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(54) **SYSTEMS AND METHODS FOR UPDATING A VALIDATION SAMPLE**

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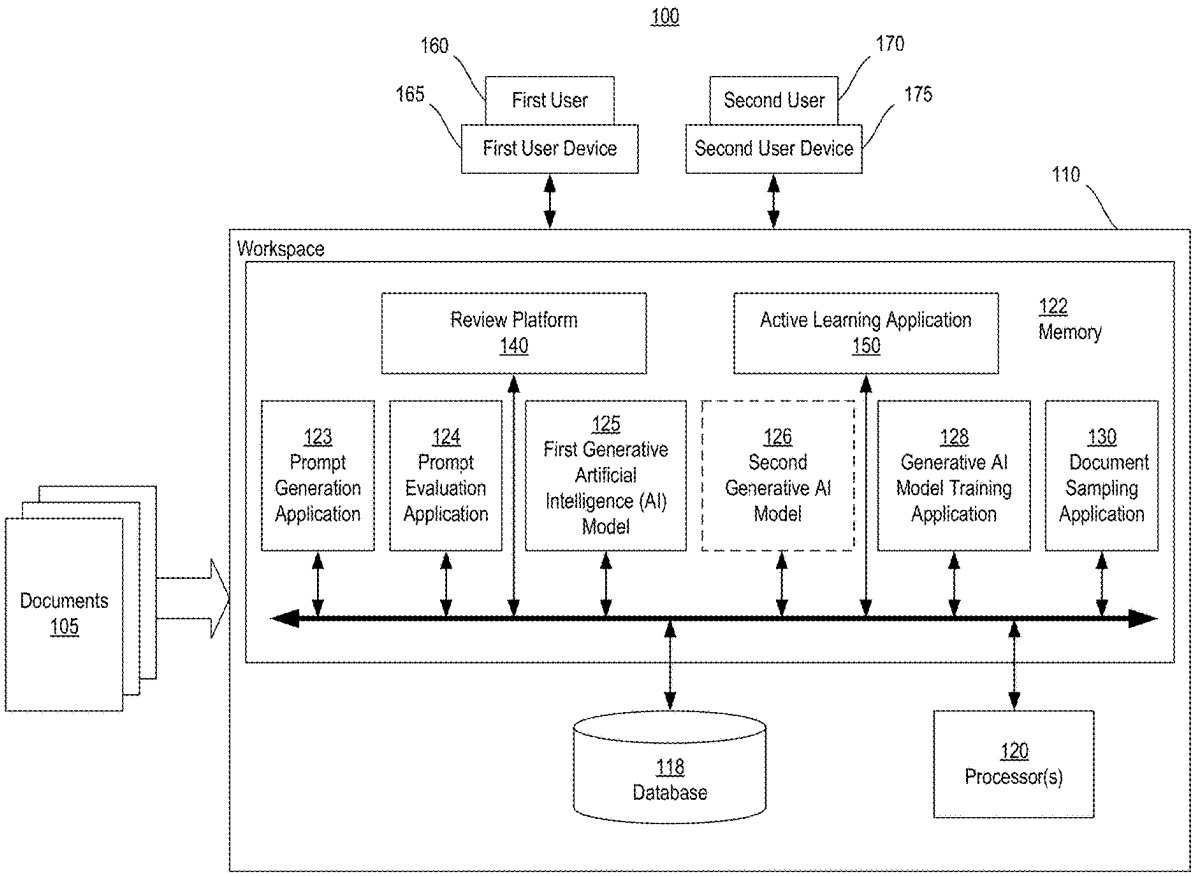
(57) **ABSTRACT**

The following relates generally to using generative AI to: (i) classify documents; (ii) generate prompts (and/or criteria for prompts) to classify documents; (iii) explain document classifications; and/or (iv) explain updates to prompts (and/or prompt criteria). In some embodiments, one or more processors: obtain an initial set of documents from a corpus of documents; classify documents within the initial set of documents by inputting a prompt and the documents within the initial set of documents into a generative artificial intelligence (AI) model; and evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue.



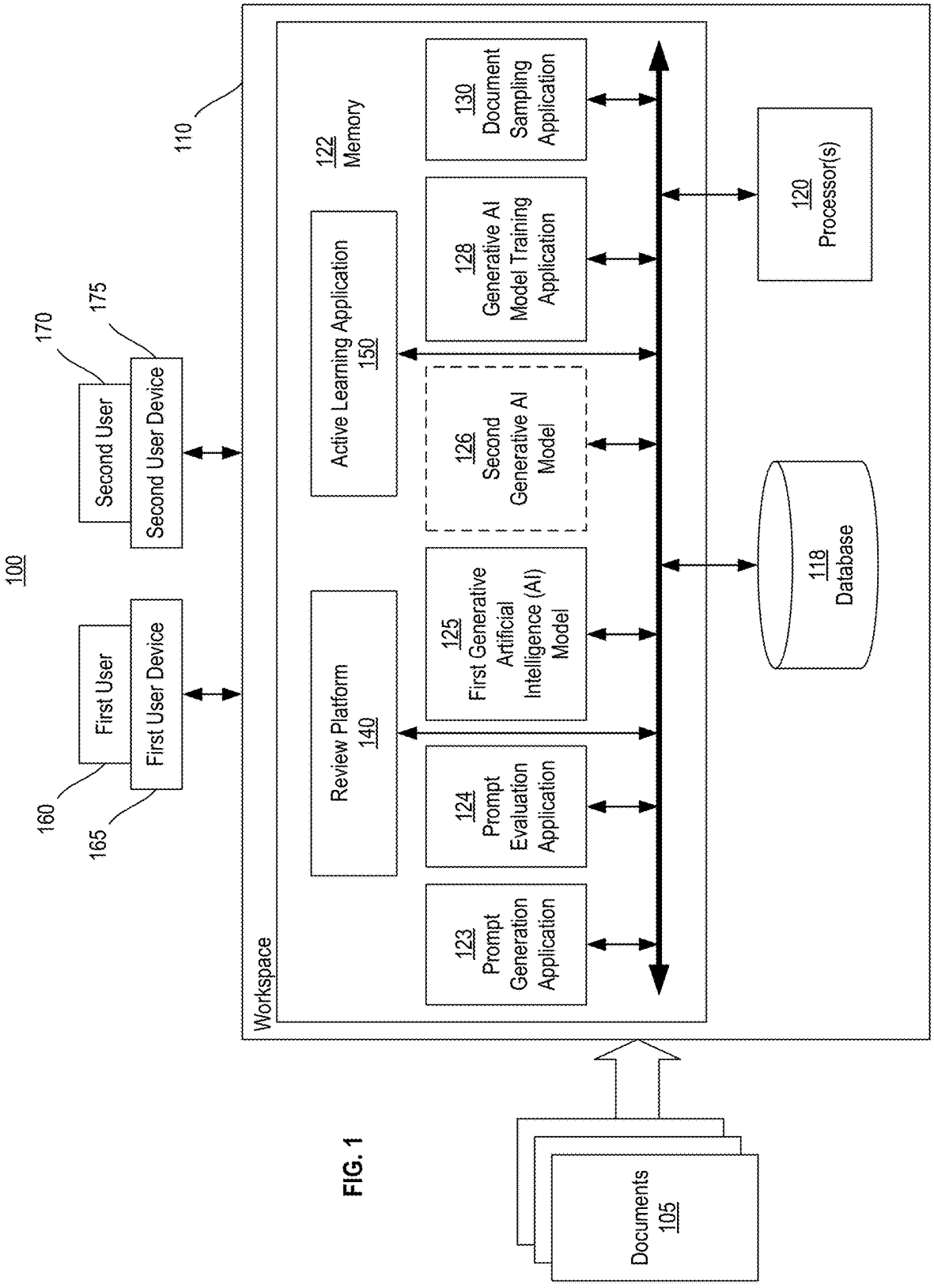

100
110
Workspace
122 Memory
130 Document Sampling Application
128 Generative AI Model Training Application
Active Learning Application 150
126 Second Generative AI Model
125 First Generative Artificial Intelligence (AI) Model
Review Platform 140
123 Prompt Generation Application
124 Prompt Evaluation Application
120 Processor(s)
118 Database
Documents 105
First User
First User Device
160
165
Second User
Second User Device
170
175

FIG. 1

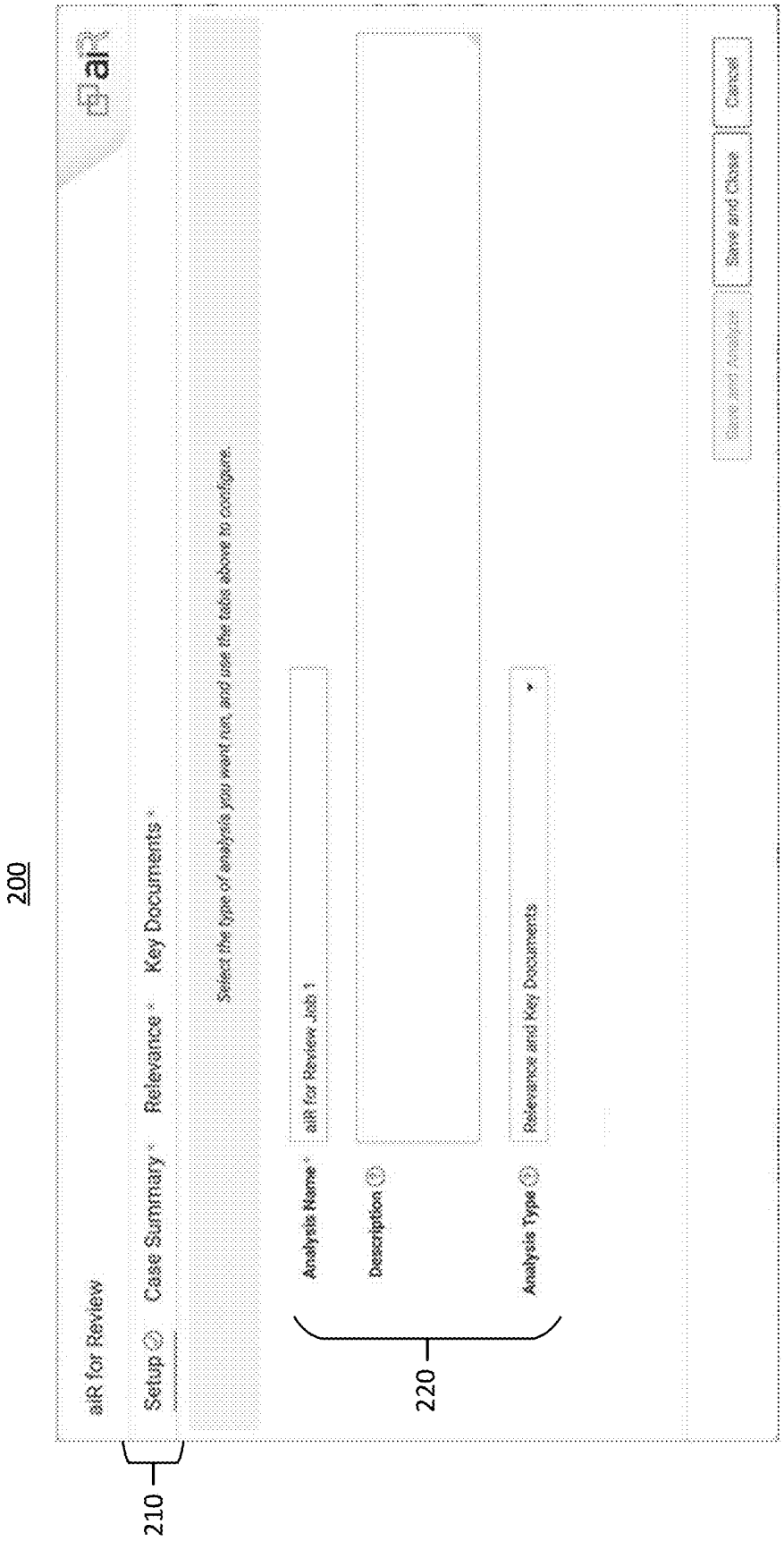

200
aiR for Review
Setup
Case Summary *
Relevance *
Key Documents *
Select the type of analysis you want run, and use the tabs above to configure
Analysis Name *
aiR for Review Job 1
Description
Analysis Type
Relevance and Key Documents
Cancel Analysis
Save and Close
Cancel
210
220

FIG. 2

FIG. 3

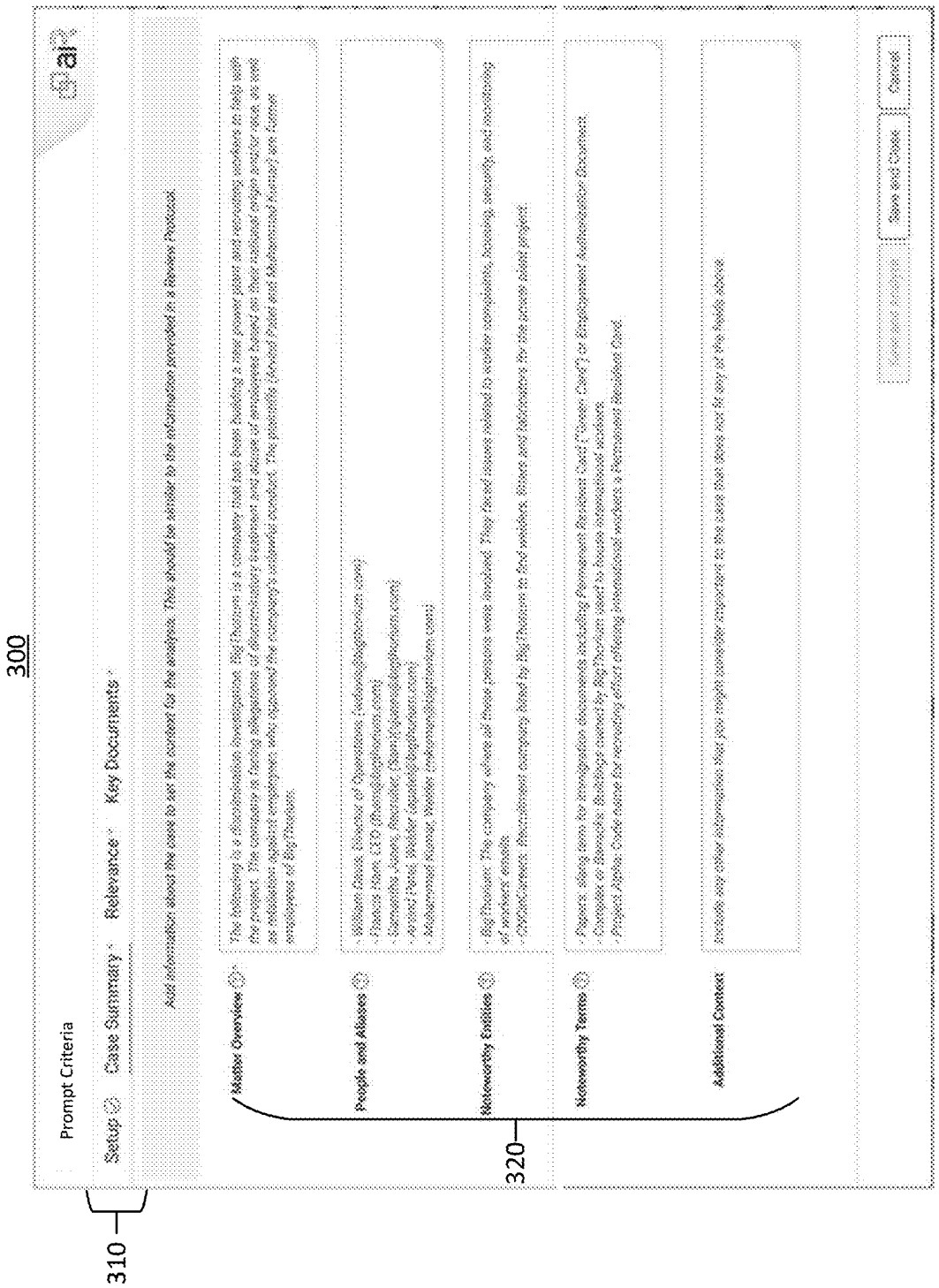
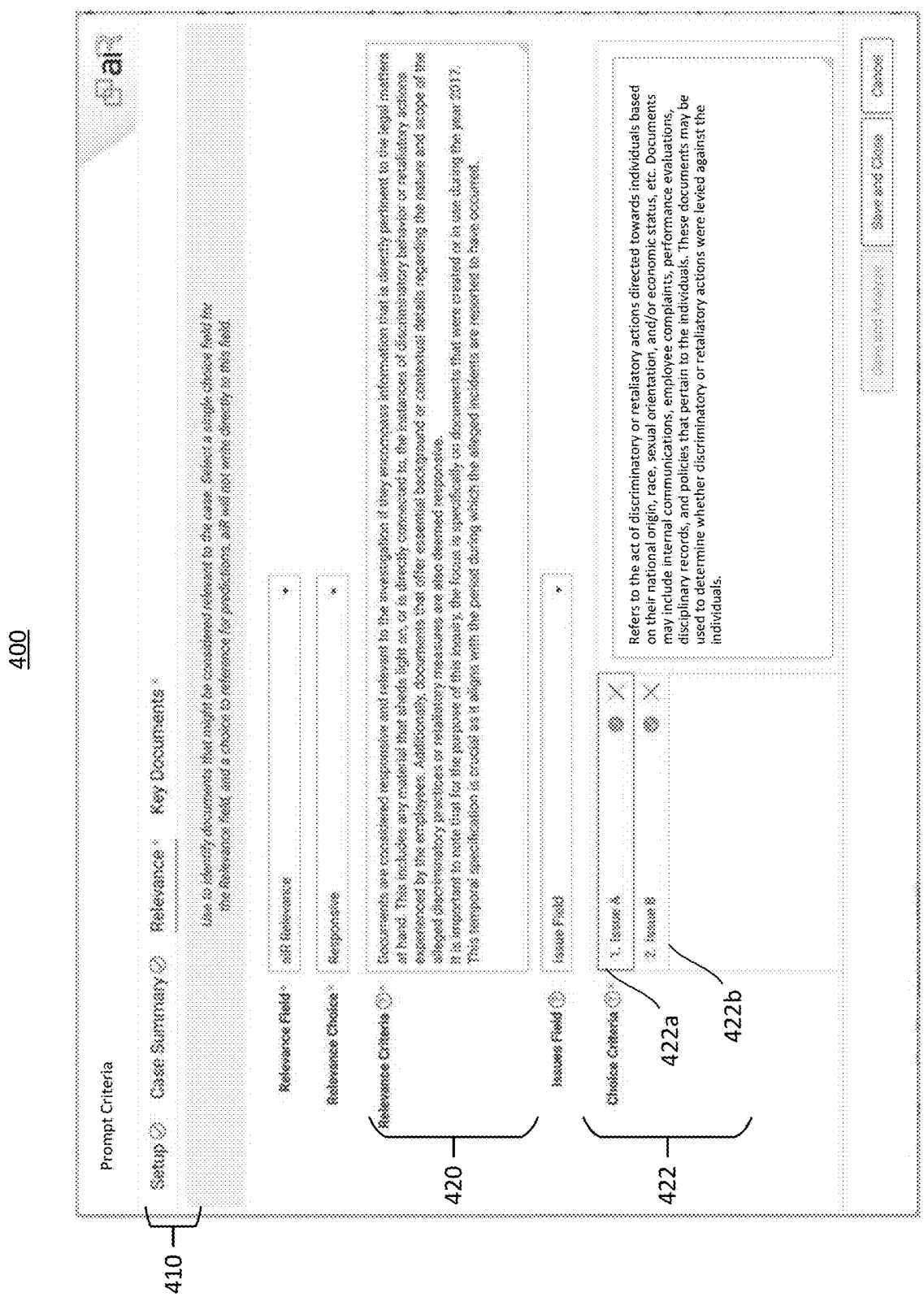

