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(54) **METHOD AND SYSTEM FOR GENERATING CONFIGURATION PARAMETERS FOR A SECURITY SYSTEM**

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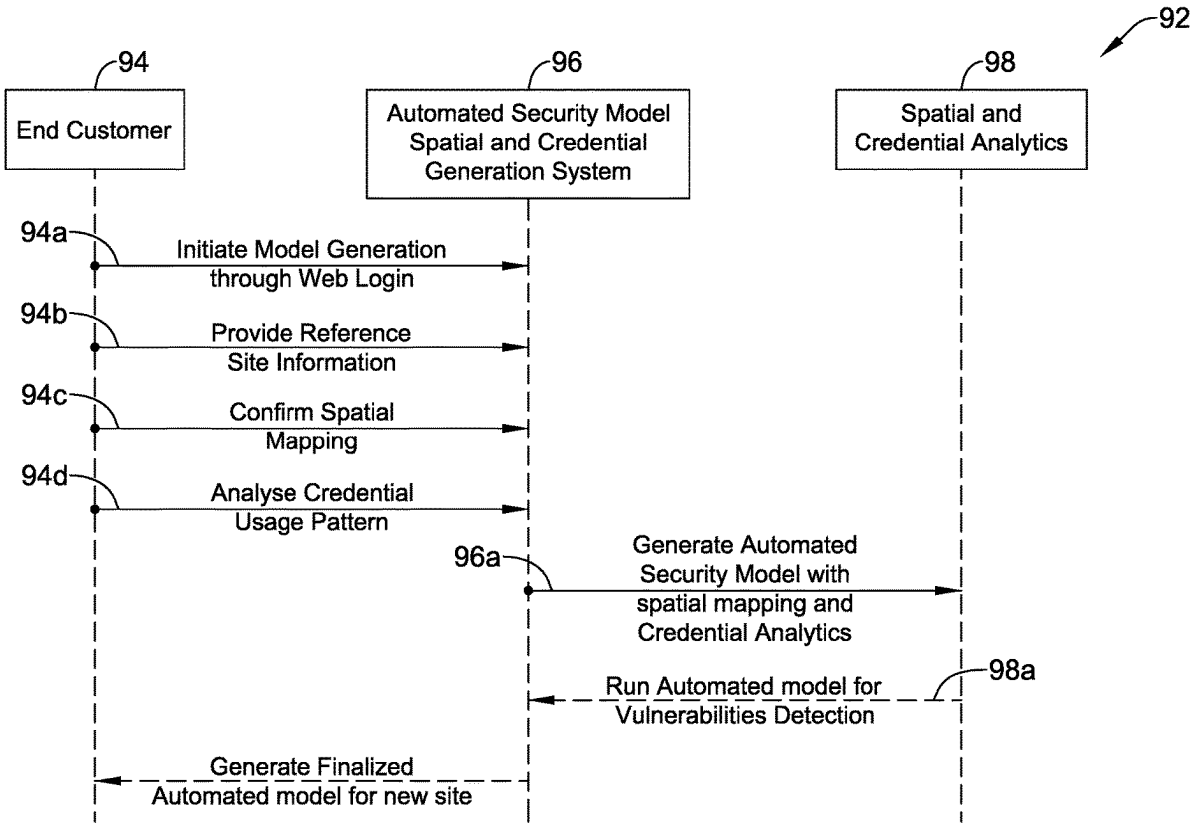
(57) **ABSTRACT**

Configuration and usage data associated with a security system for each of a plurality of existing sites may be received, including a spatial model for the security system of the corresponding existing site and historical access data for the security system of the corresponding existing site. An Artificial Intelligence (AI) model is trained using the configuration and usage data associated with the security systems of the plurality of existing sites. Site information for a target site is received and is submitted to the AI model, wherein in response, the AI model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site. The generated spatial model and the configuration parameters for the security system of the target site are subsequently used to setup and operate the security system at the target site.



