image to generate an image of a frontal view of the building,

wherein applying the corresponding BIM data model to the image of the exterior of the building comprises applying the corresponding BIM data model to the generated image of the frontal view of the building to generate the values for the plurality of new building parameters for the new building.

11. The method of claim 10,

wherein the image processing model is trained to transform an orientation of the received image of the exterior of the building to generate the image of the frontal view of the building.

12. The method of claim 10,

wherein determining the building type for the building in the image comprises applying the image processing model to the generated image of the frontal view of the building to identify the building type of the building, and

wherein applying the corresponding BIM data model to the image of the exterior of the building comprises applying the corresponding BIM data model to the generated image of the frontal view.

13. The method of claim 9,

wherein determining the building type for the building in the image comprises applying the machine learning model to the image of the exterior of the building to

identify the building type of the building.

14. The method of claim 9, further comprising:

processing, by the machine learning system, the images of buildings and corresponding values for the building parameters for the buildings to train the machine learning model.

15. The method of claim 14,

wherein the images of the buildings are synthetic images of buildings, and

wherein each of the synthetic images of buildings is generated by inputting, to a program, different values for each of the building parameters to cause the program to generate a synthetic image of a building for each combination of values for the building parameters.

16. The method of claim 14,

wherein each image of the images of buildings has a label identifying a type of the building in the image, and

wherein the processing comprises, for each image of the images of the buildings:

selecting, by the machine learning system, the BIM data model of the plurality of BIM data models that corresponds to the label identifying the type of the building in the image; and

processing, by the machine learning system, the image and the corresponding values for the building parameters for the building to train the selected BIM data model.

17. The method of claim 9, further comprising:

generating, by the BIM data generation system, using the values for the plurality of new building parameters for the new building, the BIM data for the new building.

18. The method of claim 9, wherein the plurality of new building parameters comprise two or more of a building dimension, a number of floors, a floor height, a location of a window, or a dimension of a window.

19. A non-transitory computer-readable medium comprising machine readable instructions executable by processing circuitry to cause a machine learning system to:

receive an image of an exterior of a building, wherein the machine learning system comprises a machine learning model that includes a plurality of building information modeling (BIM) data models corresponding to respective building types, each BIM data model of the BIM data models trained using images of buildings that conform to the building type corresponding to the BIM data model and corresponding values for building parameters for the buildings;

determine a building type for the building in the image;

select the corresponding BIM data model of the plurality of BIM data models for the building type for the building in the image;

apply the corresponding BIM data model to the image of the exterior of the building to generate values for a plurality of new building parameters for a new building having the building type for the building in the image, wherein the values for the plurality of new building parameters are configured for use as input values for parameters to a BIM data generation system to generate BIM data for the new building; and

output the values for the plurality of new building parameters for the new building.