300
310
320
Prompt Criteria
Setup
Case Summary
Relevance
Key Documents
Add information about the case to set the context for the analysis. This should be similar to the information provided in a Review Protocol.
Matter Overview
People and Aliases
Noteworthy Entities
Noteworthy Terms
Additional Context
Save and Close
Cancel

FIG. 4


400
Prompt Criteria
Setup
Case Summary
Relevance
Key Documents
Use to identify documents that might be considered relevant to the case. Select a single choice field for the Relevance field, and a choice to reference for predictions. aiR will not write directly to this field.
Relevance Field
aiR Relevance
Relevance Choice
Responsive
Relevance Criteria
Documents are considered responsive and relevant to the investigation if they encompass information that is directly pertinent to the legal matters at hand. This includes any material that sheds light on, or is directly connected to, the instances of discriminatory behavior or retaliatory actions experienced by the employees. Additionally, documents that offer essential background or contextual details regarding the nature and scope of the alleged discriminatory practices or retaliatory measures are also deemed responsive.
It is important to note that for the purpose of this inquiry, the focus is specifically on documents that were created or in use during the year 2017. This temporal specification is crucial as it aligns with the period during which the alleged incidents are reported to have occurred.
Issues Field
Issue Field
Choice Criteria
1. Issue A
2. Issue B
Refers to the act of discriminatory or retaliatory actions directed towards individuals based on their national origin, race, sexual orientation, and/or economic status, etc. Documents may include internal communications, employee complaints, performance evaluations, disciplinary records, and policies that pertain to the individuals. These documents may be used to determine whether discriminatory or retaliatory actions were levied against the individuals.
Save and Close
Cancel
410
420
422
422a
422b

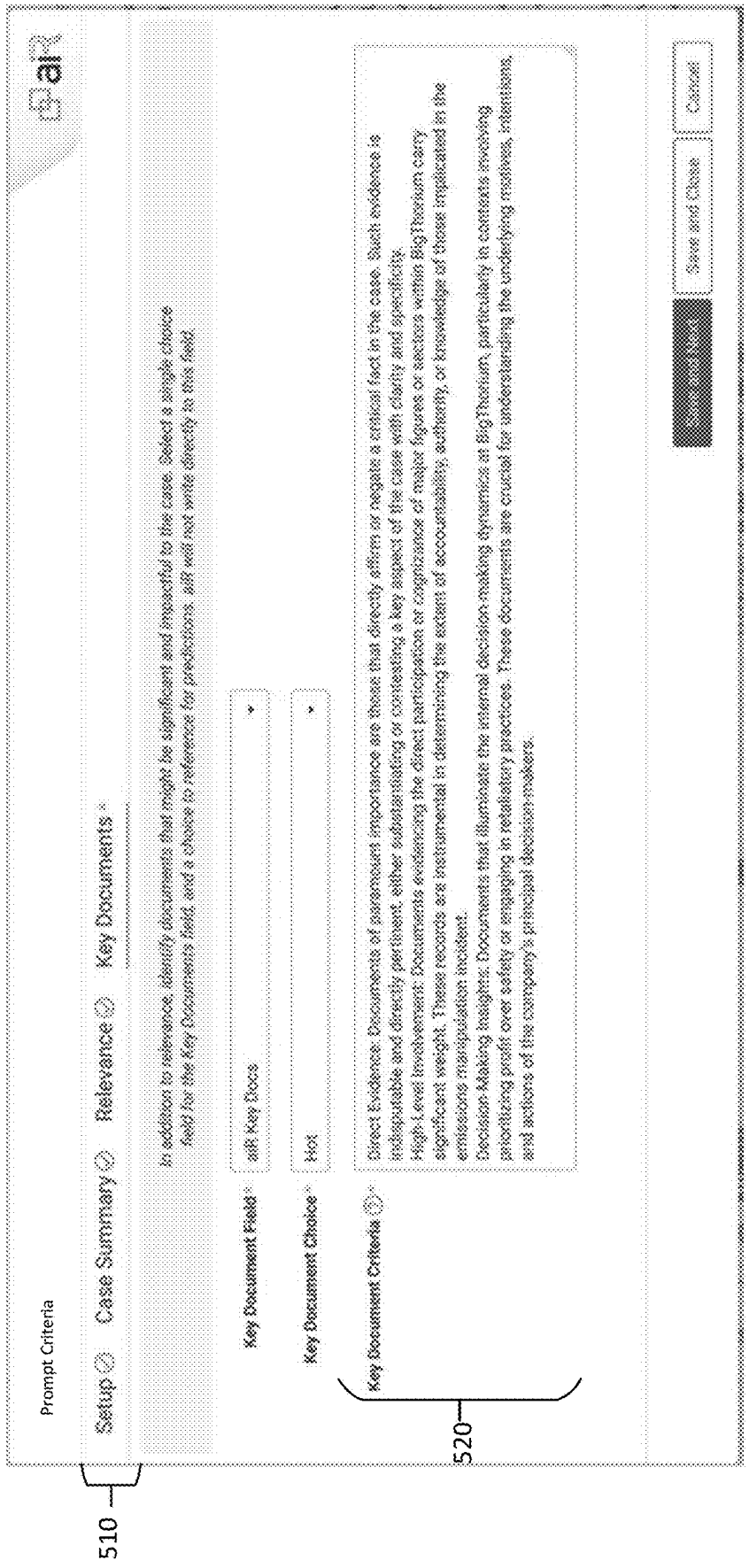

500
510
520
Prompt Criteria
Setup
Case Summary
Relevance
Key Documents
Key Document Field
Key Document Choice
Key Document Criteria
Cancel

FIG. 5

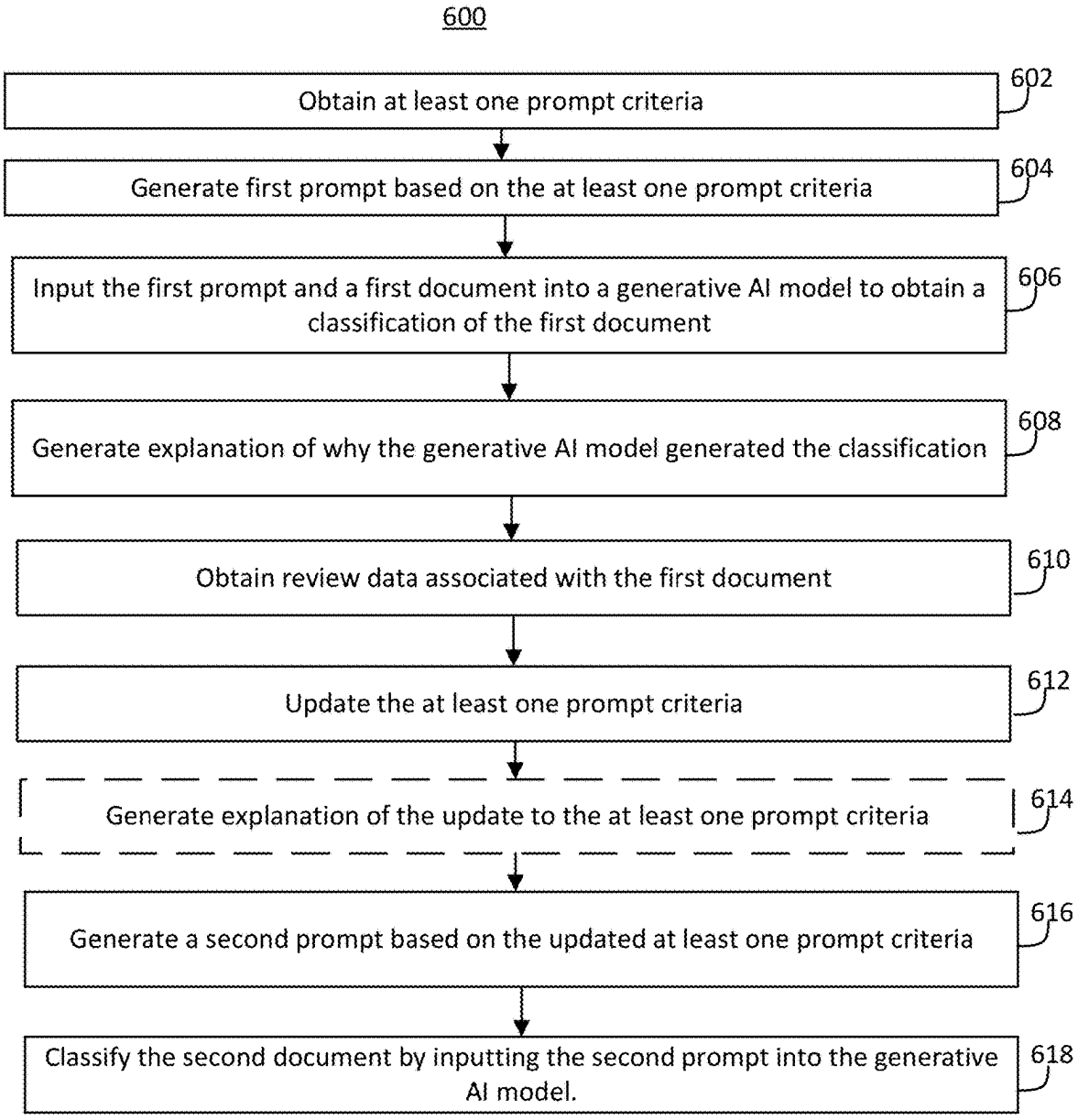

600
Obtain at least one prompt criteria
602
Generate first prompt based on the at least one prompt criteria
604
Input the first prompt and a first document into a generative AI model to obtain a classification of the first document
606
Generate explanation of why the generative AI model generated the classification
608
Obtain review data associated with the first document
610
Update the at least one prompt criteria
612
Generate explanation of the update to the at least one prompt criteria
614
Generate a second prompt based on the updated at least one prompt criteria
616
Classify the second document by inputting the second prompt into the generative AI model.
618

FIG. 6

FIG. 7

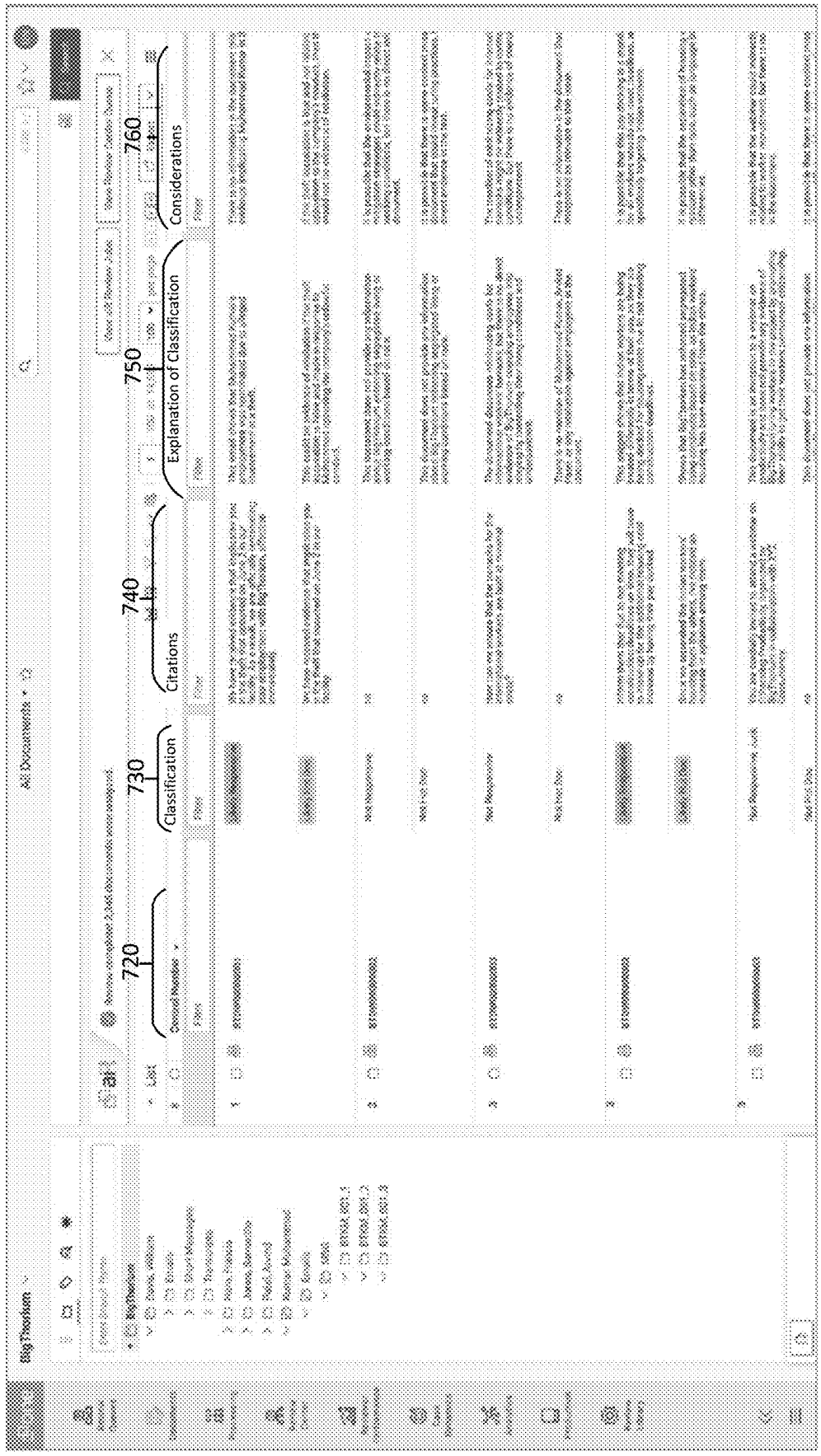
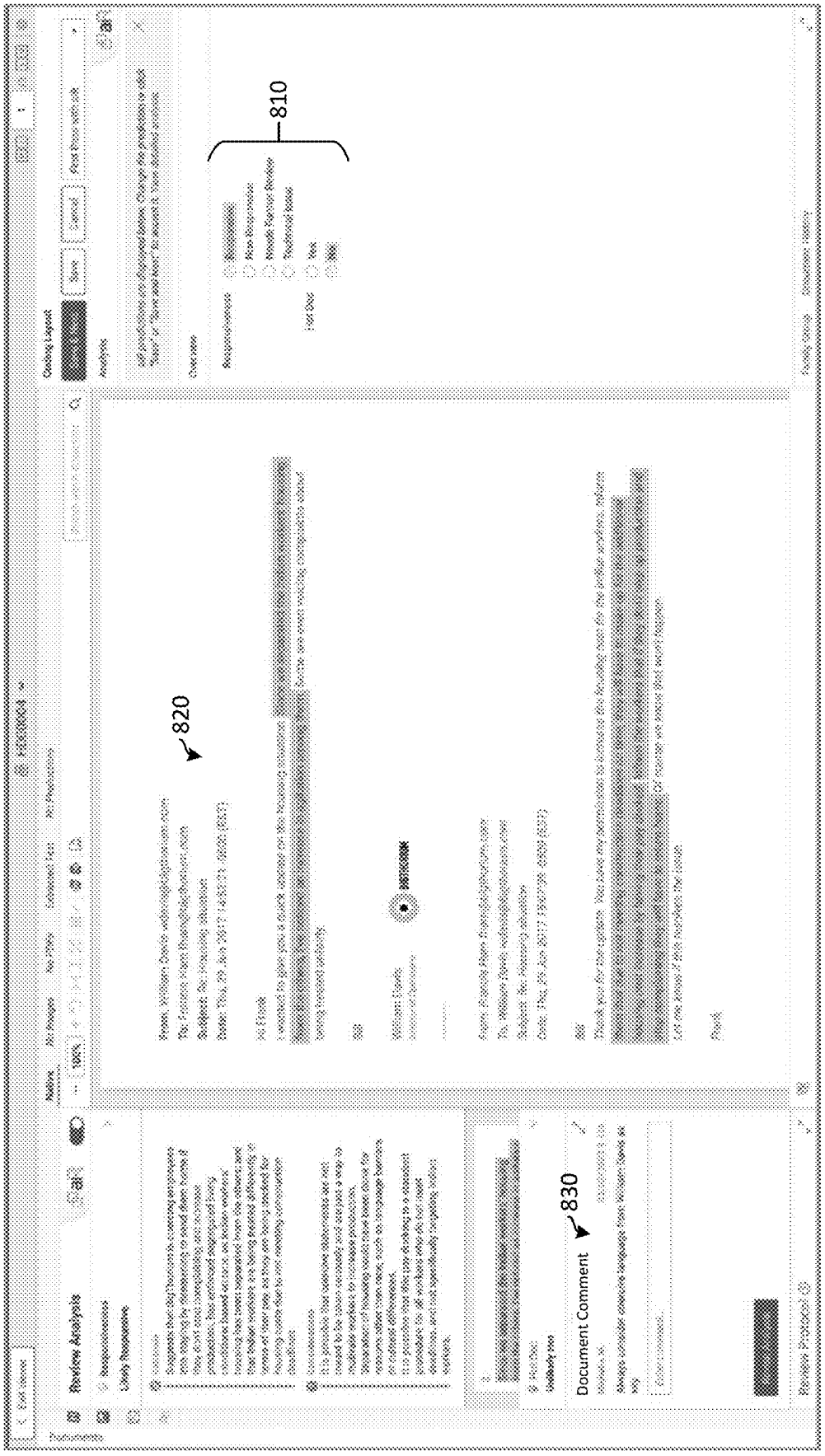

700
720
730
740
750
760
Classification
Citations
Explanation of Classification
Considerations