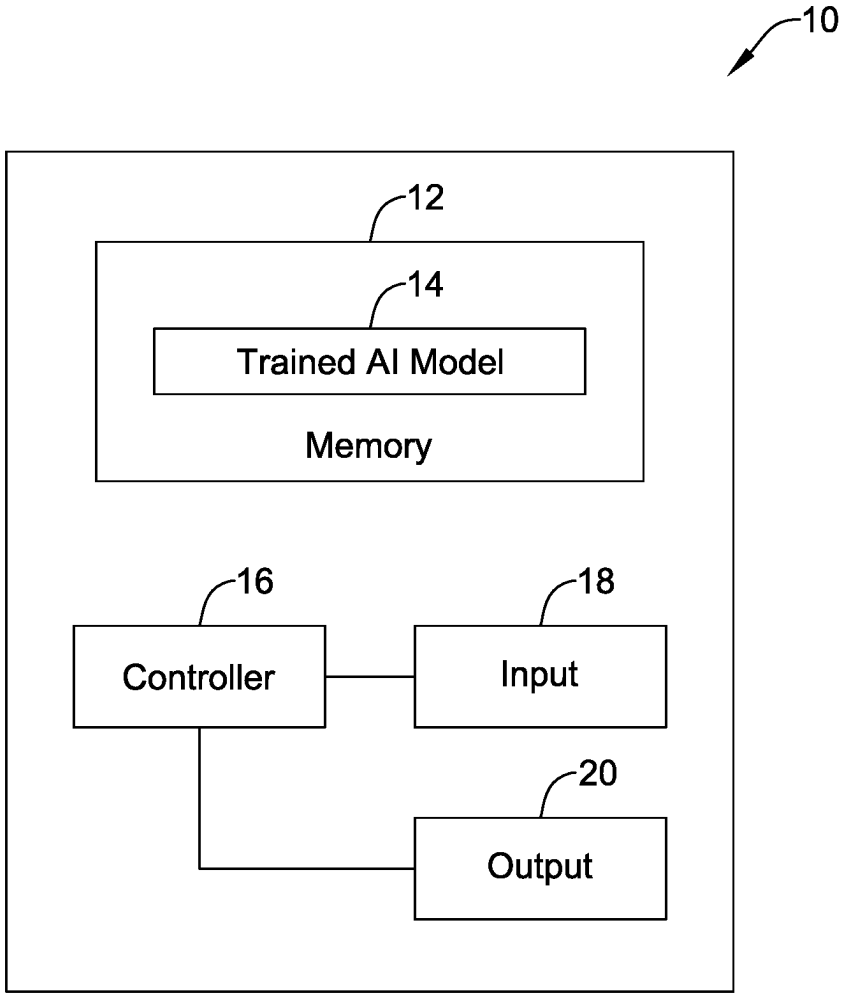

10
12
14
Trained AI Model
Memory
16
18
Controller
Input
20
Output

FIG. 1

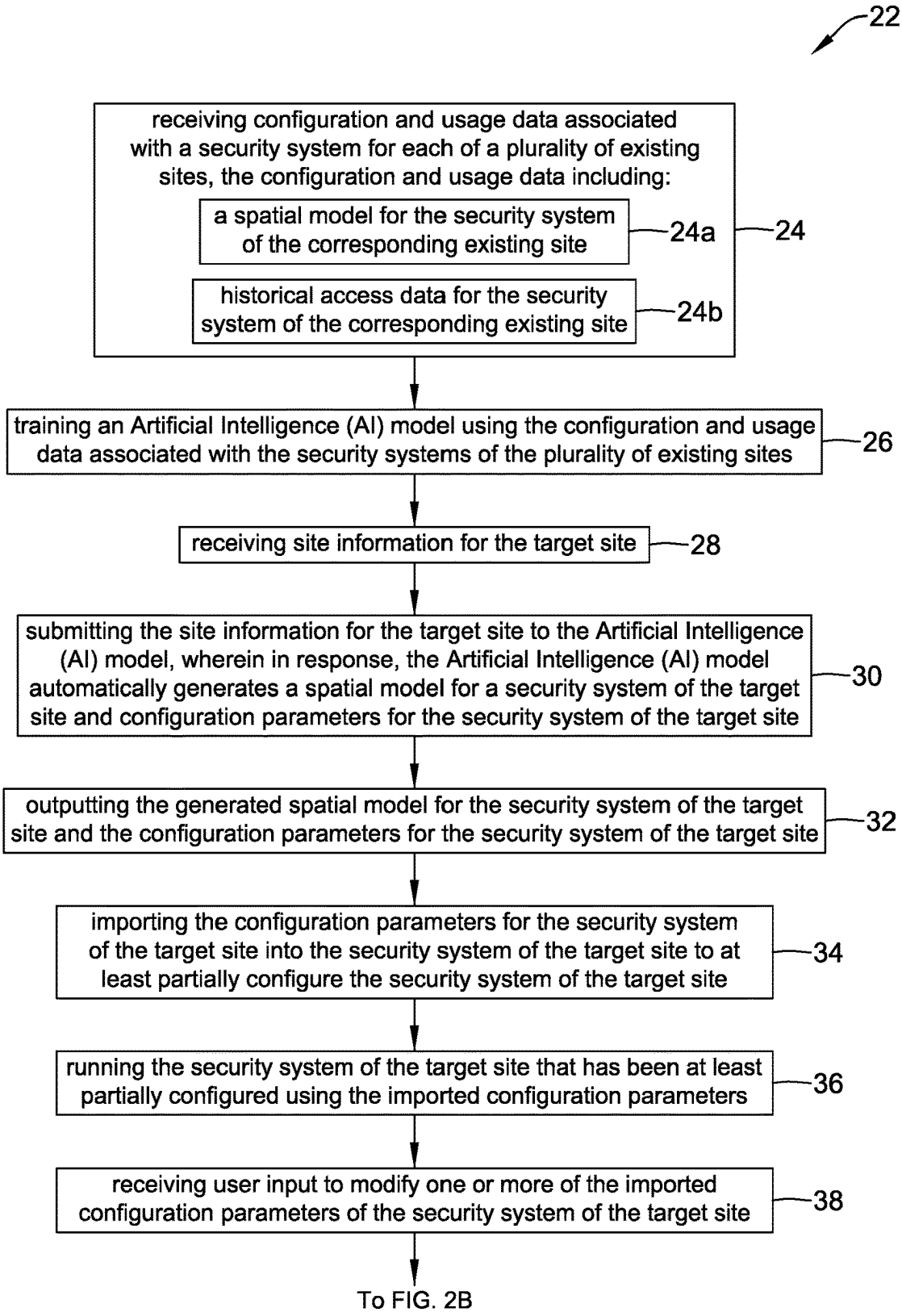

22
receiving configuration and usage data associated with a security system for each of a plurality of existing sites, the configuration and usage data including:
a spatial model for the security system of the corresponding existing site
24a
24
historical access data for the security system of the corresponding existing site
24b
training an Artificial Intelligence (AI) model using the configuration and usage data associated with the security systems of the plurality of existing sites
26
receiving site information for the target site
28
submitting the site information for the target site to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site
30
outputting the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site
32
importing the configuration parameters for the security system of the target site into the security system of the target site to at least partially configure the security system of the target site
34
running the security system of the target site that has been at least partially configured using the imported configuration parameters
36
receiving user input to modify one or more of the imported configuration parameters of the security system of the target site
38
To FIG. 2B

FIG. 2A

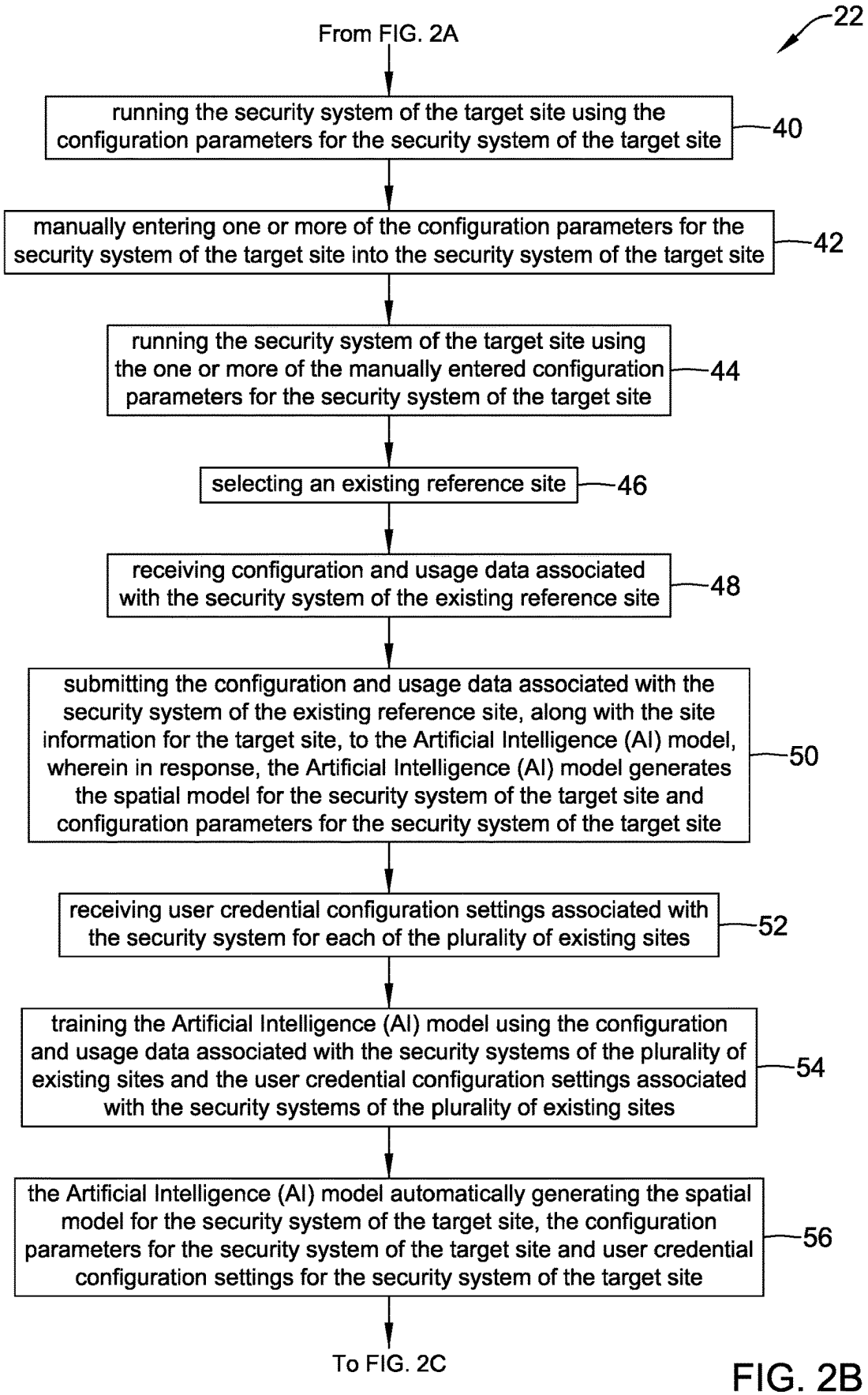

From FIG. 2A
22
running the security system of the target site using the configuration parameters for the security system of the target site
40
manually entering one or more of the configuration parameters for the security system of the target site into the security system of the target site
42
running the security system of the target site using the one or more of the manually entered configuration parameters for the security system of the target site
44
selecting an existing reference site
46
receiving configuration and usage data associated with the security system of the existing reference site
48
submitting the configuration and usage data associated with the security system of the existing reference site, along with the site information for the target site, to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model generates the spatial model for the security system of the target site and configuration parameters for the security system of the target site
50
receiving user credential configuration settings associated with the security system for each of the plurality of existing sites
52
training the Artificial Intelligence (AI) model using the configuration and usage data associated with the security systems of the plurality of existing sites and the user credential configuration settings associated with the security systems of the plurality of existing sites
54
the Artificial Intelligence (AI) model automatically generating the spatial model for the security system of the target site, the configuration parameters for the security system of the target site and user credential configuration settings for the security system of the target site
56
To FIG. 2C