FIG. 8

800



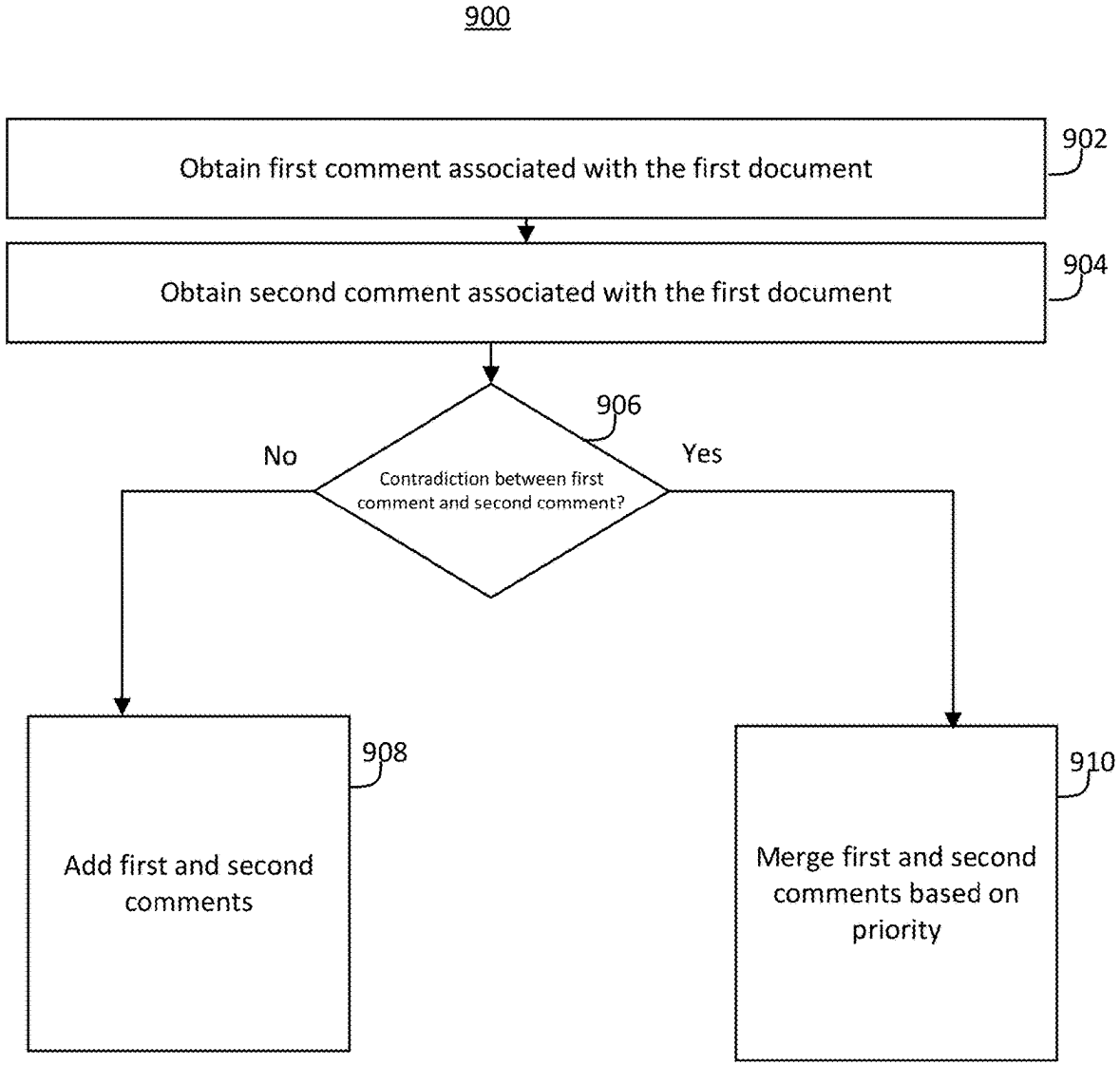

900
Obtain first comment associated with the first document
902
Obtain second comment associated with the first document
904
906
Contradiction between first comment and second comment?
No
Yes
908
Add first and second comments
910
Merge first and second comments based on priority

FIG. 9

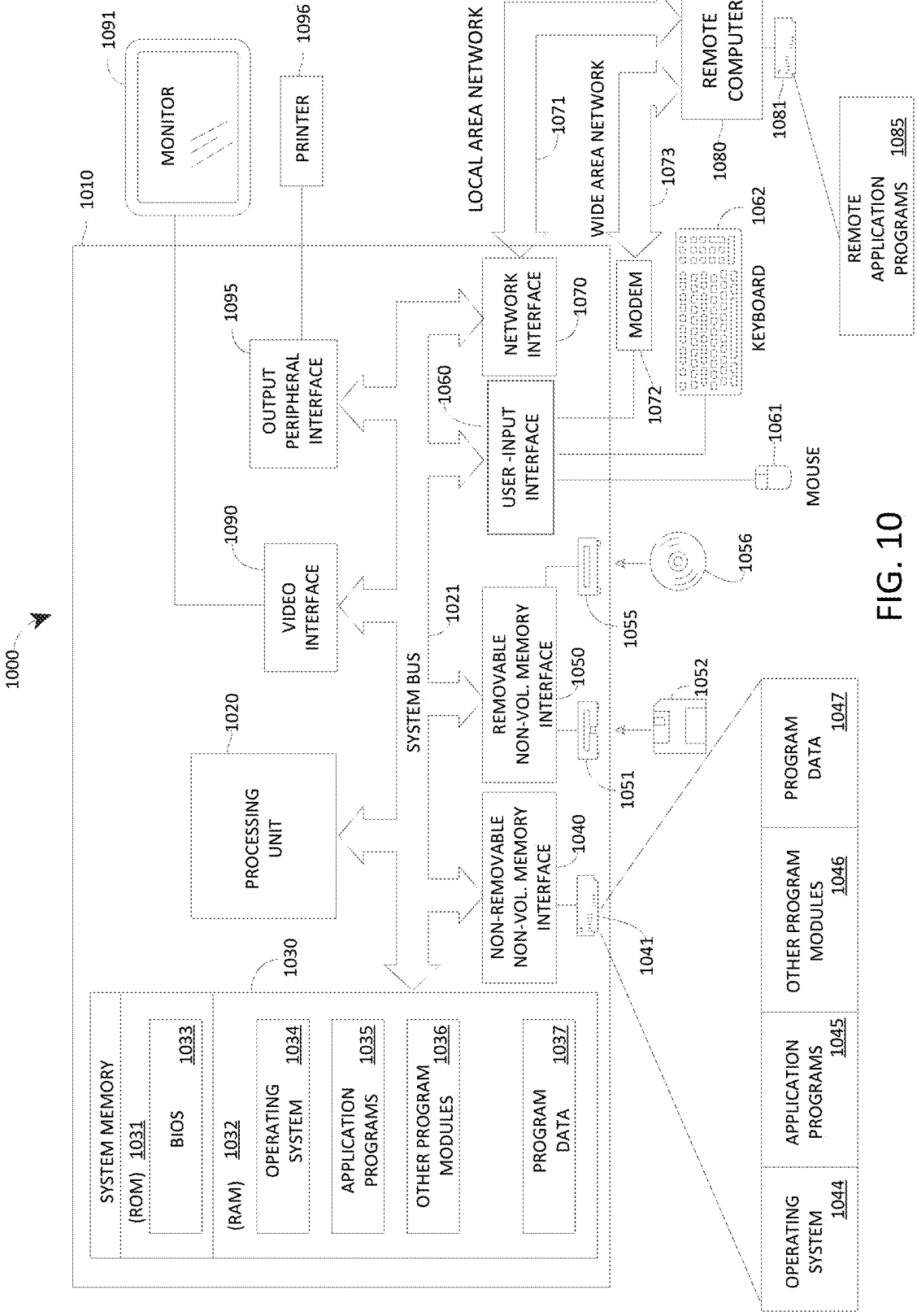

1000
1010
MONITOR
1091
PRINTER
1096
LOCAL AREA NETWORK
WIDE AREA NETWORK
1071
1073
REMOTE COMPUTER
1080
1081
REMOTE APPLICATION PROGRAMS 1085
KEYBOARD
1062
MODEM
1072
NETWORK INTERFACE
1070
OUTPUT PERIPHERAL INTERFACE
1095
USER -INPUT INTERFACE
1060
MOUSE
1061
VIDEO INTERFACE
1090
1056
1055
SYSTEM BUS
1021
REMOVABLE NON-VOL. MEMORY INTERFACE
1050
1052
PROCESSING UNIT
1020
1051
NON-REMOVABLE NON-VOL. MEMORY INTERFACE
1040
1041
SYSTEM MEMORY
(ROM) 1031
BIOS 1033
(RAM) 1032
OPERATING SYSTEM 1034
APPLICATION PROGRAMS 1035
OTHER PROGRAM MODULES 1036
PROGRAM DATA 1037
1030
OPERATING SYSTEM 1044
APPLICATION PROGRAMS 1045
OTHER PROGRAM MODULES 1046
PROGRAM DATA 1047

FIG. 10

1100

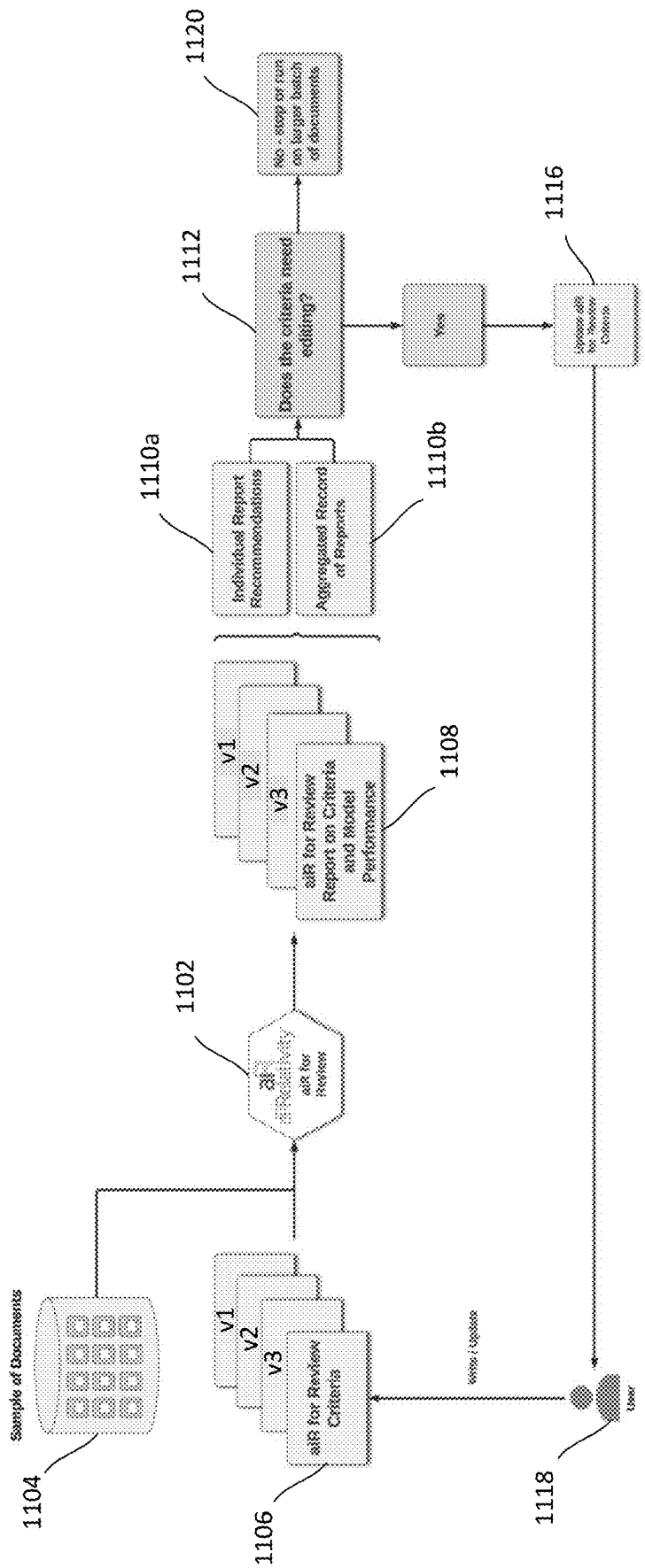

1104
Sample of Documents
1106
v1
v2
v3
aiR for Review Criteria
1102
aiR for Review
1108
v1
v2
v3
aiR for Review Report on Criteria and Model Performance
1110a
Individual Report Recommendations
1110b
Aggregated Record of Reports
1112
Does the criteria need editing?
1120
No - stop or run on larger batch of documents
Yes
1116
1118
User

FIG. 11

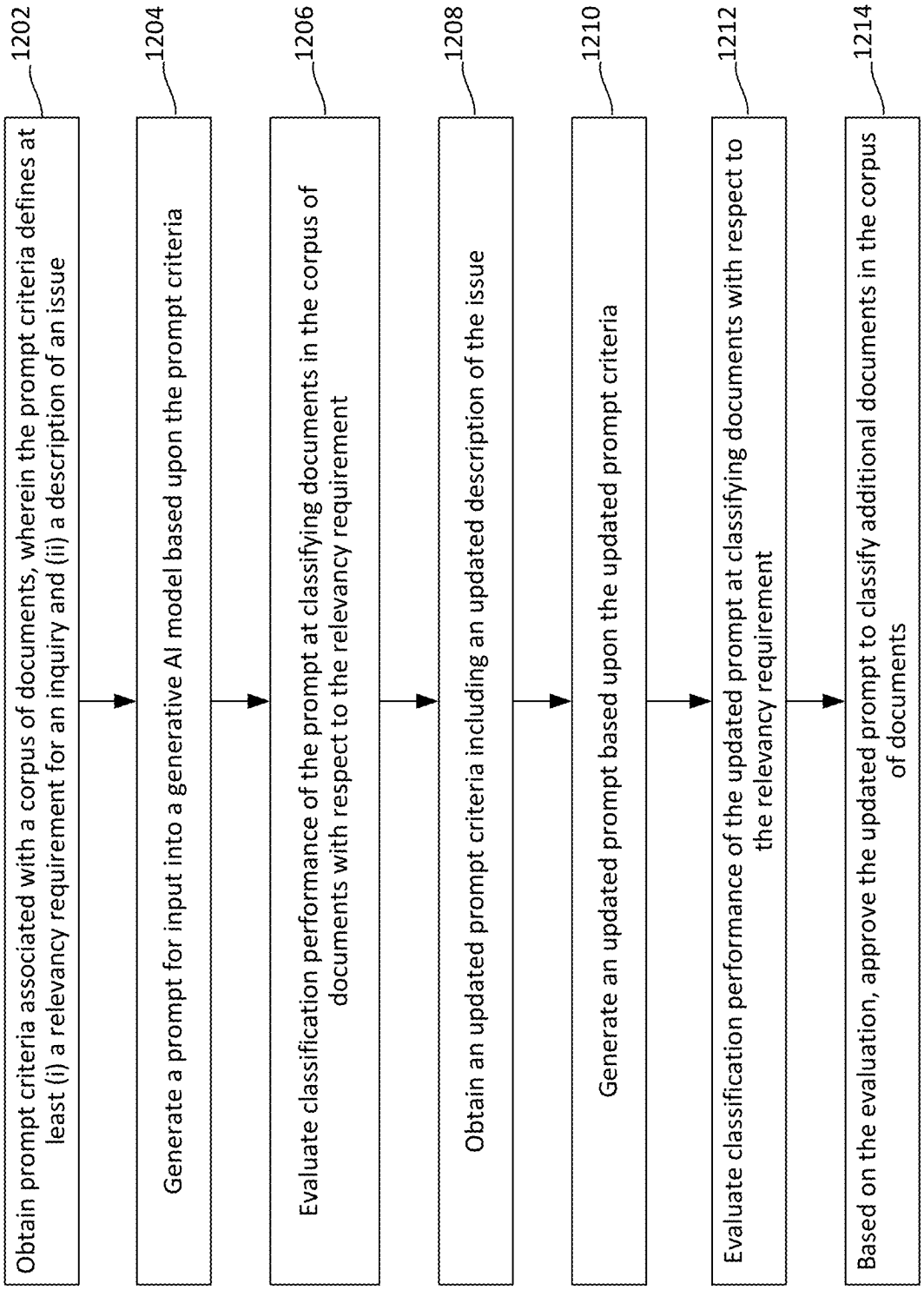

1200
Obtain prompt criteria associated with a corpus of documents, wherein the prompt criteria defines at least (i) a relevancy requirement for an inquiry and (ii) a description of an issue
1202
Generate a prompt for input into a generative AI model based upon the prompt criteria
1204
Evaluate classification performance of the prompt at classifying documents in the corpus of documents with respect to the relevancy requirement
1206
Obtain an updated prompt criteria including an updated description of the issue
1208
Generate an updated prompt based upon the updated prompt criteria
1210
Evaluate classification performance of the updated prompt at classifying documents with respect to the relevancy requirement
1212
Based on the evaluation, approve the updated prompt to classify additional documents in the corpus of documents
1214

FIG. 12

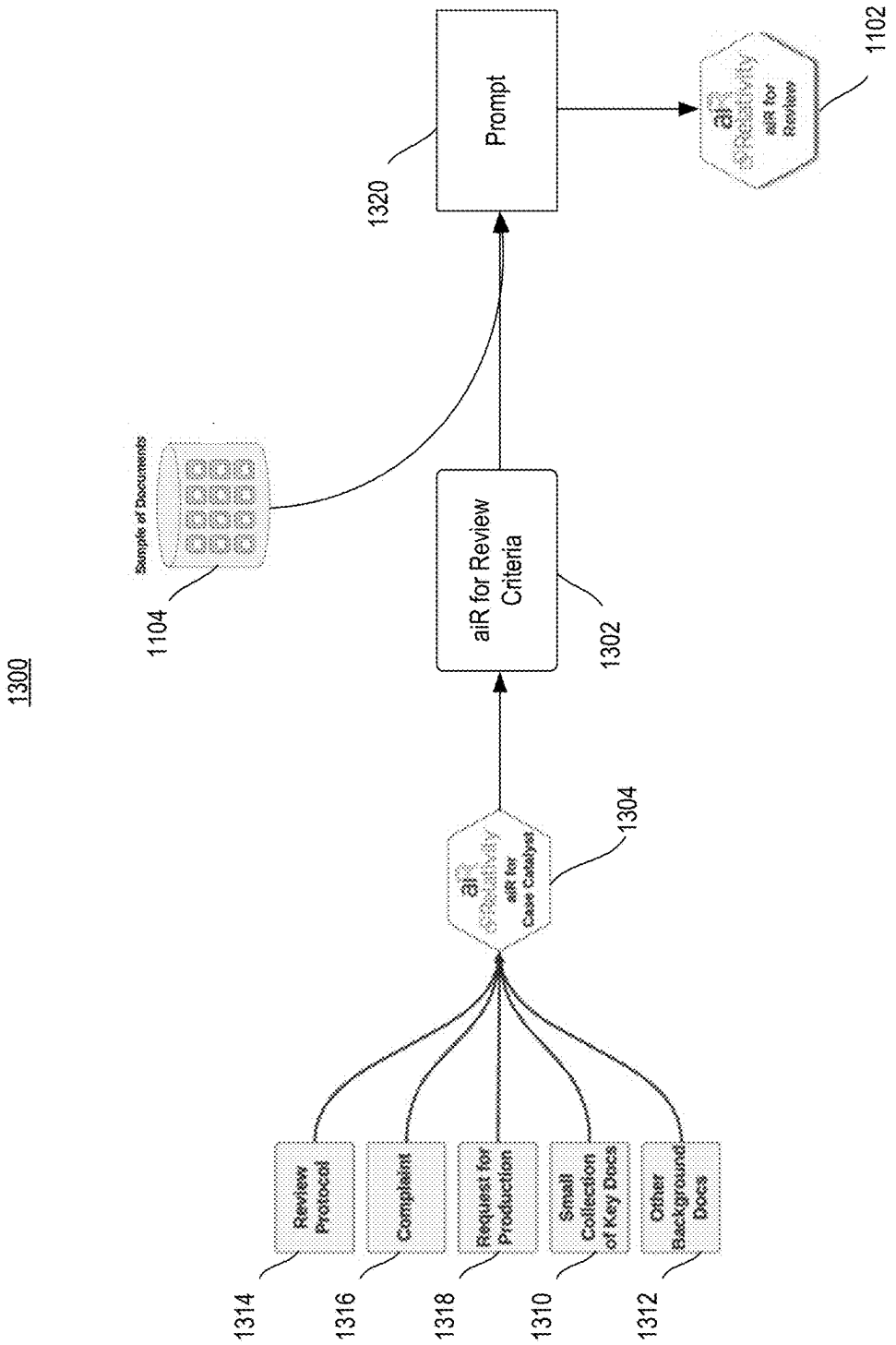

1300
Review Protocol
Complaint
Request for Production
Small Collection of Key Docs
Other Background Docs
1314
1316
1318
1310
1312
1304
aiR for Review Criteria
1302
Sample of Documents
1104
Prompt
1320
1102

FIG. 13

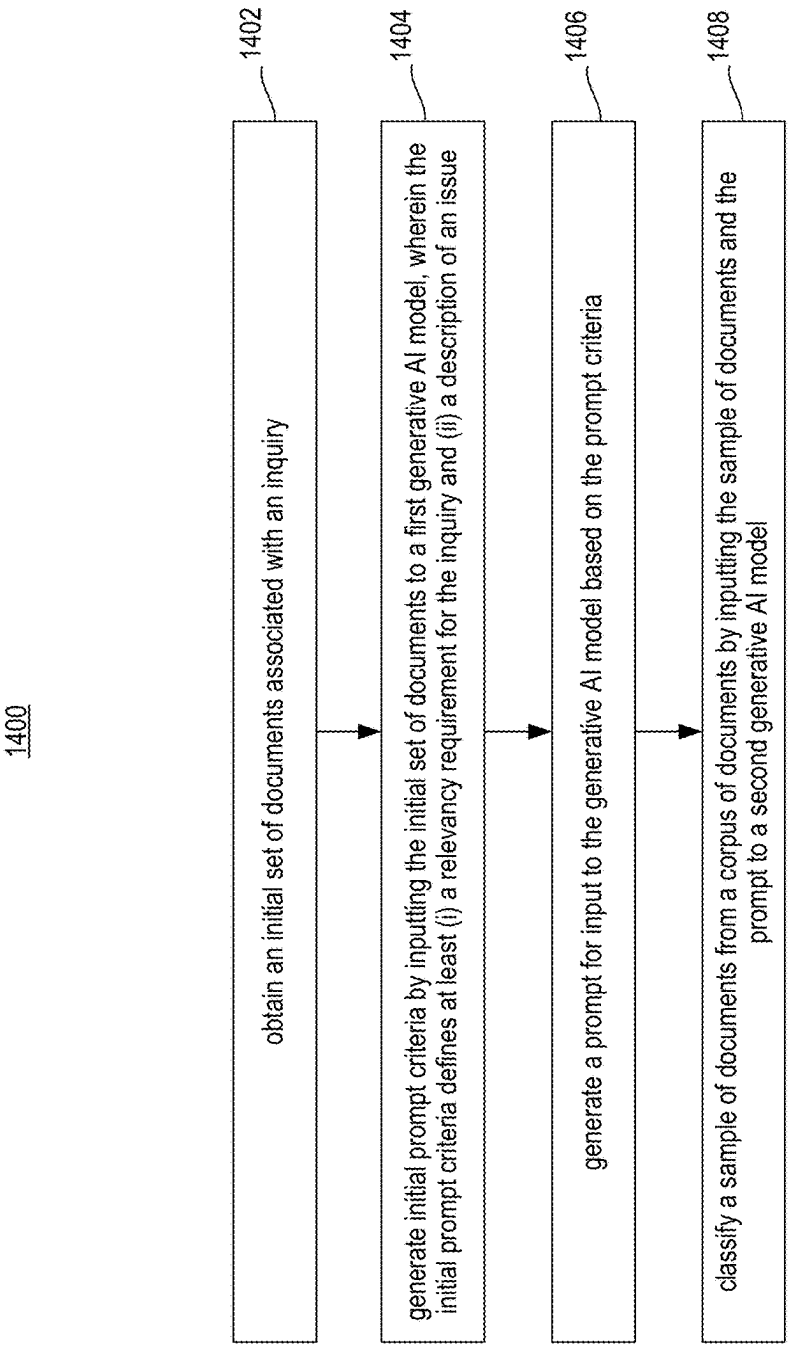

1400
1402
obtain an initial set of documents associated with an inquiry
1404
generate initial prompt criteria by inputting the initial set of documents to a first generative AI model, wherein the initial prompt criteria defines at least (i) a relevancy requirement for the inquiry and (ii) a description of an issue
1406
generate a prompt for input to the generative AI model based on the prompt criteria
1408
classify a sample of documents from a corpus of documents by inputting the sample of documents and the prompt to a second generative AI model

FIG. 14

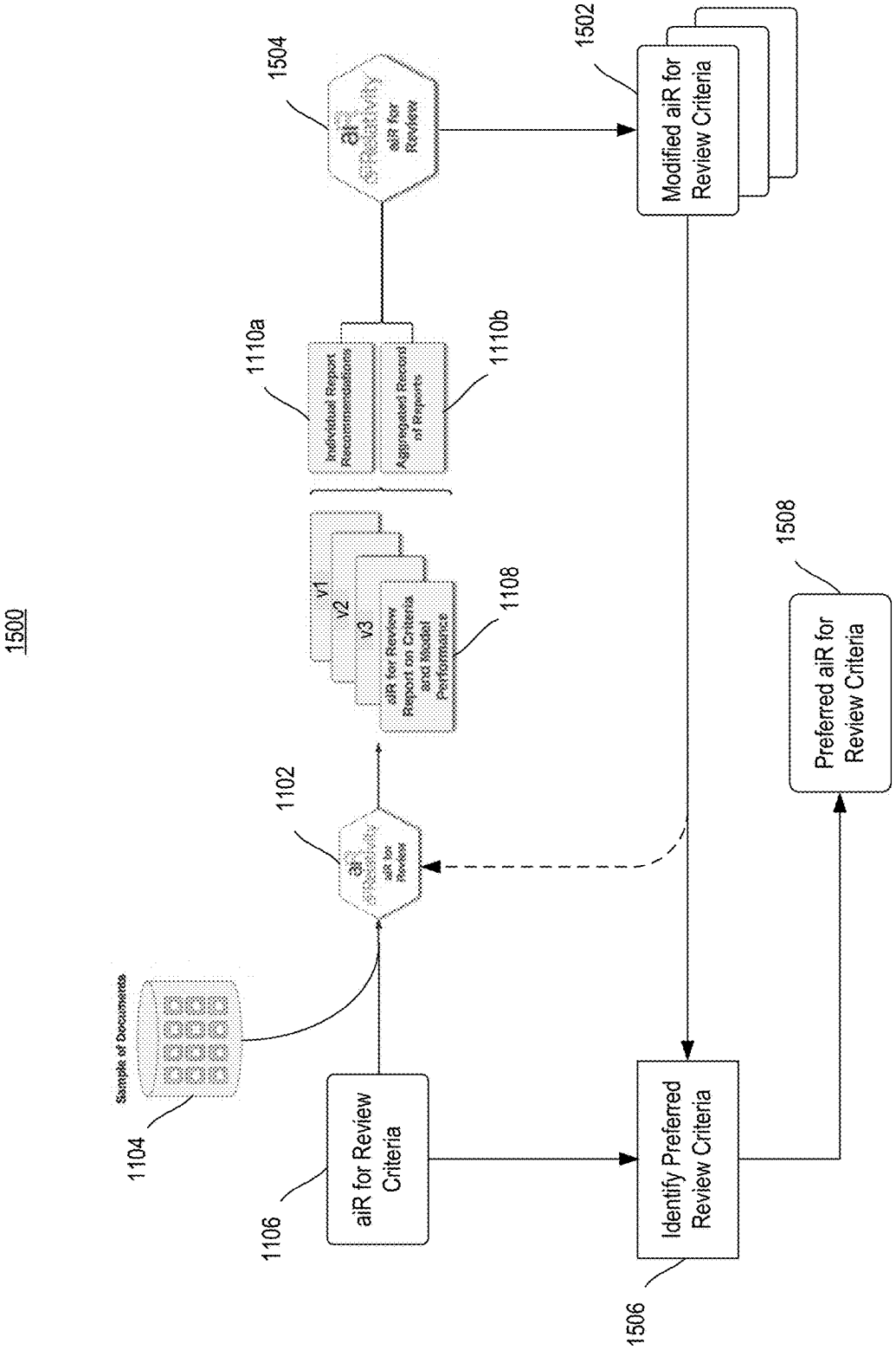

1500
1502
Modified aiR for Review Criteria
1504
aiR for Review
1110a
Individual Report Recommendations
1110b
Aggregated Record of Reports
1108
v1
v2
v3
aiR for Review Report on Criteria and Model Performance
1102
aiR for Review
1104
Sample of Documents
1106
aiR for Review Criteria
1506
Identify Preferred Review Criteria
1508
Preferred aiR for Review Criteria

FIG. 15

1600

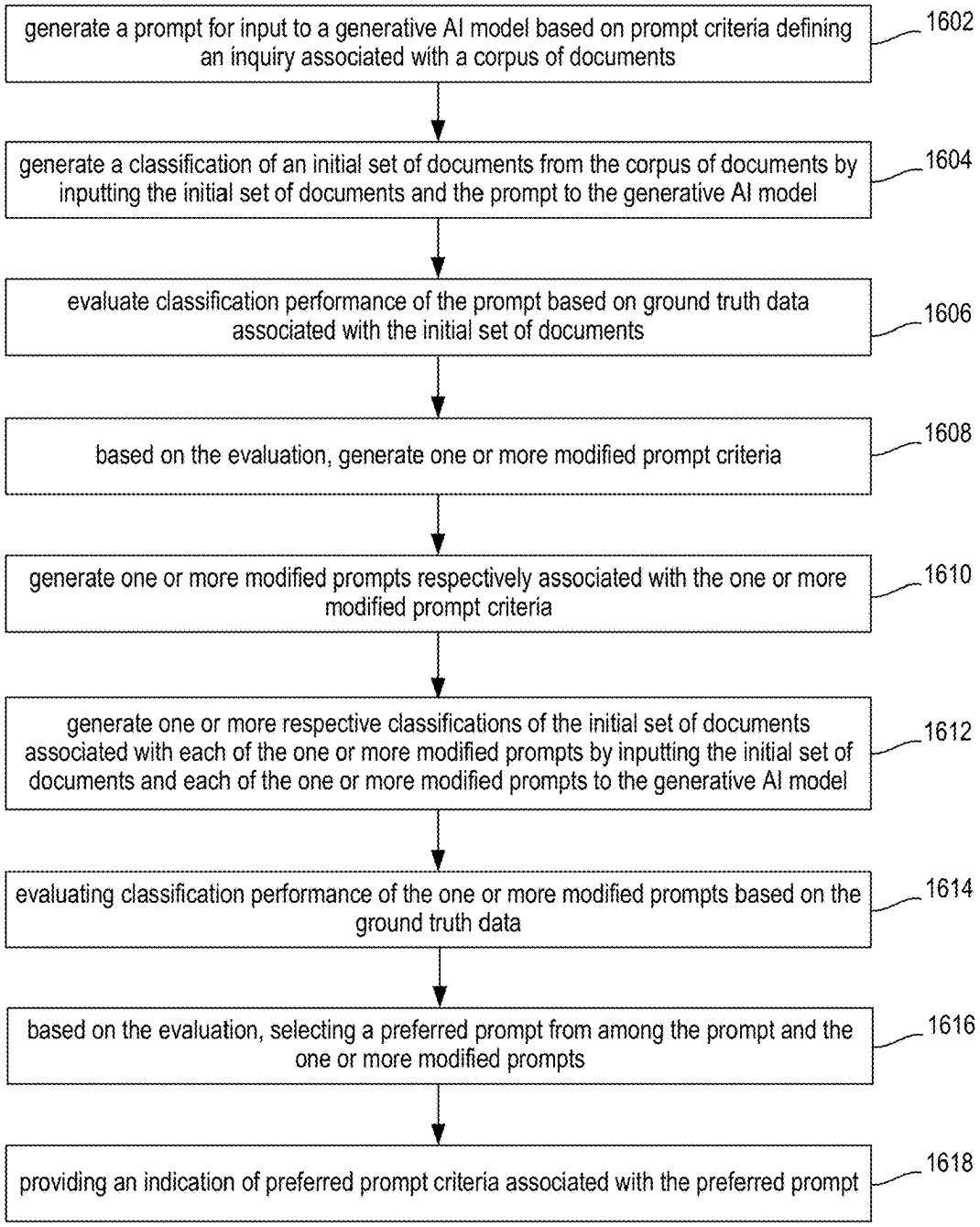

generate a prompt for input to a generative AI model based on prompt criteria defining an inquiry associated with a corpus of documents
1602
generate a classification of an initial set of documents from the corpus of documents by inputting the initial set of documents and the prompt to the generative AI model
1604
evaluate classification performance of the prompt based on ground truth data associated with the initial set of documents
1606
based on the evaluation, generate one or more modified prompt criteria
1608
generate one or more modified prompts respectively associated with the one or more modified prompt criteria
1610
generate one or more respective classifications of the initial set of documents associated with each of the one or more modified prompts by inputting the initial set of documents and each of the one or more modified prompts to the generative AI model
1612
evaluating classification performance of the one or more modified prompts based on the ground truth data
1614
based on the evaluation, selecting a preferred prompt from among the prompt and the one or more modified prompts
1616
providing an indication of preferred prompt criteria associated with the preferred prompt
1618

FIG. 16

1700

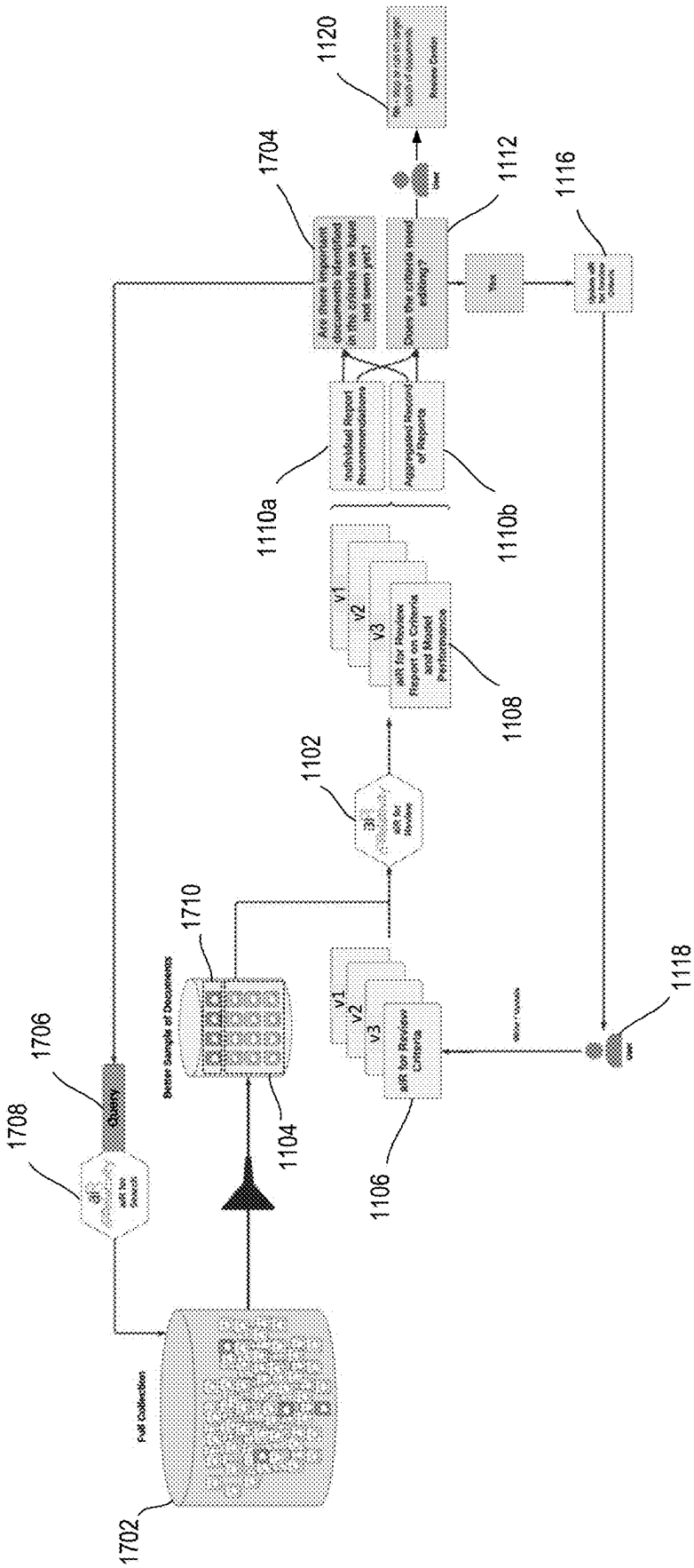

1702
Full Collection
1704
1706
Query
1708
1710
Better Sample of Documents
1104
1106
v1
v2
v3
1102
1108
v1
v2
v3
1110a
1110b
1112
1116
1118
1120