FIG. 2B

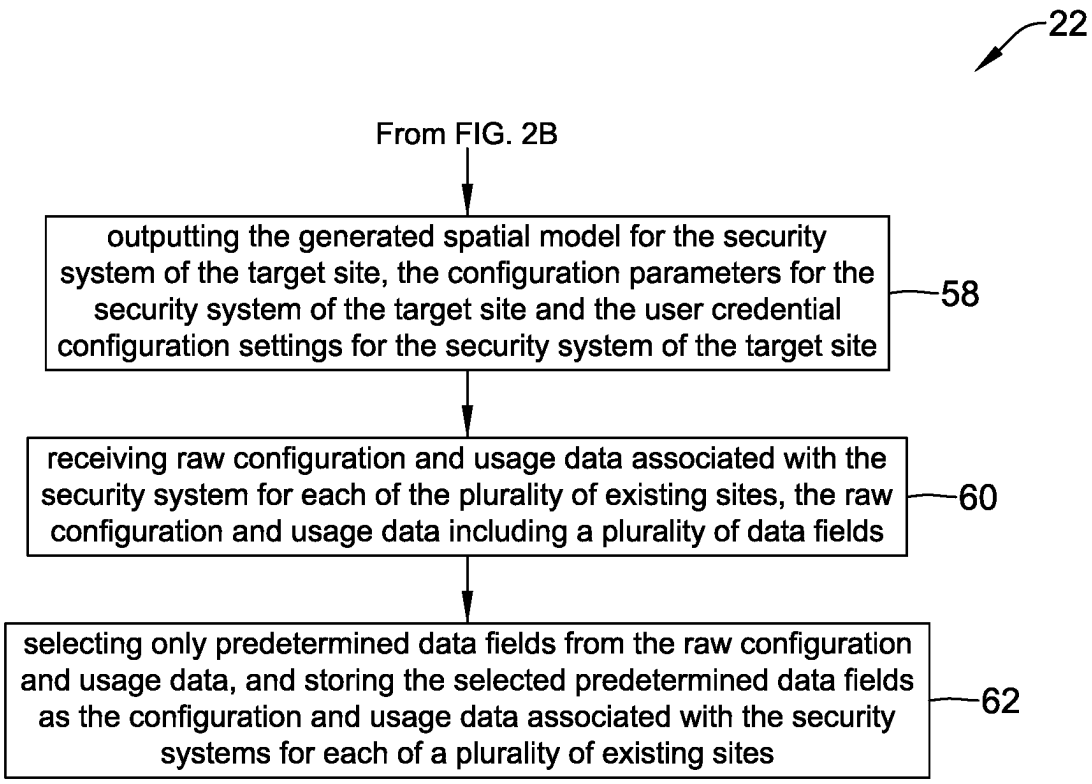

22
From FIG. 2B
outputting the generated spatial model for the security system of the target site, the configuration parameters for the security system of the target site and the user credential configuration settings for the security system of the target site
58
receiving raw configuration and usage data associated with the security system for each of the plurality of existing sites, the raw configuration and usage data including a plurality of data fields
60
selecting only predetermined data fields from the raw configuration and usage data, and storing the selected predetermined data fields as the configuration and usage data associated with the security systems for each of a plurality of existing sites
62

FIG. 2C

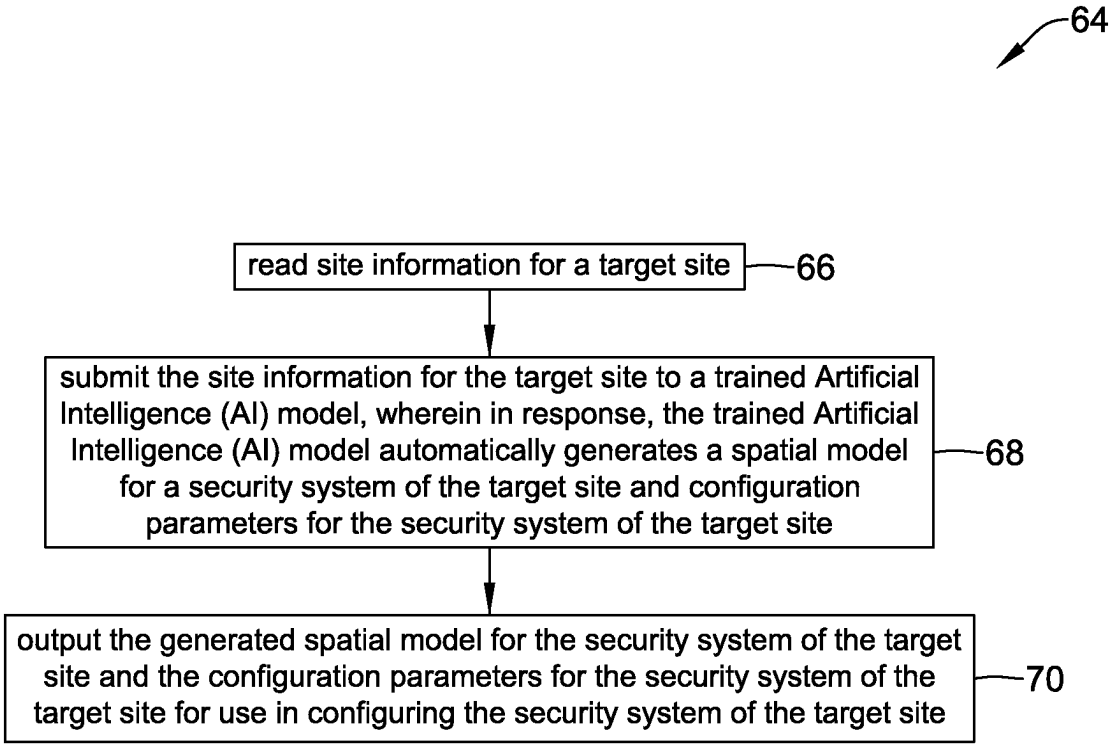

64
read site information for a target site
66
submit the site information for the target site to a trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site
68
output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site for use in configuring the security system of the target site
70

FIG. 3

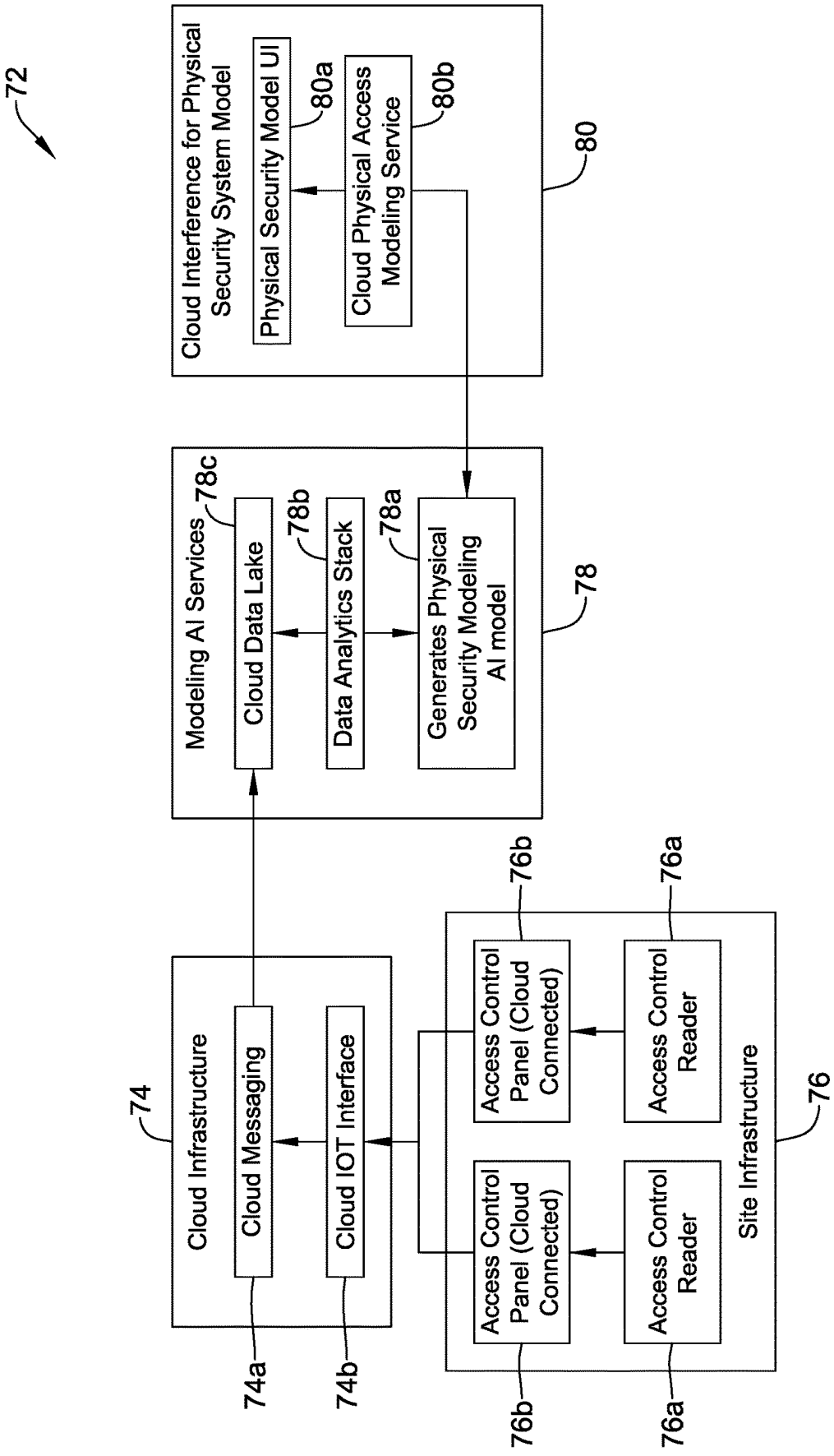

72
Cloud Interference for Physical Security System Model
Physical Security Model UI
80a
Cloud Physical Access Modeling Service
80b
80
Modeling AI Services
78c
Cloud Data Lake
78b
Data Analytics Stack
78a
Generates Physical Security Modeling AI model
78
Cloud Infrastructure
74
Cloud Messaging
Cloud IOT Interface
74a
74b
Access Control Panel (Cloud Connected)
76b
Access Control Reader
76a
Site Infrastructure
76