FIG. 17

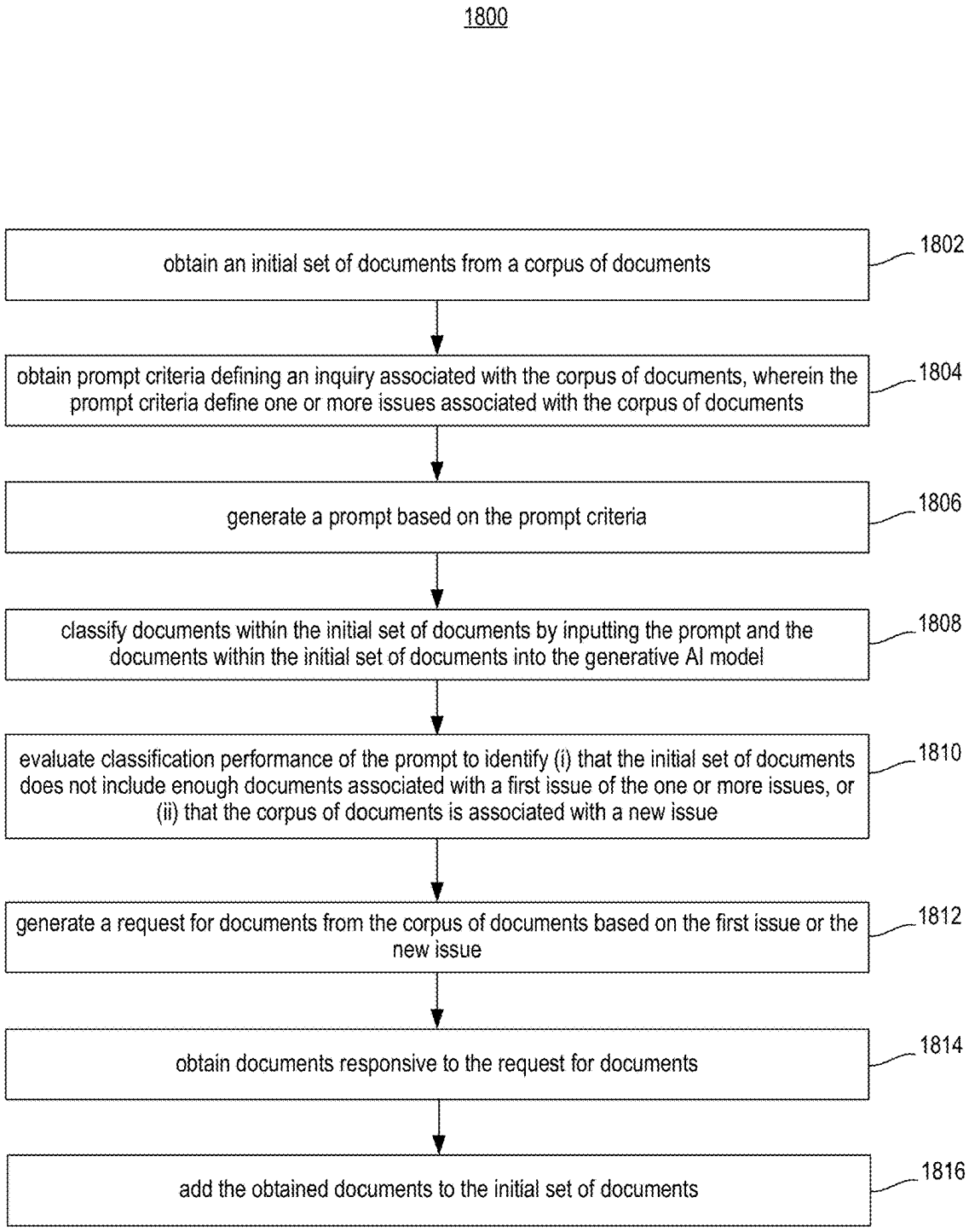

1800
obtain an initial set of documents from a corpus of documents
1802
obtain prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents
1804
generate a prompt based on the prompt criteria
1806
classify documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model
1808
evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue
1810
generate a request for documents from the corpus of documents based on the first issue or the new issue
1812
obtain documents responsive to the request for documents
1814
add the obtained documents to the initial set of documents
1816

FIG. 18

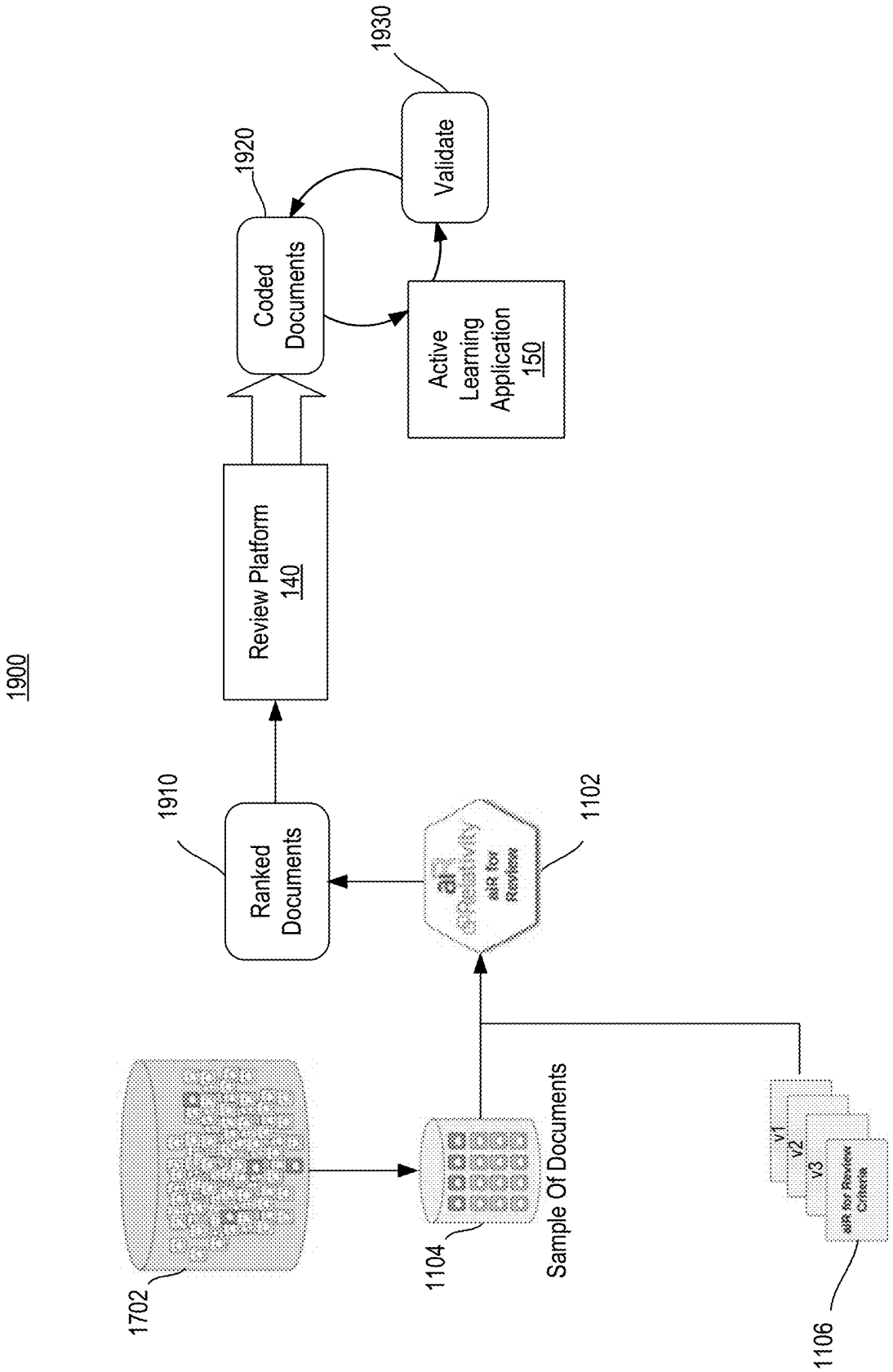

1900
Review Platform
140
Active
Learning
Application
150
Coded
Documents
1920
Validate
1930
Ranked
Documents
1910
1102
1702
1104
Sample Of Documents
1106

FIG. 19

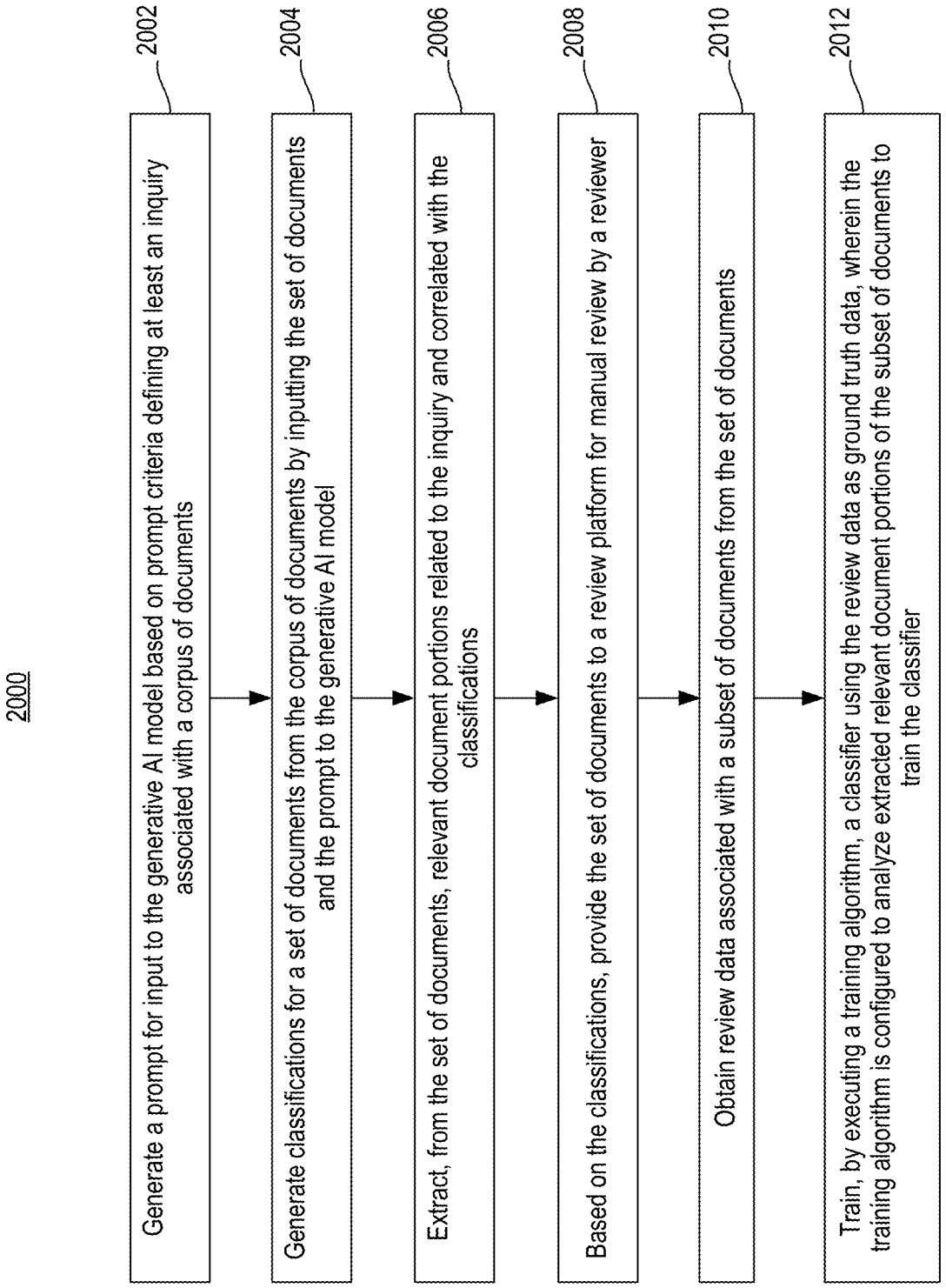

2000
2002
Generate a prompt for input to the generative AI model based on prompt criteria defining at least an inquiry associated with a corpus of documents
2004
Generate classifications for a set of documents from the corpus of documents by inputting the set of documents and the prompt to the generative AI model
2006
Extract, from the set of documents, relevant document portions related to the inquiry and correlated with the classifications
2008
Based on the classifications, provide the set of documents to a review platform for manual review by a reviewer
2010
Obtain review data associated with a subset of documents from the set of documents
2012
Train, by executing a training algorithm, a classifier using the review data as ground truth data, wherein the training algorithm is configured to analyze extracted relevant document portions of the subset of documents to train the classifier

FIG. 20

SYSTEMS AND METHODS FOR UPDATING A VALIDATION SAMPLE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of the filing date of (1) U.S. Provisional Application No. 63/552,278, entitled "Scalable Prompt Engineering for LLMs with Testing and Merging" (filed Feb. 12, 2024), (2) U.S. Provisional Application No. 63/559,660, entitled "Scalable Prompt Engineering for LLMs with Testing and Merging" (filed Feb. 29, 2024), (3) U.S. Provisional Application No. 63/702,637, entitled "Scalable Prompt Engineering with Testing and Merging" (filed Oct. 2, 2024), (4) U.S. Provisional Application No. 63/748,251, entitled "Scalable Prompt Engineering with Testing and Merging" (filed Jan. 22, 2025), (5) U.S. Provisional Application No. 63/757,288, entitled "Scalable Prompt Engineering with Testing and Merging" (filed Feb. 11, 2025), the entire contents of each of which is hereby expressly incorporated herein by reference.

FIELD

[0002] The present disclosure generally relates to generative artificial intelligence (AI), and more particularly relates to using generative AI to, among other things: (i) classify documents; (ii) generate prompts (and/or criteria for prompts) to classify documents; (iii) explain document classifications; and/or (iv) explain updates to prompts (and/or prompt criteria).

BACKGROUND

[0003] In the eDiscovery process commonly associated with litigation, for example, reviewers (e.g., attorneys) are commonly provided with a voluminous corpus of documents (e.g., emails, SMS communications, group texts, presentations, reports, spreadsheets, etc.) that conform to a discovery request. Thus, rather than manually review each document in the corpus, eDiscovery processes sometimes deploy machine learning models to identify documents responsive to an inquiry (e.g., identifying privileged documents, documents responsive to a discovery request, etc.).

[0004] However, in some instances, even deploying machine learning models may be cumbersome and inefficient. For example, different attorneys working on the same case may have different ideas about which documents should be indicated as responsive; and thus the attorneys may deploy the machine learning models in different ways, resulting in conflicting indications of responsiveness. As another example, training a machine learning classifier may require manual review of thousands of documents to generate a sufficient number of labeled training examples for the classifier to satisfy performance requirements.

[0005] The systems and methods disclosed herein provide solutions to these problems and may provide solutions to the ineffectiveness, insecurities, difficulties, inefficiencies, encumbrances, and/or other drawbacks of conventional techniques.

SUMMARY

[0006] In one aspect, a computer-implemented method for using a generative artificial intelligence (AI) model to classify documents may be provided. In one example, the method may include: (1) obtaining, via one or more processors, an initial set of documents from a corpus of documents; (2) obtaining, via the one or more processors, prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents; (3) generating, via the one or more processors, a prompt based on the prompt criteria; (4) classifying, via the one or more processors, documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model; (5) evaluating, via the one or more processors, classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue; (6) generating, via the one or more processors, a request for documents from the corpus of documents based on the first issue or the new issue; (7) obtaining, via the one or more processors, documents responsive to the request for documents; and (8) adding, via the one or more processors, the obtained documents to the initial set of documents.

[0007] In another aspect, a computer system for classifying documents may be provided. The one or more non-transitory memories having stored thereon computer-executable instructions that, when executed by the one or more processors, may cause the one or more processors to: (1) obtain an initial set of documents from a corpus of documents; (2) obtain prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents; (3) generate a prompt based on the prompt criteria; (4) classify documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model; (5) evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue; (6) generate a request for documents from the corpus of documents based on the first issue or the new issue; (7) obtain documents responsive to the request for documents; and (8) add the obtained documents to the initial set of documents.

[0008] In yet another aspect, a tangible, non-transitory computer readable medium storing computer-readable instructions for classifying documents may be provided. In one example, the tangible, non-transitory computer readable medium, when executed by one or more processors of a computer system, may cause the computer system to: (1) obtain an initial set of documents from a corpus of documents; (2) obtain prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents; (3) generate a prompt based on the prompt criteria; (4) classify documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model; (5) evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue; (6) generate a request for documents from the corpus of documents based on the first

issue or the new issue; (7) obtain documents responsive to the request for documents; and (8) add the obtained documents to the initial set of documents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Advantages will become more apparent to those skilled in the art from the following description of the preferred embodiments which have been shown and described by way of illustration. As will be realized, the present embodiments may be capable of other and different embodiments, and their details are capable of modification in various respects. Accordingly, the drawings and description are to be regarded as illustrative in nature and not as restrictive.

[0010] The figures described below depict various aspects of the applications, methods, and systems disclosed herein. It should be understood that each figure depicts an embodiment of a particular aspect of the disclosed applications, systems and methods, and that each of the figures is intended to accord with a possible embodiment thereof. Furthermore, wherever possible, the following description refers to the reference numerals included in the following figures, in which features depicted in multiple figures are designated with consistent reference numerals.

[0011] FIG. **1** illustrates an example computer environment for using a generative AI model to: (i) classify documents, and/or (ii) provide explanations in which the exemplary computer-implemented methods described herein may be implemented.

[0012] FIG. **2** illustrates an example screen allowing a user to enter criteria including setup criteria.

[0013] FIG. **3** illustrates an example screen allowing a user to enter criteria including case summary criteria.

[0014] FIG. **4** illustrates an example screen allowing a user to enter criteria including relevance criteria.

[0015] FIG. **5** illustrates an example screen allowing a user to enter criteria including key documents criteria.

[0016] FIG. **6** illustrates an example computer-implemented method of using a generative AI model to: (i) classify documents, and/or (ii) provide explanations.

[0017] FIG. **7** illustrates an example screen including example classifications of documents, and example explanations thereof.

[0018] FIG. **8** illustrates an example screen including a document classification and a document comment.

[0019] FIG. **9** illustrates an example implantation of merging document comments.

[0020] FIG. **10** illustrates an example computing system, according to an embodiment.

[0021] FIG. **11** illustrates an example combined block and logic diagram for iterative prompting of an example generative AI model.

[0022] FIG. **12** illustrates an example computer-implemented method for using a generative artificial intelligence (AI) model to classify documents.

[0023] FIG. **13** illustrates an example combined block and logic diagram for automated prompting of an example generative AI model.

[0024] FIG. **14** illustrates an example computer-implemented method for using a generative artificial intelligence (AI) model to classify documents.

[0025] FIG. **15** illustrates an example combined block and logic diagram for automated prompting of an example generative AI model.

[0026] FIG. **16** illustrates an example computer-implemented method for using a generative artificial intelligence (AI) model to classify documents.

[0027] FIG. **17** illustrates an example combined block and logic diagram for document sampling and prompt generation.

[0028] FIG. **18** illustrates an example computer-implemented method for using a generative artificial intelligence (AI) model to classify documents.

[0029] FIG. **19** illustrates an example combined block and logic diagram for training a classifier using an example generative AI model.

[0030] FIG. **20** illustrates an example computer-implemented method for using a generative artificial intelligence (AI) model to train a classifier.

DETAILED DESCRIPTION

[0031] The present techniques relate to generative artificial intelligence (AI), and more particularly relate to using generative AI to: (i) classify documents; (ii) generate prompts (and/or criteria for prompts) to classify documents; (iii) explain document classifications; and/or (iv) explain updates to prompts (and/or prompt criteria).

[0032] In some embodiments, these techniques are applied in the eDiscovery process. For example, in the eDiscovery process, reviewers (e.g., attorneys, etc.) are commonly provided with a voluminous corpus of documents (e.g., emails, SMS communications, group texts, presentations, reports, spreadsheets, etc.) that conform to a discovery request. Thus, rather than manually review each document in the corpus, eDiscovery processes commonly deploy machine learning models to identify documents responsive to an inquiry (e.g., identifying privileged documents, documents responsive to a discovery request, etc.). However, these machine learning processes involve a significant number of manually-labeled training examples before a classifier can be sufficiently trained to have statistical confidence in its performance with respect to remaining documents in the corpus. Thus, some conventional machine learning-based process involve a significant amount of manual review time before the machine learning classifiers can be deployed.

[0033] On the other hand, techniques described herein related to generating a prompt-based classification model that is used in conjunction with a generative AI model such that the generative AI model is able to accurately classify the documents. Said another way, techniques described herein relate to modifying a prompt that includes classification instructions for how a generative AI model is to classify a document, rather than training a machine learning classifier. As one example, the prompt-based model may include one more categories and/or criteria that indicate to the generative AI model how documents should be classified. For instance, one criterion may indicate that any emails mentioning the chief executive officer (CEO) of a company should be classified as responsive. Other examples will be described in more detail below. It should be appreciated that while the process of refining the prompt-based model described herein still involves manual review of outputs from the generative AI model, the amount of review is significantly less than required to train a conventional machine learning classifier.

[0034] As will be explained herein, there are unique challenges to overcome to efficiently implement a prompt-based classification model. As one example, different attorneys working on the same case may have different ideas

about which documents should be indicated as responsive; and thus the attorneys may input different criteria to generate the prompt, resulting in conflicting classifications of responsiveness. As another example, a first reviewer may review documents with respect to a first inquiry included in the prompt-based classification model. In this example, consolidating the feedback with respect to the first inquiry into the corresponding portion of the prompt-based classification model may still impact the performance of the model with respect to a second inquiry included in the prompt-based classification model. As another example, in some embodiments, a generative AI model may assist in updating the prompt (e.g., by reconciling different comments from different users). Accordingly, it may not always be clear why a document was classified in a particular way.

[0035] The systems and methods disclosed herein provide solutions to these problems and others.

Example Environment

[0036] To this end, FIG. **1** illustrates an exemplary computer environment **100** for using a generative AI model to: (i) classify documents, and/or (ii) provide explanations in which the exemplary computer-implemented methods described herein may be implemented. The high-level architecture includes both hardware and software applications, as well as various data communications channels for communicating data between the various hardware and software components.

[0037] As illustrated, the computing environment **100** includes a workspace **110** associated with a corpus of documents **105**, such as a set of documents associated with an eDiscovery project. Such documents in the corpus of documents **105** may have file types. Examples of the file type include: an email file, a word processing file, a spreadsheet file, an audio recording, imagery data (e.g., image and/or video data), a text message, etc.

[0038] The workspace **110** and/or the components thereof may be implemented as software modules within a cloud and/or distributed computing system (e.g., Amazon Web Services (AWS) or Microsoft Azure). Accordingly, the components of the workspace **110** may include separate logical addresses via which the components are accessible via a bus **115** or other messaging channel supported by the cloud computing system. In some embodiments, the workspace **110** includes multiple instances of the same component to increase the ability the parallelization for the various functions performed via the respective components.

[0039] To implement the computing environment **100**, a computing system may be used, such as computing system **1000** of the example of FIG. **10** to host and/or execute at least a portion of the workspace **110**. The computing system **1000** may include a computer **1010**. Components of the computer **1010** may include, but are not limited to, a processing unit **1020**, a system memory **1030**, and a system bus **1021** that couples various system components including the system memory **1030** to the processing unit **1020**. In some embodiments, the processing unit **1020** may include one or more parallel processing units capable of processing data in parallel with one another. The system bus **1021** may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, or a local bus, and may use any suitable bus architecture. By way of example, and not limitation, such architectures include the Industry Standard Architecture (ISA) bus, Micro Channel Architecture (MCA) bus, Enhanced ISA (EISA) bus, Video Electronics Standards Association (VESA) local bus, and Peripheral Component Interconnect (PCI) bus (also known as Mezzanine bus).

[0040] Computer **1010** may include a variety of computer-readable media. Computer-readable media may be any available media that can be accessed by computer **1010** and may include both volatile and nonvolatile media, and both removable and non-removable media. By way of example, and not limitation, computer-readable media may comprise computer storage media and communication media. Computer storage media may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. Computer storage media may include, but is not limited to, RAM, ROM, EEPROM, FLASH memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by computer **1010**.

[0041] Communication media typically embodies computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism, and may include any information delivery media. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media may include wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), infrared and other wireless media. Combinations of any of the above are also included within the scope of computer-readable media.

[0042] The system memory **1030** may include computer storage media in the form of volatile and/or nonvolatile memory such as read only memory (ROM) **1031** and random access memory (RAM) **1032**. A basic input/output system **1033** (BIOS), containing the basic routines that help to transfer information between elements within computer **1010**, such as during start-up, is typically stored in ROM **1031**. RAM **1032** typically contains data and/or program modules that are immediately accessible to, and/or presently being operated on, by processing unit **1020**. By way of example, and not limitation, FIG. **10** illustrates operating system **1034**, application programs **1035**, other program modules **1036**, and program data **1037**. For example, the application programs **1035**, the program modules **1036** and/or the program **1037** may include any of the applications executed within the workspace **110**.

[0043] The computer **1010** may also include other removable/non-removable, volatile/nonvolatile computer storage media. By way of example only, FIG. **10** illustrates a hard disk drive **1041** that reads from or writes to non-removable, nonvolatile magnetic media, a magnetic disk drive **1051** that reads from or writes to a removable, nonvolatile magnetic disk **1052**, and an optical disk drive **1055** that reads from or writes to a removable, nonvolatile optical disk **1056** such as a CD ROM or other optical media. Other removable/non-removable, volatile/nonvolatile computer storage media that can be used in the exemplary operating environment include, but are not limited to, magnetic tape cassettes, flash

memory cards, digital versatile disks, digital video tape, solid state RAM, solid state ROM, and the like. The hard disk drive **1041** may be connected to the system bus **1021** through a non-removable memory interface such as interface **1040**, and magnetic disk drive **1051** and optical disk drive **1055** may be connected to the system bus **1021** by a removable memory interface, such as interface **1050**.

[0044] The drives and their associated computer storage media discussed above and illustrated in FIG. **10** provide storage of computer-readable instructions, data structures, program modules and other data for the computer **1010**. In FIG. **10**, for example, hard disk drive **1041** is illustrated as storing operating system **1044**, application programs **1045**, other program modules **1046**, and program data **1047**. Note that these components can either be the same as or different from operating system **1034**, application programs **1035**, other program modules **1036**, and program data **1037**. Operating system **1044**, application programs **1045**, other program modules **1046**, and program data **1047** are given different numbers here to illustrate that, at a minimum, they are different copies. A user may enter commands and information into the computer **1010** through input devices such as cursor control device **1061** (e.g., a mouse, trackball, touch pad, etc.) and keyboard **1062**. A monitor **1091** or other type of display device is also connected to the system bus **1021** via an interface, such as a video interface **1090**. In addition to the monitor, computers may also include other peripheral output devices such as printer **1096**, which may be connected through an output peripheral interface **1095**.

[0045] The computer **1010** may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer **1080**. The remote computer **1080** may be a personal computer, a server, a router, a network PC, a peer device or other common network node, and may include many or all of the elements described above relative to the computer **1010**, although only a memory storage device **1081** has been illustrated in FIG. **10**. The logical connections depicted in FIG. **10** include a local area network (LAN) **1071** and a wide area network (WAN) **1073**, but may also include other networks. Such networking environments are commonplace in hospitals, offices, enterprise-wide computer networks, intranets and the Internet.

[0046] When used in a LAN networking environment, the computer **1010** is connected to the LAN **1071** through a network interface or adapter **1070**. When used in a WAN networking environment, the computer **1010** may include a modem **1072** or other means for establishing communications over the WAN **1073**, such as the Internet. The modem **1072**, which may be internal or external, may be connected to the system bus **1021** via the input interface **1060**, or other appropriate mechanism. The communications connections **1070**, **1072**, which allow the device to communicate with other devices, are an example of communication media, as discussed above. In a networked environment, program modules depicted relative to the computer **1010**, or portions thereof, may be stored in the remote memory storage device **1081**. By way of example, and not limitation, FIG. **10** illustrates remote application programs **1085** as residing on memory device **1081**.

[0047] The techniques for training a prompt based classification model described herein may be implemented in part or in their entirety within a computing system such as the computing system **1000** illustrated in FIG. **10**. In some embodiments, the computing system **1000** is a server computing system communicatively coupled to a local workstation (e.g., a remote computer **1080**) via which a user interfaces with the computing the computing system **1000**. For example, the computer **1010** may be configured to present one or more user interfaces at a local workstation (e.g., a client device) for presentation thereat to receive descriptions of the classification model and/or to present outputs of the prompt-based classification model.

[0048] In some embodiments, the computing system **1000** may include any number of computers **1010** configured in a cloud or distributed computing arrangement. Accordingly, the computing system **1000** may include a cloud computing manager system (not depicted) that efficiently distributes the performance of the functions described herein between the computers **1010** based on, for example, a resource availability of the respective processing units **1020** or system memories **1030** of the computers **1010**. In these embodiments, the documents in the corpus of documents and/or the data associated with the prompt-based classification model may be stored in a cloud or distributed storage system (not depicted) accessible via the interfaces **1071** or **1073**. Accordingly, the computer **1010** may communicate with the cloud storage system to access the documents within the corpus of documents, for example, when generating an embedding vector as part of the model training process.

[0049] As illustrated, the workspace **110** includes various modules and/or applications that can be executed within the workspace **110**. For example, workspace **110** may include the prompt generation application **123**, the prompt evaluation application **124**, the first generative AI model **125**, the second generative AI model **126**, the generative AI model training application **128**, the documents sampling application **130**, and/or the active learning application **150**. In some embodiments, the first generative AI model **125** is used to classify documents and the second generative AI model **126** is used to modify prompts based on user comments. In other embodiments, the first generative AI model **125** performs both tasks. Generally, the first generative AI model **125** and the second generative AI model **126** may be large-scale deep neural networks capable of processing and generating media/content such as text, speech, audio, images, videos, etc. In some embodiments, the generative AI model **125** and the generative AI model **126** may include specialized architectural features that improve performance (e.g., content interpretation and generation) within a topic or concept. For example, the generative AI model **125** and the generative AI model **126** may include architectural features that improve chain of thought reasoning by selectively activating portions of the model based on the input to the model. In some instances, these specialized architectural features may result in the generative AI model **125** and the second generative AI model **126** being a "reasoning model."

[0050] In operation, the applications executing within the workspace **110** may be configured to facilitate the classification of documents in the corpus of documents **105**. Accordingly, the corpus of documents **105** may be stored at one or more locations, including a local database or cache **118** and/or a remote storage system (not depicted), such as a data lake or other cloud-storage system. Additionally or alternatively, the prompt generation application **123** may be configured to present a user interface by which a user may define prompt criteria that are used to define the classification performed by the prompt-based classification model

used in conjunction with the first generative AI model **125** to classify a document. Additionally and/or alternatively, the prompt criteria may define relevancy criteria and issues associated with an inquiry related to the corpus of documents **105** and/or relevancy criteria and issues associated with the classification performed by the prompt-based classification model used in conjunction with the first generative AI model **125** to classify a document or set of documents from the corpus of documents **105**. For example, if the corpus of documents **105** is associated with a lawsuit, relevancy criteria may describe how to assess whether a document is relevant to a production request, and the issues may relate to the component elements of the lawsuit that need to be proved. The prompt generation application **123** may supplement the prompt criteria with additional context defining how the first generative AI model **125** is to interpret the prompt criteria to classify a document. The prompt criteria, the additional context, and a target document may be converted into a prompt that is input into the first generative AI model **125**. For example, the prompt generation application **123** may include language defining the nature of the prompt criteria, specify what the generative AI model is to output (such as the classification, a description of why the classification was applied, context in the document that led to classification, etc.). The outputs of the generative AI model may then be presented via the review platform **140**.

[0051] The prompt criteria may be provided by the first user **160** (e.g., via the first user device **165**) and/or the second user **170** (e.g., via the second user device **175**) via a graphical user interface presented by the prompt generation application **123**. Examples of the first user **160** and/or second user **170** include attorneys, prompt engineers, case managers, reviewers, anyone involved in a document review process, etc. Accordingly, examples of the first user device **165** and/or the second user device **175** include user devices of: attorneys, prompt engineers, case managers, reviewers, anyone involved in a document review process, etc. In this regard, examples of the first user device **165** and/or the second user device **175** may include any suitable device(s), such as a computer, a mobile device, a smartphone, a laptop, a phablet, a chatbot or voice bot, etc. The first user device **165** and/or the second user device **175** may include one or more display devices, one or more processors, one or more memories, etc.

[0052] The prompt evaluation application **124** may be configured to evaluate the classification performance of a prompt that is generated based on the prompt criteria, with respect to an input set of documents (e.g., an initial set of documents that includes a sufficient number of examples of each classification type with corresponding instructions included in the prompt). Accordingly, the prompt evaluation application **124** may be configured to generate one or more classification performance metrics with respect to the relevance criteria and/or issues associated therewith across the set of documents. For example, the metrics may include recall, precision, elusion, and/or other classification metrics known in the art. It should be appreciated that because a single prompt to the generative AI model **125** may include classification instructions for the relevance criteria and any component issues, modifying the prompt criteria associated with an issue may impact the classification performance with respect to the other classifications defined in the prompt, such as, the relevancy criteria. Accordingly, the prompt evaluation application **124** may be configured to track classification performance (e.g., over time and/or as modifications to the prompt criteria are manually or automatically made) with respect to the relevancy criteria and each issue to detect any potential unintentional performance impacts of modifications to the prompt criteria.

[0053] The document sampling application **130** may be configured to obtain samples of documents from the corpus of documents **105**. Generally, samples of documents from the corpus of documents **105** may be used (e.g., by the prompt evaluation application **124**) to evaluate the classification performance of a prompt (e.g., a prompt generated by the prompt generation application **123**). Additionally, the document sampling application **130** may be configured to obtain documents from the corpus of documents **105** on a random basis, a statistical basis, a diversity basis, and/or a deterministic basis. For example, the document sampling application **130** may be configured to obtain an initial random sample of documents from the corpus of documents **105**. In some embodiments, the documents sampling application **130** may obtain a sample of documents, or an additional sample of documents, from the corpus of documents **105** based on the classification performance of a prompt. For example, the prompt evaluation application **124** may determine that an initial sample of documents obtained by the document sampling application **130** does not include enough documents associated with a particular issue defined by the prompt criteria, and in response, the documents sampling application **130** may obtain additional documents associated with the particular issue from the corpus of documents **105**. In some embodiments, the documents sampling application **130** may be configured to evaluate the prompt criteria and/or the associated classification performance (e.g., performance reports generated by the prompt evaluation application **124**), a vector space associated with the corpus of documents **105**, a knowledge graph of facts associated with the corpus of documents, and/or or additional information/data of the workspace **110** to determine whether a sample of documents is sufficient.

[0054] As illustrated, the workspace **110** includes a review platform **140** to facilitate manual review of any documents. In some embodiments, the review platform **140** may be configured to present one or more graphical user interface (GUIs) on the first user device **165** and/or the second user device **175**. Accordingly, the review platform **140** and the first user device **165** and/or the second user device **175** may be communicatively coupled via one or more communication networks. For example, the communication networks one or more wired and/or wireless local area networks (LANs), and/or one or more wired and/or wireless wide area networks (WANs), such as the Internet.

[0055] The active learning application **150** may include a trained active learning classifier, such as a support vector machine (SVM), a neural network, or another suitable machine learning classifier. Generally, the active learning application **150** may be configured to train a classifier (e.g., the active learning classifier) using coded documents (e.g., reviewer provided coding decisions for documents via the review platform **140**) from the corpus of documents **105**. In some embodiments, the active learning application **150** may implement an initial training phase for a machine learning classifier/model, wherein the classifier is trained using a suitable machine learning training algorithm (e.g., logistic regression algorithm). Additionally, the active learning

application **150** may be configured to implement an active learning training loop for a machine learning classifier whereby a queue-based strategy to select the most informative documents for review is implemented (e.g., via the review platform **140**), documents are labeled by a human reviewer (e.g., via the review platform **140**), and the labeled documents are provided to the machine learning classifier training algorithm for further training of the classifier.

[0056] Additionally, to determine when the active training loop is complete, the active learning application **150** may validate the trained classifier against a validation set (e.g., labelled documents not used for training) to evaluate the performance of the trained classifier. Based on the evaluation, the active learning application **150** may repeat the active learning training loop until satisfactory performance for the trained machine learning classifier has been reached. It should be noted that the active learning application **150** may implemented as one or more software modules within a cloud and/or distributed computing system. Example techniques for training a machine learning classifier using an active learning training process are described in U.S. application Ser. No. 11/409,589 (Attorney Docket No. 32646/54395), entitled "Methods and Systems for Determining Stopping Point", filed Oct. 22, 2020, the entire disclosure of which is hereby incorporated by reference.

[0057] Furthermore, although the example environment **100** illustrates only one of each of the components, any number of the example components are contemplated (e.g., any number of computing devices, first user devices, second user devices, databases, etc.).

Example Prompt Criteria

[0058] As mentioned above, the first user device **165** and/or the second user device **175** may provide prompt criteria to the prompt generation application **123** to provide a definition for a prompt-based classification model that is used to classify a document via a generative AI model. Broadly speaking, the prompt criteria may include any criteria that may be used to explain how documents may be classified. Examples of the prompt criteria include: setup, case summary, relevance, and/or key documents. Furthermore, each of the prompt criteria may have a criteria category, as will be discussed further below.

[0059] FIG. **2** depicts an example screen **200** (e.g., a prompt criteria editor interface), which may be generated by the prompt generation application **123**. As illustrated, the example screen **200** includes selectable categories **210** corresponding to different types of user inputs related to the prompt-classification model that may be specified via the prompt generation application **123** (e.g., setup, case summary, relevance, and key documents). In the illustrated example, the example screen **200** is configured to receive setup input.

[0060] As illustrated, the example screen **200** enables the user to enter the input data **220** defining the configuration of the prompt-based classification model. It should be appreciated that the input data **220** may define information associated with the prompt-based classification model that is not used within the prompt-based classification model itself.

[0061] In the illustrated example, the input data **220** includes an analysis name for naming the prompt-based classification model. The name may be associated with a classification model object that is maintained in the workspace **110**. The name may be used to distinguish between multiple prompt-based classification models within the workspace **110**.

[0062] The input data **220** also includes description field to provide a high-level description of the prompt-based classification model. The description may be provided such that users are able to identify the particular analysis performed by the prompt-classification model, for example, such that a user that has access to multiple classification models (prompt-based or traditional ML) understands the purpose of the defined prompt-based classification model. For example the description may state, e.g., "1,000,000 documents for case no. xx-xxxx will be reviewed to respond to discovery request pertaining to topic ABC."

[0063] It should be appreciated that corpus of documents the model acts upon may change over time (e.g., as additional documents are collected or the scope of the inquiry changes). Accordingly, in the prior example, if workspace **110** ingested more than 1,000,000 documents, the model can still be used to classify the documents in excess of 1,000,000. Additionally, in some embodiments, the model may be stored and utilized with completely different datasets than the dataset for which the model was created.

[0064] The analysis type input data **220** is a drop down that is used to signal to the prompt generation application **123** the type of classification task being performed by the prompt-based classification model. The selection of the analysis type may change the specific fields of prompt criteria presented to the user and/or change the additional context added to the prompt criteria by the prompt generation application **123**. For example, the analysis type drop down may enable the user to specify analysis types of: (i) relevance and key documents, (ii) confidential, (iii) privileged, etc.

[0065] FIG. **3** depicts an example screen **300** (e.g., a prompt criteria editor interface), which may be generated by the prompt generation application **123**. As illustrated, the example screen **300** includes selectable categories **310** corresponding to different types of user inputs that may be specified via the prompt generation application **123** (e.g., setup, case summary, relevance, and key documents). In the illustrated example, the example screen **300** is configured to receive user inputs related to case summary prompt criteria.