FIG. 4

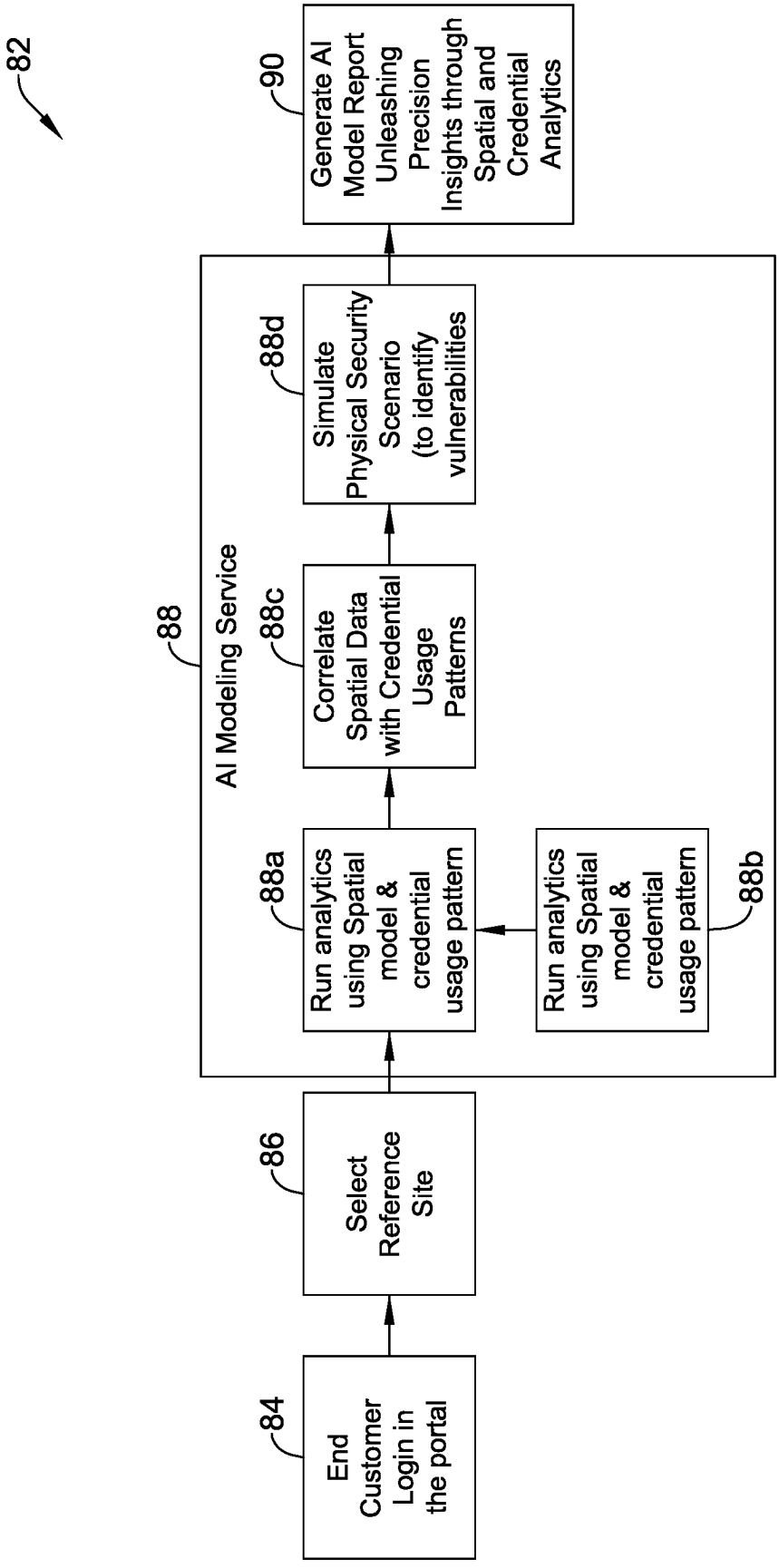

82
84
End Customer Login in the portal
86
Select Reference Site
88
AI Modeling Service
88a
Run analytics using Spatial model & credential usage pattern
88b
Run analytics using Spatial model & credential usage pattern
88c
Correlate Spatial Data with Credential Usage Patterns
88d
Simulate Physical Security Scenario (to identify vulnerabilities
90
Generate AI Model Report Unleashing Precision Insights through Spatial and Credential Analytics

FIG. 5

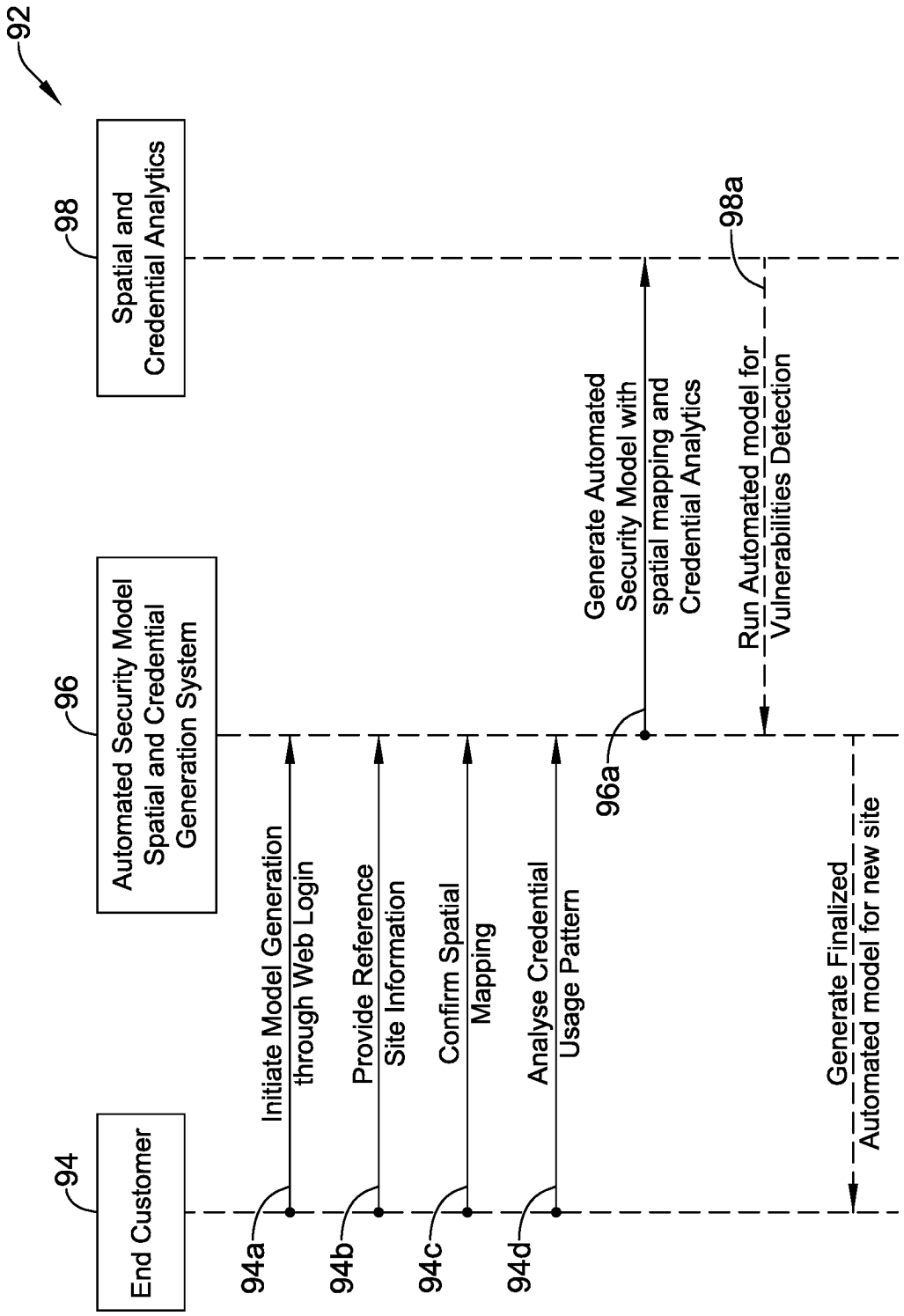

92
94
End Customer
96
Automated Security Model Spatial and Credential Generation System
98
Spatial and Credential Analytics
94a
Initiate Model Generation through Web Login
94b
Provide Reference Site Information
94c
Confirm Spatial Mapping
94d
Analyse Credential Usage Pattern
96a
Generate Automated Security Model with spatial mapping and Credential Analytics
98a
Run Automated model for Vulnerabilities Detection
Generate Finalized Automated model for new site

FIG. 6

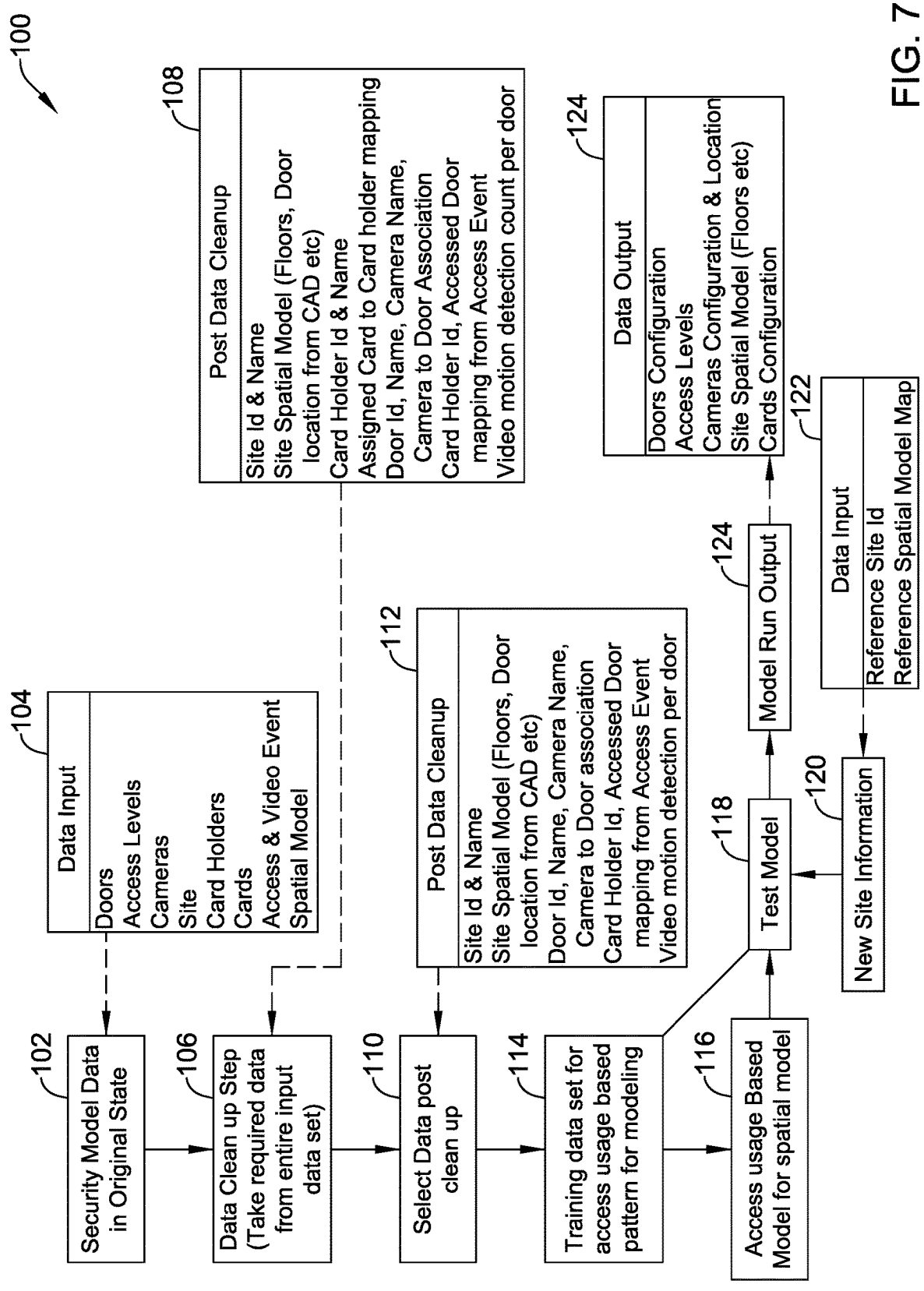

100
102
Security Model Data in Original State
104
Data Input
Doors
Access Levels
Cameras
Site
Card Holders
Cards
Access & Video Event
Spatial Model
106
Data Clean up Step (Take required data from entire input data set)
108
Post Data Cleanup
Site Id & Name
Site Spatial Model (Floors, Door location from CAD etc)
Card Holder Id & Name
Assigned Card to Card holder mapping
Door Id, Name, Camera Name, Camera to Door Association
Card Holder Id, Accessed Door mapping from Access Event
Video motion detection count per door
110
Select Data post clean up
112
Post Data Cleanup
Site Id & Name
Site Spatial Model (Floors, Door location from CAD etc)
Door Id, Name, Camera Name, Camera to Door association
Card Holder Id, Accessed Door mapping from Access Event
Video motion detection per door
114
Training data set for access usage based pattern for modeling
116
Access usage Based Model for spatial model
118
Test Model
120
New Site Information
124
Model Run Output
122
Data Input
Reference Site Id
Reference Spatial Model Map
124
Data Output
Doors Configuration
Access Levels
Cameras Configuration & Location
Site Spatial Model (Floors etc)
Cards Configuration

FIG. 7

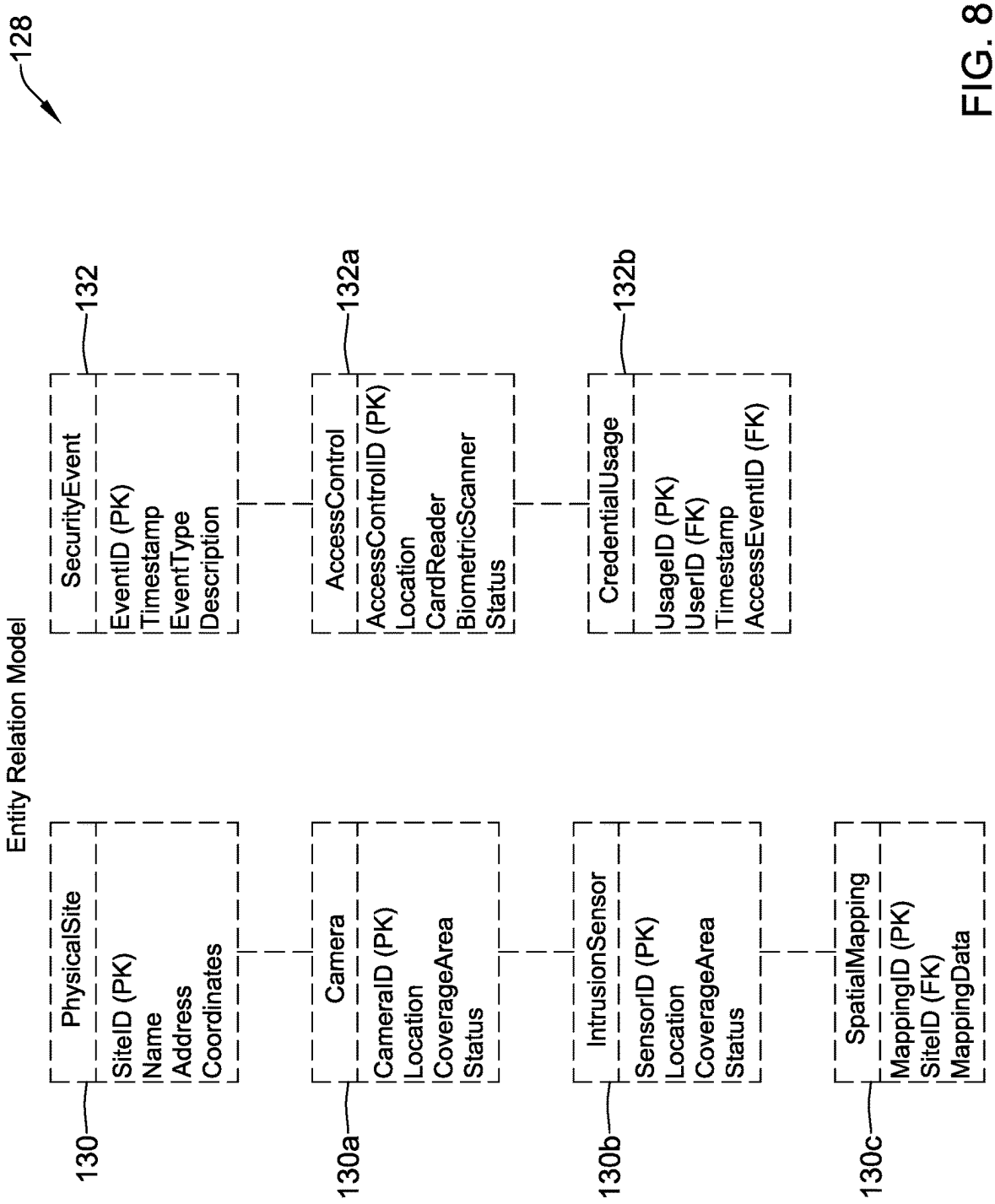

128
Entity Relation Model
PhysicalSite
SiteID (PK)
Name
Address
Coordinates
130
SecurityEvent
EventID (PK)
Timestamp
EventType
Description
132
Camera
CameraID (PK)
Location
CoverageArea
Status
130a
AccessControl
AccessControlID (PK)
Location
CardReader
BiometricScanner
Status
132a
IntrusionSensor
SensorID (PK)
Location
CoverageArea
Status
130b
CredentialUsage
UsageID (PK)
UserID (FK)
Timestamp
AccessEventID (FK)
132b
SpatialMapping
MappingID (PK)
SiteID (FK)
MappingData
130c

FIG. 8

METHOD AND SYSTEM FOR GENERATING CONFIGURATION PARAMETERS FOR A SECURITY SYSTEM

TECHNICAL FIELD

[0001] The present disclosure relates generally to security systems, and more particularly to generating configuration parameters for a security system.