[0066] As illustrated, the example screen **300** enables the user to enter case summary prompt criteria **320**. The case summary prompt criteria may relate to a summary of the case.

[0067] As one example, the prompt criteria **320** may include a matter overview field. The matter overview field enables the user to enter a description over the overall matter the associated with the corpus of the documents. That is, the matter overview may be used to describe the overall nature of the dispute, as opposed to the specific inquiry to which the prompt-based classification model is being used respond. Accordingly, the matter overview field may include a description of the basic facts of the case, allegations made against a defendant, etc.

[0068] As another example, the prompt criteria **320** may include a people and aliases field via which the user defines key individuals. For example, the same individual may be referenced in different manners across the corpus of documents **105** (e.g., full name vs. nickname, work email vs. personal email, etc.). Accordingly, the aliases field enables the user to signal to the generative AI model that different

aliases of the individual refer back to the same person. The aliases filed also enable the user to input job titles and/or roles associated with the individual to provide additional context as the role of the listed individuals.

[0069] As another example, the prompt criteria **320** includes a noteworthy entities field that enables the user to define entities (such as companies, law firms, etc.) related to the matter. For example, the user may define the entity's relationship to the matter and provide a brief description of their operations. Similar to the aliases field, the entities filed may enable the user to define other names for the entities (e.g., a d/b/a name, a shorthand, a colloquial name, etc.).

[0070] As yet another example, the prompt criteria **320** also includes a noteworthy terms field. This enables the user to provide context related to specific terms that is particular to matter and would not be understood from the term's general usage. For example, the user may define slang terms used in the field and/or by the individuals and/or entities, project names used to refer to particular undertakings, codewords used to refer to specific activities performed by individuals.

[0071] Additionally, the prompt criteria **320** may include an "additional context" field that enables the user to define any other information that may be important for the generative AI models to be aware of when performing the classification.

[0072] It should be appreciated that in some embodiments, the workspace **110** includes a set of objects defining the people, entities, and/or terms. In these embodiments, the prompt generation application **123** may parse the fields to identify specific individuals, entities, and/or terms entered by the user and provide additional context maintained in the workspace objects.

[0073] FIG. **4** depicts an example screen **400** (e.g., a prompt criteria editor interface), which may be generated by the prompt generation application **123**. As illustrated, the example screen **400** includes selectable categories **410** (e.g., setup, case summary, relevance, and key documents) corresponding to different types of user inputs that may be specified via the prompt generation application **123**. In the illustrated example, the example screen **400** is configured to receive user inputs defining relevance as it relates to the inquiry.

[0074] As illustrated, the example screen **400** enables the user to enter relevance prompt criteria **420**, **422**. It should be appreciated that "relevance" may be different depending on the particular inquiry the prompt-based classification model is intended to classify. For example, the criteria **420** may be used to define relevance as it relates to responsiveness to an eDiscovery inquiry. Accordingly, the relevance field **420** may enable the user to input a text description defining the scope of relevant documents (e.g., a subject matter discussed in the document, a person or entity involved in the communication, timing criteria associated with the document, etc.). The criteria **420** may be used by the generative AI models when deciding whether or not an input document is relevant.

[0075] As another example, the example screen **400** enables the user to enter choice prompt criteria **422** related to individual issues (e.g., issue A **422***a*, and issue B **422***b*) that are related to the matter. For example, the issues may relate to specific elements that need to be proven as part of prima facie case or an affirmative defense in an eDiscovery matter. Accordingly, the criteria **422** enable the user to enter a description defining how to identify documents that are relevant to each issue associated with the prompt-based classification model.

[0076] FIG. **5** depicts an example screen **500** (e.g., a prompt criteria editor interface), which may be generated by the prompt generation application **123**. As illustrated, the example screen **500** includes selectable categories **510** (e.g., setup, case summary, relevance, and key documents). In the illustrated example, the example screen **500** may be configured to receive user inputs defining key documents prompt criteria. As indicated in FIG. **5**, a key document is a document that is significant to the matter, such as a document that is likely to be cited in a brief and/or presented as an exhibit. Accordingly, the example screen **500** includes a field via which the user is able to input information defining the types of documents that are likely to be "key documents" in the matter.

[0077] It should be appreciated that the relevance criteria **420**, the issue criteria **422**, and key document criteria **520** relate to different inquiries into the corpus of documents **105**. As will be explained below, the prompt generation application **123** may be configured to supplement the criteria **420**, **422**, and **520** with additional context such that a single prompt causes the generative AI model is able to perform each respective classification. Thus, rather than training and invoking a separate machine learning classifier for each inquiry, the prompt-based classification model enables the workspace **110** to perform multiple classifications of a document with a single call to the generative AI application programming interface (API).

Example Methods

[0078] FIG. **6** illustrates a flow diagram representing an example computer-implemented method **600** for using a generative artificial intelligence (AI) model to classify documents and/or provide explanations. The example method **600** may be implemented by a computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **600**.

[0079] The example method **600** may begin at block **602** when the prompt generation application **123** obtains at least one prompt criteria. Examples of the prompt criteria are described elsewhere herein, and may include: case summary criteria **320** of FIG. **3**; relevance criteria **420** and/or issue criteria **422** of FIG. **4**; and key documents criteria of FIG. **5**.

[0080] In some embodiments, the prompt generation application **123** obtains the at least one prompt criteria by receiving the at least one prompt criteria from the first user device **165** and/or the second user device **175**. For example, the first user **160** and/or second user **170** may enter the prompt criteria into a prompt criteria editor interface (e.g., any of screens **200**, **300**, **400**, **500**, etc.) of the first user device **165** and/or the second user device **175**, which may be sent to the workspace **110**.

[0081] At block **604**, the prompt generation application **123** generates a first prompt based upon the at least one prompt criteria. In some examples, the prompt is generated by supplementing the at least one prompt criteria with additional context. For example, the additional context may define how a generative AI model is to interpret each of the at least one prompt criteria. For example, the additional context may be text defining what it means for a document

to be "relevant." As another example, the prompt generation application **123** may parse the input criteria to provide additional context from the workspace **110** (e.g., additional context data stored at the database **118**).

[0082] As another example, the additional context may provide a rubric for how a generative AI is to output the classification. For example, the rubric may define a 5-point scale used to classify documents. In this example, 0 may correspond to junk, 1 may correspond to documents that are non-responsive, 2 may correspond to documents that are borderline responsive, 3 may correspond to documents that are responsive, and 4 may correspond to documents that are very responsive. Of course, other scales and/or rubrics may be defined based on the particular inquiry being performed. Accordingly, the additional context may define the meaning of each classification output to a generative AI model. As a result, the classification outputs of the generative AI model are in a predictable and consistent format.

[0083] At block **606**, the prompt generation application **123** inputs the prompt and a first document into the generative AI model **125** to obtain a classification of the first document. The first document may be part of a corpus of documents (e.g., stored at the database **118**, the memory **122**, or any other suitable storage location). The classifications may be any suitable classifications. In some examples, the classifications are binary (e.g., responsive or not responsive to an inquiry, etc.). In other examples, the classification may include a gradient of certainty with respect to the classification, for instance, classifications may include: junk; responsive; not responsive; likely responsive; likely not responsive, borderline; very responsive; etc. Examples of other types of classification include privileged vs. not privileged; confidential vs. not confidential; etc. As described above, the classification may be in accordance with a rubric defined in the additional context generated by the prompt generation application **123**.

[0084] At block **608**, the first generative AI model **125** generates an explanation of why the first document was classified as it was. The explanation may be generated using the same prompt that produced the classifications. Accordingly, the prompt generation application **123** may be configured to parse the outputs of the generative AI model **125** to segment the output into the various fields described herein, including those illustrated in FIG. **7**. For example, the generative AI model may output a brief summary explaining the classification, identify the criteria that most heavily influenced the classification, identify the portion of the document that resulted in the classification, identify a potential counter-argument or shortcoming in its classification, and/or provide other types of data explaining the classification. It should be appreciated that the prompt generation application **123** may be configured to supplement the prompt criteria with instructions for generating the explanatory information associated with the classification when creating the prompt that is input into the generative AI model.

[0085] In some embodiments, the generative AI model **125** also outputs a confidence score associated with a confidence in the output classification. It should be appreciated that because the generative AI model **125** is not a traditional machine learning classifier model (such as a support vector machines (SVM) classifier); for example, the score is generally not tied to a mathematical meaning. That is, while the prompt engineering techniques disclosed herein may cause the generative AI model **125** may consistently output confidence scores, there is no inherent relationship to the confidence scores when applying traditional machine learning classifiers. Accordingly, techniques disclosed herein relate to analyzing the confidence scores across a plurality of documents to generate a factor that normalizes the output of the generative AI model **125** to a scale that reflects the traditional understanding classifier confidence scores. However, in some variations, the prompt generation application **123** supplements the prompt with additional context to such that the confidence scores produced by the generative AI model **125** may be utilized as a classification probability.

[0086] The classification and/or the explanatory information may be presented to a user (e.g., via a document review user interface of the review platform **140**). For example, FIG. **7** shows an example screen **700** indicating the classifications and explanatory information for a plurality of documents included in the corpus of document. For example, the example screen **700** may include columns that, for each classified document, indicate, a control number **720**, a classification **730**, a citation to the document **740** indicative of a portion of the document that influenced the classification **730**, an explanation **750** of why model classified the document with the classification **730**, and consideration **760** referencing potential shortcomings or defects in the reasoning that resulted in the classification. It should be appreciated that the columns may be sortable to facilitate the identification documents associated with different classifications and/or explanatory information. For example, a user may want to review the classifications **730** applied to each document classified as "responsive."

[0087] At block **610**, the prompt generation application **123** obtains review data associated with the first document. For example, FIG. **8** shows an example screen **800** presented by the review platform **140** displaying the classification and the explanatory information for the classifications associated with a single document. As illustrated, the example screen **800** enables a user to review the classification output by the generative AI model **125** and provide review data indicative of the accuracy of the classification. For example, the example screen **800** includes a manual classification interface **810** (e.g., a document review interface) that enables the user to manually apply a classification label to the displayed document. As illustrated, the interface **810** may include an indication of the classification applied the generative AI model **125**. Accordingly, the review data may include an indication of whether or not manual classification of the document agrees with the classification applied by the generative AI model.

[0088] The review data related to whether or not the user and the generative AI model **125** may be used, for example, to determine one or more statistics indicative of whether the generated prompt exhibits sufficient performance to be used to classify the corpus of documents **105**. It should be appreciated that the statistics generated related to performance of the generative AI model **125** as compared to the human reviewer may be the same statistics used when evaluating the performance of a traditional ML classifier. Accordingly, by ensuring that the prompt-based classification model causes the generative AI model **125** to meet the same performance metrics as traditional ML classifiers, a user of the prompt-based classification model is able to provide defensible confidence in the accuracy of the model.

[0089] As another example of review data, the example screen **800** includes a comment interface **830** that enables a reviewer to input a comment explaining the error in the reasoning output by the generative AI model **125** and/or how the reviewer would update the prompt criteria to prevent the generative AI model from misclassifying the document. In some embodiments, these comments may be provided to a case administrator to resolve into a final version of prompt-based classification model. In other embodiments, the reviewer may be able to directly update the prompt criteria. In these embodiments, the review platform **140** may be able to generate review data for multiple versions of the prompt-based classification model to identify which version performs the best and/or performs the best with respect to particular documents and/or inquiries.

[0090] It should be appreciated that obtaining an explanation related to the reasoning behind the classification is not generally possible when using traditional ML classifiers. In systems using only traditional ML classifiers, the output is typically a classification and/or a confidence score in the classification. Accordingly, the user is provided little to no context as to why the ML classifier applied a particular label to a document. As a result, it is often difficult to troubleshoot or explain any discrepancy between the trained ML classifier and a human reviewer (should one arise).

[0091] Returning now to FIG. **6**, at block **612**, the prompt generation application **123** updates the at least one prompt criteria based on the classification of the first document and/or the review data. For example, if a document comment indicated to mark emails from a previously-unknown alias CEO alias as responsive, the people and aliases prompt criteria may be updated to include the new alias. In another example, if a threshold number of documents referencing XYZ corp. were classified as responsive, the noteworthy entities prompt criteria may be updated to include XYZ corp.

[0092] To this end, FIG. **9** depicts an example implementation of merging document comments. At block **902**, the prompt generation application **123** obtains first review data comprising a first comment associated with the first document. At block **904**, the prompt generation application **123** obtains second review data comprising a second comment associated with the first document.

[0093] At block **906**, the first generative AI model **125** and/or second generative AI model **126** determines if contradiction exists between the first comment and the second comment. Examples of contradictions include: different classifications of the same document (e.g., the first comment indicates the first document should be classified as responsive, but the second comment indicates the first document should be classified as not responsive); contradictory indications as to how to classify a type of document (e.g., one comment indicates that spreadsheets are responsive, whereas another comment indicates that spreadsheets are not responsive); contradictions regarding a person (e.g., one comment indicates that emails from the CEO are responsive, and another comment indicates that they are not responsive); etc.

[0094] If no contradiction is found, the first and second comments are added together (block **908**). If a contradiction is found, the first comment and the second comment are merged based on a priority associated with each comment (e.g., a priority associated with the users, user profiles, and/or user devices that submitted the document comments) (block **910**). For example, a CEO may utilize different names or titles depending on the audience of their communication. If a higher ranking attorney (e.g., having a higher priority) indicated that emails using a particular alias (such as an alias not included in the criteria **320**) as being responsive as being generated by the CEO, but a lower ranking attorney (e.g., having a lower priority) indicated that such emails were not responsive, the conflict would be resolved in favor of the higher ranking attorney, whereby the merged comments would indicate that emails from the previously-unknown alias should be classified as responsive. In some such examples, noncontradictory parts of the comments are still included in the merged document comments. For instance, if, in the preceding example, the lower ranking attorney's comment had included additional portions beyond the indication that emails from the CEO were not responsive, the additional portions would be included in the merged comments.

[0095] In some embodiments, the updating the at least one prompt criteria includes generating a proposed update to the at least one prompt criteria by inputting, into a generative AI model (such as the generative AI model **125** or the generative AI model **126**), the prompt criteria and any document comments to obtain one or more proposals for resolving the comments. The proposed updates to the at least one prompt criteria may be presented to a user **160**, **170** via a display (e.g., via a prompt criteria editor interface) of the user device **165**, **175**. The user **160**, **170** may, via a display (e.g., via a prompt criteria editor interface) of the user device **165**, **175**, accept (e.g., confirm that the proposed update is acceptable), reject, or modify the proposal.

[0096] At optional block **614**, the first generative AI model **125** and/or second generative AI model **126** generates an explanation of the update to the at least one prompt criteria. For example, the explanation may explain that the one or more prompt criteria has been updated to include all emails from the CEO because a number of emails from the CEO have been classified as responsive (e.g., by the user **160**, etc.).

[0097] Furthermore, in some embodiments, different permission levels are granted to different users. For example, a first permission level may be granted to a first user profile associated with a first user **160**, wherein the first permission level allows the first user profile to generate review data but not modify the at least one prompt criteria. Further in this example, a second user profile associated with a second user **170** may be granted a second permission level, wherein the second permission level allows the second user profile to both generate review data and modify the at least one prompt criteria.

[0098] At block **616**, after updating the prompt criteria to resolve any comments and/or other review data (either manually via a review administrator and/or via AI-assisted techniques), the prompt generation application **123** generates a second prompt based on the updated at least one prompt criteria. The second prompt may be generated as described above with respect to block **604** (e.g., by supplementing the at least one prompt criteria with additional context).

[0099] At block **618**, a second document is classified by inputting the second document and the second prompt into the generative AI model **125**. In some embodiments, block

618 repeats on a corpus of documents (e.g., the generative AI model 125 classifies one or more documents of the corpus of documents).

[0100] Following block 618, the example method 600 may return to (e.g., iterate back to) any of the preceding blocks. For example, the example method 600 may return to block 610 to obtain review data of the first document and/or any other document. In this regard, it should be understood that, at this iteration, in some embodiments, rather than obtain review data of the first documents, review data of the second document is obtained.

[0101] Moreover, in some embodiments, the one or more processors 120 (e.g., via the prompt generation application 123, the first generative AI model 125, and/or the second generative AI model 126) may determine that the prompt is acceptable. For example, the first and second documents may be included in a plurality of training documents. The plurality of training documents may be classified by inputting the training documents and the second prompt into the generative AI model 125. The prompt generation application 123 may then: obtain review data associated with the plurality of training documents; generate one or more validation metrics based on a comparison of the review data and the classifications of documents of the plurality of training documents; and then determine that the second prompt is acceptable based on the one or more validation metrics.

[0102] In addition, it should be understood that not all blocks and/or events of the exemplary signal diagrams and/or flowcharts are required to be performed. Moreover, the exemplary signal diagrams and/or flowcharts are not mutually exclusive (e.g., block(s)/events from each example signal diagram and/or flowchart may be performed in any other signal diagram and/or flowchart). The exemplary signal diagrams and/or flowcharts may include additional, less, or alternate functionality, including that discussed elsewhere herein. It should further be appreciated that the blocks of the signal diagrams and/or flowcharts may be performed in any suitable order.

Exemplary Training of An Exemplary Generative AI Model

[0103] In most embodiments, large language models (LLMs) and/or large multimodal models (LMMs) of the first generative AI model 125 and/or second generative AI model 126 are off-the-shelf, or pretrained (at least in part). However, in some embodiments, the generative AI model training application wholly or partially trains the LLM(s), the first generative AI model 125, and/or the second generative AI model 126. It should be appreciated that while the instant disclosure occasionally refers to LLMs accepting text-based prompts, it should be appreciated that such references envision the alternative use of LMMs to additionally accept image data as part of a prompt.

[0104] The generative AI models 125, 126 may be used to, among other things: (i) generate prompts (e.g., from prompt criteria); (ii) generate updates (or proposed updates) to prompt criteria; (iii) generate explanations of updates to prompt criteria; (iv) generate explanations of classifications; and/or (v) classify documents. It should be appreciated that although the following discussion refers to training of the generative AI model 125, it applies equally to training the generative AI model 126. It should further be appreciated that although the following discussion may refer to an AI model, it should be understood that it applies equally to an ML model.

[0105] To this end, the generative AI model 125 may output text (e.g., (i)-(iv) above), and/or classifications (e.g., (v) above). The training of the generative AI model 125 for both will be described below. Furthermore, in some implementations, the training for the classifications output uses a validation training set, whereas training for the text output does not use a validation training set. The validation training set may include, for example, documents, and corresponding classifications of the documents.

[0106] Regarding text output, the generative AI model 125 may be trained by generative AI model training application 128 using large training datasets of text which may provide sophisticated capability for natural-language tasks, such as answering questions and/or holding conversations. The generative AI model 125 may include a general-purpose pretrained LLM which, when provided with a starting set of words as an input, may attempt to provide an output (response) of the most likely set of words that follow from the input. The input may additionally or alternatively include a document, and a classification thereof. In one aspect, the input may be provided to, and/or the response received from, the generative AI model 125, via a user interface of the workspace 110. This may include a user interface device operably connected to the server via an I/O module. Exemplary user interface devices may include a touchscreen, a keyboard, a mouse, a microphone, a speaker, a display, and/or any other suitable user interface devices.