BACKGROUND

[0002] Designing and configuring a security system for a new facility, such as a physical access control system, can be very challenging. There can be a large number of hardware components that may be needed, particularly if the new facility is a large site with a lot of access doors. Each of these hardware components may need to be configured, meaning that large numbers of configuration parameters may need to be determined and then implemented before the security system can be considered operational. What would be desirable are methods and systems for automatically generating configuration parameters for a security system of a target site using configuration parameters and historical access data from security systems of one or more existing sites.

SUMMARY

[0003] The present disclosure generally relates to security systems, and more particularly to methods and systems for automatically generating configuration parameters for a security system of a target site. An illustrative method includes receiving configuration and usage data associated with a security system for each of a plurality of existing sites, the configuration and usage data including a spatial model for the security system of the corresponding existing site and historical access data for the security system of the corresponding existing site. An Artificial Intelligence (AI) model is trained using the configuration and usage data associated with the security systems of the plurality of existing sites. Site information for the target site is received and is submitted to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model automatically generates configuration parameters for the security system of the target site. In some cases, the Artificial Intelligence (AI) model automatically generates a spatial model for the security system of the target site. The generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site are outputted. In some cases, the security system of the target site is run using the generated configuration parameters.

[0004] Another example may be found in a system for generating configuration parameters for a security system of a target site. The illustrative system includes a memory and a controller that is operatively coupled to the memory. The memory stores a trained Artificial Intelligence (AI) model that is configured to generate a spatial model for a security system of the target site and configuration parameters for the security system of the target site based on configuration and historical usage data associated with a security system for each of a plurality of other sites. The controller is configured to read site information for the target site and to submit the site information for the target site to the trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates configuration parameters for the security system of the target site. In some cases, the Artificial Intelligence (AI) model automatically generates a spatial model for the security system of the target site. The controller is configured to output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site. In some cases, the security system of the target site is run using the generated configuration parameters.

[0005] Another example is found in a non-transitory computer readable medium storing instructions thereon. When the instructions are executed by one or more processors, the one or more processors are caused to read site information for a target site and to submit the site information for the target site to a trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates configuration parameters for the security system of the target site. In some cases, the trained Artificial Intelligence (AI) model automatically generates a spatial model for the security system of the target site. The one or more processors are caused to output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site for use in configuring the security system of the target site. In some cases, the security system of the target site is run using the generated configuration parameters.

[0006] The preceding summary is provided to facilitate an understanding of some of the innovative features unique to the present disclosure and is not intended to be a full description. A full appreciation of the disclosure can be gained by taking the entire specification, claims, figures, and abstract as a whole.

BRIEF DESCRIPTION OF THE FIGURES

[0007] The disclosure may be more completely understood in consideration of the following description of various examples in connection with the accompanying drawings, in which:

[0008] FIG. **1** is a schematic block diagram showing an illustrative system for generating configuration parameters for a security system;

[0009] FIGS. **2**A, **2**B and **2**C are flow diagrams that together show an illustrative method for generating configuration parameters for a security system;

[0010] FIG. **3** is a flow diagram showing an illustrative series of steps that may be carried out by one or more processors executing stored instructions;

[0011] FIG. **4** is a schematic block diagram showing an illustrative architecture for generating configuration parameters for a security system;

[0012] FIG. **5** is a schematic block diagram showing an illustrative step by step solution for generating configuration parameters for a security system;

[0013] FIG. **6** is an illustrative sequence diagram for generating configuration parameters for a security system;

[0014] FIG. **7** is a schematic block diagram showing an illustrative work flow for training and using an AI model for generating configuration parameters for a security system; and

[0015] FIG. **8** is a schematic block diagram showing illustrative relationships between different entities of a security system.

[0016] While the disclosure is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the disclosure to the particular examples described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure.

DESCRIPTION

[0017] The following description should be read with reference to the drawings, in which like elements in different drawings are numbered in like fashion. The drawings, which are not necessarily to scale, depict examples that are not intended to limit the scope of the disclosure. Although examples are illustrated for the various elements, those skilled in the art will recognize that many of the examples provided have suitable alternatives that may be utilized.

[0018] All numbers are herein assumed to be modified by the term "about", unless the content clearly dictates otherwise. The recitation of numerical ranged by endpoints includes all numbers subsumed within that range (e.g., 1 to 5 includes, 1, 1.5, 2, 2.75, 3, 3.8, 4, and 5).

[0019] As used in this specification and the appended claims, the singular forms "a", "an", and "the" include the plural referents unless the content clearly dictates otherwise. As used in this specification and the appended claims, the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

[0020] It is noted that references in the specification to "an embodiment", "some embodiments", "other embodiments", etc., indicate that the embodiment described may include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is contemplated that the feature, structure, or characteristic may be applied to other embodiments whether or not explicitly described unless clearly stated to the contrary.

[0021] In some instances, the design and configuration of a security system for a new facility, such as a physical access control system, may involve a large number of possible hardware components, particularly if the new facility is a large site with a lot of access doors. Each of these hardware components may need to be configured, meaning that large numbers of configuration parameters need to be determined and then implemented. In some instances, a new security system may be at least partially modeled using a spatial model and access credential usage patterns. In some cases, the security system design of existing facilities may be used to train an AI (artificial intelligence) model. Once the AI model is trained, certain parameters for a new security system (size of facility, number of floors, number of doors and so on) may be provided to the trained IA model, and the AI model can generate a new design for the new security system.

[0022] FIG. **1** is a schematic block diagram showing an illustrative system **10** for generating configuration parameters for a security system of a target site. The illustrative system **10** may be manifested within a computer, for example. The system **10** may be manifested within a desktop computer or a laptop computer, for example, or a computer server such as a cloud-based server. The illustrative system **10** includes a memory **12** for storing a trained Artificial Intelligence (AI) model **14**. The trained AI model **14** may be configured to generate a spatial model for a security system of the target site (e.g. number of components, types of components and/or placement location of components of the security system at the target site) as well as configuration parameters for various components of the security system of the target site. The spatial model and/or configuration parameters of the security system of the target site may be based on configuration and historical usage data associated with a security system of each of a plurality of other sites. The illustrative system **10** includes a controller **16** that is operatively coupled to the memory **12**. The controller **16** is also operatively coupled with an input **18** and an output **20**. The input **18** may be configured to allow the controller **16** to receive information from other sources (e.g. a database and/or data lake). The output **20** may be configured to allow the controller **16** to output information to other recipients (e.g. various components of the target security system, a database and/or data lake).

[0023] The controller **16** is configured to read site information for the target site. This may include data regarding the size of the target site, number of floors within the target site, number of doors within the target site, number of expected occupants of the target site, expected normal business hours at the target site, and so on, and may be received via the input **18**. The controller **16** is configured to submit the site information for the target site to the trained AI model **14**, wherein in response, the trained AI model **14** automatically generates a spatial model for the security system of the target site (e.g. number of components, types of components and/or placement location of components of the security system at the target site) as well as the configuration parameters for various components of the security system of the target site. In this example, the controller **16** is configured to output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site, such as via the output **20**. In some cases, the controller **16** may be configured to output the configuration parameters for the security system of the target site to the security system of the target site, wherein the security system of the target site runs the security system of the target site using the configuration parameters output by the controller **16** for the security system of the target site.

[0024] In some instances, the controller **16** may be configured to receive a selection of an existing reference site and to receive configuration and usage data associated with the security system of the existing reference site, such as via the input **18**. The controller **16** may be configured to then submit the configuration and usage data associated with the security system of the existing reference site, along with the site information for the target site, to the trained AI model **14**. In response, the trained AI model **14** may automatically generate the spatial model for the security system of the target site and configuration parameters for the security system of the target site. The controller **16** may then output the spatial model and configuration parameters via the output **20**.

[0025] FIGS. **2**A, **2**B and **2**C are flow diagrams that together show an illustrative method **22** for generating configuration parameters for a security system of a target site. In some instances, the method **22** may be carried out via the system **10**, for example. The illustrative method **22**

includes receiving configuration and usage data associated with a security system for each of a plurality of existing sites, as indicated at block **24**. The configuration and usage data includes a spatial model for the security system of the corresponding existing site, as indicated at block **24***a*. The configuration and usage data includes historical access data for the security system of the corresponding existing site, as indicated at block **24***b*. The configuration and usage data may include configuration parameters for various components of the corresponding existing site (e.g. door access settings, delay settings, access card settings, card reader/door lock associations, access schedules, etc.). The illustrative method **22** includes training an Artificial Intelligence (AI) model using the configuration and usage data associated with the security systems of the plurality of existing sites, as indicated at block **26**. This may result in a trained AI model, such as the trained AI model **14**.

[0026] Site information for the target site is received, as indicated at block **28**. In some cases, the site information for the target site may include one or more of a number of employees for the target site, a number of floors at the target site, and a spatial model of the target site. The spatial model of the target site may include, for example, a location of a main entrance of the target site, a location of emergency exits of the target site, the number and location of elevators at the target site, the location of internal access points for accessing more secure areas in the target site, etc.). In some instances, the spatial model of each of the plurality of existing sites may identify one or more hardware elements of the security system of the corresponding existing site and configuration settings of the security system of the corresponding existing site. As an example, the spatial model for the security system of one or more of the corresponding existing sites may identify one or more of a number of floors at the corresponding existing site, a number of doors at the corresponding existing site, a spatial location of each of one or more doors at the corresponding existing site, the number and location of control panels, card readers, door locking devices, video cameras, etc. The configuration parameters for various components of the corresponding existing site may include, for example, door access settings, delay settings, access card settings, card reader/door lock associations, access schedules, etc.).

[0027] In some cases, the identified one or more hardware elements of the security system of the corresponding existing site may include one or more of an access control panel, a card reader, a door lock, a door position sensor, a camera, a sensor, an audible alarm and a physical access card. As an example, the configuration settings of the security system of the corresponding existing site may include one or more of a door configuration setting, an access level configuration setting, a schedule configuration setting, a controller configuration setting, a rule configuration setting, a trigger configuration setting, and a credential configuration setting.

[0028] The site information for the target site is submitted to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site, as indicated at block **30**. The generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site are outputted, as indicated at block **32**. In some instances, the generated spatial model for the security system of the target site may identify one or more access panel locations, sensor locations, camera locations, and door lock locations for the security system of the target site. As an example, the generated configuration parameters for the security system of the target site may include one or more access panel configuration parameters, camera configuration parameters, door access configuration parameters, physical access card configuration parameters.

[0029] In some instances, the method **22** may further include importing the configuration parameters for the security system of the target site into the security system of the target site to at least partially configure the security system of the target site, as indicated at block **34**. The method **22** may further include running the security system of the target site that has been at least partially configured using the imported configuration parameters, as indicated at block **36**. In some cases, user input to modify one or more of the imported configuration parameters of the security system of the target site may be received, as indicated at block **38**.

[0030] Continuing on FIG. **2**B, the method **22** may further include running the security system of the target site using the configuration parameters for the security system of the target site, as indicated at block **40**. In some cases, the method **22** may further include manually entering one or more of the configuration parameters for the security system of the target site into the security system of the target site, as indicated at block **42**, and running the security system of the target site using the one or more of the manually entered configuration parameters for the security system of the target site, as indicated at block **44**.

[0031] In some instances, the method **22** may further include selecting an existing reference site, as indicated at block **46**. The existing reference site may be considered by the user to be similar to the target site. Configuration and usage data associated with the security system of the existing reference site may be received, as indicated at block **48**. The configuration and usage data associated with the security system of the existing reference site, along with the site information for the target site, may be submitted to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model generates the spatial model for the security system of the target site and configuration parameters for the security system of the target site, as indicated at block **50**.

[0032] In some cases, the method **22** may further include receiving user credential configuration settings associated with the security system for each of the plurality of existing sites, as indicated at block **52**. The Artificial Intelligence (AI) model may be trained using the configuration and usage data associated with the security systems of the plurality of existing sites and the user credential configuration settings associated with the security systems of the plurality of existing sites, as indicated at block **54**. The Artificial Intelligence (AI) model automatically generates the spatial model for the security system of the target site, the configuration parameters for the security system of the target site, and at least some user credential configuration settings (e.g. creating access card entries for each of the expected number of employees) for the security system of the target site, as indicated at block **56**. Continuing on FIG. **2**C, the generated spatial model for the security system of the target site, the configuration parameters for the security system of the target site and the user credential configuration settings for the security system of the target site are all outputted.

[0033] In some cases, the method **22** may further include receiving raw configuration and usage data associated with the security system for each of the plurality of existing sites, the raw configuration and usage data including a plurality of data fields, as indicated at block **60**. Only predetermined data fields from the raw configuration and usage data are selected, and the selected predetermined data fields are stored as the configuration and usage data associated with the security systems for each of a plurality of existing sites, as indicated at block **62**. As an example, the selected predetermined data fields may include one or more of a site identifier, a spatial model, a door identifier, a camera identifier, a camera name, a camera to door association, a card holder identifier, an access mapping of detected access events, and a video motion detection count per door. These are just examples.

[0034] FIG. **3** is a flow diagram showing an illustrative series of steps **64** that one or more processors may be caused to perform as a result of the one or more processors executing executable instructions stored on a non-transitory, computer readable storage medium. As an example, the one or more processors may be part of the controller **16**. The one or more processors may be caused to read site information for a target site, as indicated at block **66**. The one or more processors may be caused to submit the site information for the target site to a trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site, as indicated at block **68**. The one or more processors may be caused to output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site for use in configuring the security system of the target site, as indicated at block **70**.

[0035] FIG. **4** is a schematic block diagram showing an illustrative architecture **72** for generating configuration parameters for a security system. In some instances, the illustrative architecture **72** may be considered as being manifested within the controller **16**. In some cases, parts of the architecture **72** may be manifested within the controller **16** and parts of the architecture **72** may be manifested within one or more computer servers such as cloud-based servers. The illustrative architecture **72** includes a cloud interface block **74**, a site infrastructure block **76**, a modeling AI services block **78** and a cloud interface for physical security system block **80**. Each of these blocks **74**, **76**, **78** and **80** may work together in generating configuration parameters for a security system at a target site.

[0036] The cloud interface block **74** includes a cloud messaging block **74***a* and a cloud IOT interface **74***b*. The cloud messaging block **74***a* communicates with a cloud data lake **78***c* in order to capture and provide historical data for various existing sites for use by the Modeling AI Services block **78**. The historical data may include card access events, device configurations and site configurations. The cloud IOT interface **74***b* receives information from a number of site infrastructure block **76**. Each of a plurality of existing sites may include a site infrastructure block **76** that provides data to the cloud IOT interface **74***b*. Each site infrastructure block **76** may include, for example, access card readers **76***a* that provide card access information to access control panels **76***b* that are cloud-connected. The access control panels **76***b* communicate the access data to the cloud IOT interface **74***b*.

[0037] The cloud interface for physical security system block **80** includes a physical Security Model UI (user interface) block **80***a* that communicates with a cloud physical access modeling service block **80***b*. The cloud physical access modeling service block **80***b* communicates information such as a new site name, reference site and total expected visitors and/or employees to a block **78***a*. A data analytics stack block **78***b* communicates with both the block **78***a* and the cloud data lake **78***c*.

[0038] FIG. **5** is a schematic block diagram showing an illustrative step by step solution **82** for generating configuration parameters for a security system at a target site. An end customer logs in at block **84** and selects a reference site at block **86**. The reference site may be one or more existing or historical facilities that are believed to correspond closely to various physical parameters of a new target site. This information is provided to an AI model service block **88**. Within the AI model service block **88**, the information provided to the AI model service block **88** is received by a block **88***a*, where analytics are run. The block **88***a* also receives physical site information regarding the new target site. The physical site information may be obtained from CAD drawings or other floorplans or blueprints, sensor placements, access configurations and data from motion sensors such as PIR (passive infrared) sensors. At a block **88***c*, spatial data is correlated with credential usage patterns. At a block **88***d*, a physical security scenario is simulated to identify any vulnerabilities. The AI model service block **88** outputs data to a block **90**, which generates a report. The report may include specific site device information, card requirements, and configuration parameters for the security system at the target site.

[0039] FIG. **6** is an illustrative sequence diagram **92** for generating configuration parameters for a security system of a new target site. The sequence diagram **92** includes several actors, including an end customer **94**, an automated security model block **96** and a spatial and credential analysis block **98**. The end customer **94** initiates model generation, as indicated at **94***a*. The end customer **94** provides reference site information, as indicated at **94***b*. The end customer **94** confirms the spatial mapping, as indicated at **94***c*. The end customer **94** confirms an analysis of a credential usage pattern, as indicated at **94***d*. The automated security model block **96** then generates an automated security model that includes spatial mapping and credential analysis, as indicated at **96***a*. The spatial and credential analysis block **98** runs an automated simulation model to detect vulnerabilities in the generated automated security model for the new target site, as indicated at **98***a*. As an example, for access-related events, the simulation model may be a software-based simulator. For video-related events, the simulation model may be a video recorder-based software simulation that can provide video as well as generating video motion detection events. If vulnerabilities are detected, the spatial and credential analysis block **98** modifies the automated security model until any detected vulnerabilities are reduced to below a threshold vulnerability level. The finalized automated security model is then reported back tot the end customer **94**. The finalized automated security model may include specific site device information, card requirements, and/or configuration parameters for the security system at the target site.

[0040] FIG. **7** is a schematic block diagram showing an illustrative work flow **100** for training and using an AI model

for generating configuration parameters for a security system at a target site. The illustrative work flow **100** begins with security model data in its original state, as indicated at block **102**. The security model data may be collected from a plurality of existing sites. The data may include, for example, site ID and site name, a spatial model for the existing site, a number and location of doors, card readers and cameras at the existing site, the number of access levels, the number of card holders, the number, location and time of access events and/or video events, as well as other data, as indicated at block **104**. The data is provided to a data cleanup utility, in which required data is taken from the entire input data set, as indicated at block **106**. The post-data cleanup data may include a limited set of data, such as one or more of site ID and name, site spatial model, card holder ID and name, assigned card to card holder mapping, door ID and name, camera ID and name, camera to door association, card holder ID and accessed door mapping from access event, and video motion detection count per door, as indicated at block **108**. Some of this data may be generated by the data cleanup utility based on the raw data that is received from each existing site, such as the card holder ID and accessed door mapping, which may be generated from the recorded access event.

[0041] Particular post-data cleanup data may be selected, as indicated at block **110**. The selected post-data cleanup data may include, for example, site ID and name, site spatial model, door ID and name, camera ID and name, camera to door associations, card holder ID and accessed door mapping from access event, and video motion detection count per door, as indicated at block **112**. Training data is obtained, as indicated at block **114**. Based on the training data, an access usage-based model is generated, as indicated at block **116**. The model is tested, as indicated at block **118**. In some cases, the access usage-based model is tested against various test sites to verify the access usage-based model provides good results. If the access usage-based model does not consistently produce satisfactory results, control is passed back to block **114** and additional training data is applied.

[0042] Once the access usage-based model (e.g. AI model) is deemed to be sufficiently trained. Information regarding a new target site **120** is provided to the access usage-based model **118**. The new site information may be from a reference site that is selected by the user, wherein the reference site is believed to be similar to the new target site. The new site information may include a reference site ID and reference spatial model map, as indicated at block **122**. The new site information is applied to the trained access usage-based model **118**, and the access usage-based model **118** automatically generates a spatial model for the security system of the target site. The generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site are outputted, as shown at **126**. The data output may include one or more of door configurations, access levels, camera configurations and locations, site spatial model and cards configuration, as indicated at block **126**. These are just examples. In some cases, the security system of the target site is run using the generated configuration parameters.

[0043] FIG. **8** is a schematic block diagram showing relationships between different entities **128**. The entities **128** include a physical site entity **130** and a security event entity **132**. The physical site entity **130** may include one or more of a camera block **130***a*, an intrusion sensor block **130***b* and a spatial mapping block **130***c*. These are just examples. The security event entity **132** may include one or more of an access control block **132***a* and a credential usage block **132***b*. Each of the blocks **130**, **130***a*, **130***b*, **130***c*, **132***a*, **132**, **132***a* and **132***b* includes a list of pertinent configuration parameters.

[0044] Having thus described several illustrative embodiments of the present disclosure, those of skill in the art will readily appreciate that yet other embodiments may be made and used within the scope of the claims hereto attached. It will be understood, however, that this disclosure is, in many respects, only illustrative. Changes may be made in details, particularly in matters of shape, size, arrangement of parts, and exclusion and order of steps, without exceeding the scope of the disclosure. The disclosure's scope is, of course, defined in the language in which the appended claims are expressed.

What is claimed is:

1. A method for generating configuration parameters for a security system of a target site, the method comprising:

receiving configuration and usage data associated with a security system for each of a plurality of existing sites, the configuration and usage data including:

a spatial model for the security system of the corresponding existing site;

historical access data for the security system of the corresponding existing site;

training an Artificial Intelligence (AI) model using the configuration and usage data associated with the security systems of the plurality of existing sites;

receiving site information for the target site;

submitting the site information for the target site to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site; and

outputting the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site.

2. The method of claim **1**, comprising:

importing the configuration parameters for the security system of the target site into the security system of the target site to at least partially configure the security system of the target site; and

running the security system of the target site that has been at least partially configured using the imported configuration parameters.

3. The method of claim **2**, comprising:

receiving user input to modify one or more of the imported configuration parameters of the security system of the target site.

4. The method of claim **1**, comprising:

running the security system of the target site using the configuration parameters for the security system of the target site.

5. The method of claim **1**, comprising:

manually entering one or more of the configuration parameters for the security system of the target site into the security system of the target site; and

running the security system of the target site using the one or more of the manually entered configuration parameters for the security system of the target site.

6. The method of claim 1, comprising:

selecting an existing reference site;

receiving configuration and usage data associated with the security system of the existing reference site; and

submitting the configuration and usage data associated with the security system of the existing reference site, along with the site information for the target site, to the Artificial Intelligence (AI) model, wherein in response, the Artificial Intelligence (AI) model generates the spatial model for the security system of the target site and configuration parameters for the security system of the target site.

7. The method of claim 1, wherein the site information for the target site comprises one or more of:

a number of employees for the target site;

a number of floors at the target site; and

a spatial model of the target site.

8. The method of claim 1, wherein the spatial model of each of the plurality of existing sites identifies one or more hardware elements of the security system of the corresponding existing site and configuration settings of the security system of the corresponding existing site.

9. The method of claim 8, wherein the identified one or more hardware elements of the security system of the corresponding existing site include one or more of an access control panel, a card reader, a door lock, a door position sensor, a camera, a sensor, an audible alarm and a physical access card.

10. The method of claim 8, wherein the configuration settings of the security system of the corresponding existing site include one or more of a door configuration setting, an access level configuration setting, a schedule configuration setting, a controller configuration setting, a rule configuration setting, a trigger configuration setting, and a credential configuration setting.

11. The method of claim 1, wherein the spatial model for the security system of one or more of the corresponding existing sites identifies one or more of:

a number of floors at the corresponding existing site;

a number of doors at the corresponding existing site; and

a spatial location of each of one or more doors at the corresponding existing site.

12. The method of claim 1, comprising:

receiving user credential configuration settings associated with the security system for each of the plurality of existing sites;

training the Artificial Intelligence (AI) model using the configuration and usage data associated with the security systems of the plurality of existing sites and the user credential configuration settings associated with the security systems of the plurality of existing sites;

the Artificial Intelligence (AI) model automatically generating the spatial model for the security system of the target site, the configuration parameters for the security system of the target site and user credential configuration settings for the security system of the target site; and

outputting the generated spatial model for the security system of the target site, the configuration parameters for the security system of the target site and the user credential configuration settings for the security system of the target site.

13. The method of claim 1, comprising:

receiving raw configuration and usage data associated with the security system for each of the plurality of existing sites, the raw configuration and usage data including a plurality of data fields; and

selecting only predetermined data fields from the raw configuration and usage data, and storing the selected predetermined data fields as the configuration and usage data associated with the security systems for each of a plurality of existing sites.

14. The method of claim 13, wherein the selected predetermined data fields include one or more of:

a site identifier;

a spatial model;

a door identifier;

a camera identifier;

a camera name;

a camera to door association;

a card holder identifier;

an access mapping of detected access events; and

a video motion detection count per door.

15. The method of claim 1, wherein the generated spatial model for the security system of the target site identifies one or more access panel locations, sensor locations, camera locations, and door lock locations for the security system of the target site.

16. The method of claim 1, wherein the generated configuration parameters for the security system of the target site include one or more access panel configuration parameters, camera configuration parameters, door access configuration parameters, physical access card configuration parameters.

17. A system for generating configuration parameters for a security system of a target site, comprising:

a memory for storing a trained Artificial Intelligence (AI) model that is configured to generate a spatial model for a security system of the target site and configuration parameters for the security system of the target site based on configuration and historical usage data associated with a security system for each of a plurality of other sites;

a controller operatively coupled to the memory, the controller configured to:

read site information for the target site;

submit the site information for the target site to the trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates the spatial model for the security system of the target site and configuration parameters for the security system of the target site; and

output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site.

18. The system of claim 17, wherein the controller is configured to:

output the configuration parameters for the security system of the target site to the security system of the target site, wherein the security system of the target site runs the security system of the target site using the configuration parameters output by the controller for the security system of the target site.

19. The system of claim **17**, wherein the controller is configured to:

receive a selection of an existing reference site;

receive configuration and usage data associated with the security system of the existing reference site; and

submit the configuration and usage data associated with the security system of the existing reference site, along with the site information for the target site, to the trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates the spatial model for the security system of the target site and configuration parameters for the security system of the target site.

20. A non-transitory computer readable medium storing instructions thereon that when executed by one or more processors cause the one or more processors to:

read site information for a target site;

submit the site information for the target site to a trained Artificial Intelligence (AI) model, wherein in response, the trained Artificial Intelligence (AI) model automatically generates a spatial model for a security system of the target site and configuration parameters for the security system of the target site; and

output the generated spatial model for the security system of the target site and the configuration parameters for the security system of the target site for use in configuring the security system of the target site.

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