[0107] Multi-turn (i.e., back-and-forth) conversations may require LLMs to maintain context and coherence across multiple user utterances, which may require the generative AI model 125 to keep track of an entire conversation history as well as the current state of the conversation. The generative AI model 125 may rely on various techniques to engage in conversations with users, which may include the use of short-term and long-term memory. Short-term memory may temporarily store information (e.g., in the memory 122) that may be required for immediate use and may keep track of the current state of the conversation and/or to understand the user's latest input in order to generate an appropriate response. Long-term memory may include persistent storage of information (e.g., the database 118) which may be accessed over an extended period of time. The long-term memory may be used by the generative AI model 125 to store information about the user (e.g., preferences, chat history, etc.) and may be useful for improving an overall user experience by enabling the generative AI model 125 to personalize and/or provide more informed responses.

[0108] In some embodiments, the system and methods to generate and/or train the generative AI model 125 (e.g., via the generative AI model training application 128) which may be used in the generative AI model 125, may include three steps: (1) a supervised fine-tuning (SFT) step where a pretrained language model (e.g., an LLM) may be fine-tuned on a relatively small amount of demonstration data curated by human labelers to learn a supervised policy (SFT AI model) which may generate responses/outputs from a selected list of inputs. The SFT AI model may represent a cursory model for what may be later developed and/or configured as the generative AI model 125; (2) a reward model step where human labelers may rank numerous SFT AI model responses to evaluate the responses which best mimic preferred human responses, thereby generating comparison data. The reward model may be trained on the comparison data; and/or (3) a policy optimization step in

which the reward model may further fine-tune and improve the SFT AI model. The outcome of this step may be the generative AI model **125** using an optimized policy. In one aspect, step one may take place only once, while steps two and three may be iterated continuously, e.g., more comparison data is collected on the current generative AI model **125**, which may be used to optimize/update the reward model and/or further optimize/update the policy.

Iterative Prompting of an Example Generative AI Model

[0109] FIG. **11** depicts an iterative prompting approach **1100** for a prompt-based classification model **1102** (e.g., the prompt-based classification model used in conjunction with the first generative AI model **125**) for refining prompts input to the classification model **1102**. Generally, the classification model **1102**, and moreover the iterative prompting approach **1100**, may be implemented for responding to a request for production during litigation. Accordingly, a sample of documents **1104** may be processed using the classification model **1102**. More particularly, the sample of documents **1104** may be evaluated using a prompt derived from prompt criteria **1106** (e.g., relevance criteria **420** and/or issue criteria **422**) that is input to the classification model **1102**. In response to the input prompt, the classification model **1102** may output a classification of each input document (e.g., each document in the sample of documents **1104**). As the prompt criteria **1106** are iteratively updated, previous versions of the prompt criteria **1106** are stored to evaluate which prompt criteria exhibit the strongest classification performance.

[0110] The classification model **1102** may be a generative artificial intelligence model (AI), a language model (LM), and/or a large language model (LLM), etc., capable of classifying a document based upon an input natural language prompt. Generally, a prompt generated based upon the prompt criteria **1106** may be input with each document of the sample of documents **1104** to the classification model **1102** to obtain a set of classifications for the sample of documents **1104**. As described herein, the prompt criteria **1106** may include a set, or sets, of instructions that define how a document should be analyzed and/or classified by the classification model **1102** with respect to relevancy requirements and/or the descriptions of the issues (e.g., relevance criteria **420** and/or issue criteria **422**). The sample of documents **1104** may be associated with a set of ground truth classification (e.g., review data associated with the sample of documents **1104**). For example, each document from the sample of documents **1104** may be reviewed and labelled by a user (e.g., the user **1118**, the first user **160** of FIG. **1**, etc.) with respective classifications. In some embodiments, the review data may be associated with any number of inquiries or classifications defined by the prompt criteria **1106**.

[0111] Based upon the classifications output by the classification model **1102** and the associated ground truth data, the prompt evaluation application **124** may generate performance reports **1108** for the prompt criteria **1106**. Generally, the performance reports **1108** indicate the performance of the classification model **1102** at classifying documents in the sample of documents **1104** based on the prompt criteria **1106**. For example, the performance reports **1108** may be generated by performing mathematical calculation to determine accuracy metrics, precision metrics, recall metrics, elusion metrics, other suitable classification metrics, and/or some combination thereof. In some embodiments, such classification metrics may be required to meet a particular threshold value (e.g., a customizable threshold value, a court ordered threshold value, etc.). Accordingly, the performance reports **1108** may track the progress of different versions of the prompt criteria toward reaching such threshold.

[0112] The performance reports **1108** may be analyzed to generate individual report recommendations **1110***a* and an aggregated record of reports **1110***b*. The individual report recommendations **1110***a* may indicate the performance of the classification model **1102** (e.g., the performance of the classification model **1102** at classifying documents in the sample of documents **1104**) with respect to the relevancy requirements and/or the description of an issue defined by the prompt criteria **1106** (e.g., with respect to issue A **422***a* and issue B **422***b* of FIG. **4**). The individual report recommendations **1110***a* are stored and associated with the respective version of the prompt criteria **1106**. In some embodiments, the individual report recommendations **1110***a* may be generated based upon the classification metrics from the performance reports **1108**, and generally, may include a description of how the prompt criteria **1106** performed with respect to particular types of documents and/or content therein. For example, the individual report recommendations **1110***a* may be generated via inputting the performance reports **1108** into a generative AI model (which maybe the classification model **1102**, but may be a different model) along with a prompt asking the generative AI model to analyze particular aspects of the performance (e.g., summarizing the documents incorrectly classified by the classification model, summarizing the documents that were classified as borderline, summarizing the ability to detect particular issues, etc.). As a result, users are provided guidance with respect to how to update the prompt criteria **1106** to improve performance with respect to the classification metric.

[0113] The aggregated record of reports **1110***b* may indicate the performance of the different versions of prompt criteria **1106** over time. For example, the aggregated record of reports **1110***b* may enable tracking of which versions of the prompt criteria exhibit the best classification performance with respect to the component criteria/classifiers (e.g., relevance criteria **420**, and issue criteria **422** of FIG. **4**) included in the prompt criteria **1106**. The aggregated record of reports **1110***b* may summarize the performance reports **1108** and the individual report recommendations **1110***a*, and may indicate whether the classification metrics (e.g., accuracy metrics, precision metrics, recall metrics, etc.) are meeting respective and/or aggregate performance metric thresholds. In some embodiments, the individual report recommendations **1110***a* and/or the aggregated record of reports **1110***b* may include a natural language summary indicating components of the prompt criteria **1106** that negatively impacted performance of classifying documents in the sample of documents **1104**. Additionally, the aggregated record of reports **1110***b* may be generated by inputting multiple performance reports **1108** with the same prompt used to generate an individual report recommendation **1110***a*.

[0114] At block **1112**, based on the performance reports **1108**, the individual report recommendations **1110***a*, and the aggregated record of reports **1110***b*, the prompt evaluation application **124** may determine whether the prompt criteria **1106** needs to be edited or updated. In some embodiments, classification performance (e.g., performance reports **1108** and the individual report recommendations **1110***a*) of the

current prompt criteria **1106** (e.g., version 4 of the prompt criteria **1106**) may be compared to classification performance of an earlier version of the prompt criteria (e.g., version 1, 2, and/or 3 of the prompt criteria **1106**). In some embodiments, the aggregated record of reports **1110***b* may be analyzed to compare classification performance of the current prompt criteria **1106** to classification performance of earlier versions of the prompt criteria. Based on the comparison, it may be determined whether the classification performance of the current prompt criteria **1106** has improved, and/or not degraded, with respect to the classification metric threshold.

[0115] When the classification performance has not met the classification metric threshold, it may be determined that the prompt criteria **1106** needs to be updated and/or edited. For instance, the current prompt criteria **1106** (e.g., version 4 of the prompt criteria **1106**) may be an updated version of the earlier prompt criteria **1106**. In some embodiments, updating the prompt criteria **1106** may include identify a particular prompt criterion that needs updating and/or automatically suggest an updated definition of the prompt criteria **1106**. In response, the user may modify the prompt criteria **1106** and/or accept a suggested modification of the prompt criteria **1106** to create a new version thereof. In response, the functionality described with respect to blocks **1102-1110** may be repeated with respect to the new version of the prompt criteria.

[0116] On the other hand, if the prompt criteria **1106** does not need to be updated (block **1120**) (e.g., the classification model **1102** satisfied the classification metric threshold), the prompt criteria **1106** may be approved and used to obtain classifications of additional documents in the corpus of documents (e.g., documents from the corpus of documents **105** not included in the sample of documents **1104**).

Example Methods

[0117] FIG. **12** illustrates a flow diagram representing an example computer-implemented method **1200** for an iterative prompting approach for a prompt-based classification model. The example method **1200** may be implemented by the computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **1200**.

[0118] The example method **1200** may begin at block **1202** when the prompt generation application **123** obtains prompt criteria associated with a corpus of documents, wherein the prompt criteria define at least (i) a relevancy requirement for an inquiry and (ii) a description of an issue. Examples of the prompt criteria are described elsewhere herein, and may include: case summary criteria **320** of FIG. **3**; relevance criteria **420** and/or issue criteria **422** of FIG. **4**; and key documents criteria of FIG. **5**.

[0119] At block **1204**, the prompt generation application **123** generates a prompt for input into the generative AI model (e.g., the generative AI model **125**) based upon the prompt criteria. In some examples, the prompt is generated by supplementing the prompt criteria with additional context. For example, the additional context, or a portion of the additional context, may be a set of rules that instruct the generative AI model to reach intermediate conclusions before outputting a classification for a document. Continuing with this example, the intermediate conclusions may include citations to documents in the corpus of documents that support the intermediate conclusions, rationales behind the intermediate conclusions, and/or considerations accounted for when making the intermediate conclusions. As another example, the additional context may include additional prompt criteria defining a case summary, a description of relevant entities, and/or identifications of key documents (e.g., hot documents, or user input documents). As another example, the additional context may include instructions that cause the generative AI model to process different types of documents separately. For example, different data may be extracted from different documents, different meta data in different documents may be extracted and/or analyzed separately, etc. For example, a portable document format (PDF) may be processed using a multimodal model and/or may be used to generate a textual description of a PDF. As another example, the additional context may include a set of instructions that cause the generative AI model to expressly handle individual issues in a prompt (e.g., defined by the prompt criteria) based on the document type. Additionally, the types of documents in the corpus of documents may affect/influence how prompt criteria are updated.

[0120] At block **1206**, the prompt evaluation application **124** evaluates classification performance of the prompt at classifying documents in the corpus of documents with respect to the relevancy requirement(s) defined by the prompt criteria. The classifications may be any suitable classifications. In some examples, a document may be classified as junk, responsive, not responsive, likely responsive, or not likely responsive. For example, the prompt evaluation application **124** may evaluate classification performance of the prompt with respect to the relevancy requirement by inputting the prompt and each document of a sample of documents from the corpus of documents into the generative AI model to obtain a set of respective classifications of the sample of documents, obtaining review data associated with the sample of documents including ground truth data associated with the relevancy requirement, and applying the review data to determine classification performance of the prompt with respect to the relevancy requirement.

[0121] At block **1208**, the prompt generation application **123** obtains an updated prompt criteria including an updated description of the issue.

[0122] At block **1210**, the prompt generation application **123** generates an updated prompt based upon the updated prompt criteria. In some examples, the prompt generation application **123** analyzes, via the generative AI model **125** (or another generative AI model, such as the second generative AI model **126**), for example, the prompt criteria to determine that no contradiction exists between the relevancy requirement and the description of the issue, in response to determining that a contradiction exists, the prompt generation application **123** may generate an alert for a user (e.g., an alert for the first user **160**). For example, a contradiction between the prompt criteria may be a conflicting set of instructions (e.g., do X in response to Y; and do Z in response to Y; where X and Z are mutually exclusive actions), a grammatical error, a lack of coherence in a set of instructions, etc.

[0123] At block **1212**, the prompt evaluation application **124** evaluates classification performance of the updated prompt at classifying documents with respect to the rel-

evancy requirement. For example, the prompt evaluation application **124** may compare the classification performance associated with the prompt to classification performance associated with the updated prompt. For example, the prompt evaluation application **124** may determine that classification performance of the updated prompt with respect to the issue has improved over the classification performance of the prompt with respect to the issue. As another example, the prompt evaluation application **124** may determine that classification performance of the updated prompt with respect to the relevancy requirement has not degraded over the classification performance of the prompt with respect to the relevancy requirement.

[0124] At block **1214**, the prompt evaluation application **124**, approves the updated prompt to classify additional documents in the corpus of documents based on the evaluation.

Automated Prompting of an Example Generative AI Model

[0125] FIG. **13** depicts an automated prompting approach **1300** for the prompt-based classification model **1102** of FIG. **11** (e.g., the prompt-based classification model used in conjunction with the first generative AI model **125**) for generating initial prompt criteria **1302** for input to the classification model **1102**. More particularly, a generative AI model **1304** (e.g., the first generative AI model **125**) may generate the initial prompt criteria **1302** based on an initial set of documents and/or contextual information associated with an inquiry (e.g., a request for production). Example techniques for selecting the initial set of documents are described in U.S. Provisional Application No. 63/72231 (Attorney Docket No. 32646/70317P), entitled "Systems and Methods for Identifying a Seed Set of Documents from a Corpus of Documents", filed Nov. 19, 2024, the entire disclosure of which is hereby incorporated by reference.

[0126] The prompt generation application **123** may generate the initial prompt criteria **1302** by inputting the initial set of documents and the contextual information to the generative AI model **1304**. In some embodiments, the initial set of documents includes one or more key documents **1310** and/or one or more background documents **1312**. For example, the initial set of documents may include one or more communications from a user associated with a request for production (e.g., a key document **1310**) and one or more contractual agreements associated with the user (e.g., a background document **1312**). In some embodiments, the contextual information may include a review protocol **1314**, one or more complaints **1316**, and/or request for production information **1318**. Additionally or alternatively, the prompt evaluation application **124** may input, with the initial set of documents and the contextual information, additional context to the generative AI model **1304** including a set of instructions that define how the initial set of documents and the contextual information should be analyzed by the generative AI model **1304**.

[0127] As described herein, prompt criteria may include a set, or sets, of instructions that define how a document should be analyzed and/or classified by the classification model **1102** with respect to relevancy requirements and/or the descriptions of the issues (e.g., relevance criteria **420** and/or issue criteria **422**). Generally, the one or more key documents **1310**, the one or more background documents **1312**, the review protocol **1314**, the one or more complaints **1316**, and/or the request for production information **1318**, may be analyzed by the generative AI model **1304** to generate a set of instructions that define how a document should be analyzed by the classification model **1102**.

[0128] Similar to the iterative prompting approach **1100** of FIG. **11**, a sample of documents **1104** from a corpus of documents (e.g., the corpus of documents **105** of FIG. **1**) may be evaluated using an initial prompt **1320** derived from the initial prompt criteria **1302** and input to the classification model **1102**. Again, similar to the iterative prompting approach **1100**, the classification model **1102** may output a classification of each input document (e.g., each document in the sample of documents **1104**) in response to the input prompt. Based upon the classification output by the classification model **1102** and ground truth data associated with the sample of documents **1104**, the prompt evaluation application **124** may generate classification performance reports for the initial prompt **1320**. In some embodiments, the prompt evaluation application **124** automatically determines whether the initial prompt criteria **1302** needs to be updated. In other embodiments, prompt evaluation application **124** presents the performance reports to a user to receive a user-provided indication of whether the initial prompt criteria **1302** needs to be updated.

[0129] When the prompt evaluation application **124** determines that the prompt criteria **1302** does not need to be updated, the initial prompt criteria **1302** may be approved for classifying additional documents in the corpus of documents (e.g., documents from the corpus of documents **105** not included in the sample of documents **1104**). On the other hand, when the prompt evaluation application **124** determines that the prompt criteria **1302** needs to be updated, the initial prompt criteria may be refined using the iterative prompting approach **1100**, for example, or another prompting approach described herein.

Example Methods

[0130] FIG. **14** illustrates a flow diagram representing an example computer-implemented method **1400** for using a generative artificial intelligence (AI) model to classify documents. The example method **1400** may be implemented by the computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **1600**.

[0131] The example method **1400** may begin at block **1402** when the document sampling application **130** obtains an initial set of documents associated with an inquiry. For example, the initial set of documents may include one or more of a complaint, a request for production, key documents, and/or one or more background documents.

[0132] At block **1404**, the prompt generation application **123** generates initial prompt criteria by inputting the initial set of documents to a first generative AI model (e.g., the generative AI model **1304** of FIG. **13**, the first generative AI model **125** of FIG. **1**, or another similar generative AI model), wherein the initial prompt criteria defines at least (i) a relevancy requirement for the inquiry and (ii) a description of an issue. For example, generating the initial prompt criteria may include the prompt generation application **123** inputting an indication of a review protocol associated with the inquiry and the initial set of documents to the first generative AI model. In some embodiments, the relevancy requirement and the description of the issue are associated

with respective component fields of the prompt criteria. Further, the prompt generation application **123** may generate one or more modified component fields corresponding to one or more component fields of the prompt criteria by inputting the prompt and the classification performance of the prompt to a third generative AI model. In some embodiments, at least one of the one or more modified component fields is associated with the relevancy requirement or the description of the issue. Additionally, the prompt generation application **123** may generate the modified prompt criteria based on the one or more modified component fields.

[0133] At block **1406**, the prompt generation application **123** generates a prompt for input to the generative AI model based on the prompt criteria. In some embodiments, the prompt evaluation application **124** may analyze the prompt criteria and/or the prompt to determine that no contradiction exists between the relevancy requirement and the description of the issue. In response to determining that a contradiction exists, the prompt evaluation application **124** may generate an alert.

[0134] At block **1408**, the prompt evaluation application **124** classifies a sample of documents from a corpus of documents (e.g., the corpus of documents **105** of FIG. **1**) by inputting the sample of documents and the prompt to a second generative AI model (e.g., the prompt-based classification model **1102** of FIG. **11**). In some embodiments, the prompt evaluation application **124** may evaluate classification performance of the modified prompt at classifying documents with respect to the relevancy requirement and the description of the issue. Further, based on the evaluation, the prompt evaluation application **124** may approve the modified prompt or the initial prompt to classify additional documents in the corpus of documents. For example, the prompt evaluation application **124** may compare the classification performance of the prompt to classification performance of the modified prompt.

[0135] In some embodiments, the example method **1400** may include one or more additional steps not depicted in FIG. **14**. For example, the prompt evaluation application **124** may evaluate classification performance of the prompt based on ground truth data associated with the sample of documents. Continuing with this example, the prompt generation application **123** may obtain modified prompt criteria including one or more of (i) a modified relevancy requirement or (ii) a modified description of the issue, and may generate a modified prompt based on the modified prompt criteria. Further, the prompt evaluation application **124** may generate an updated classification of the sample of documents by inputting the sample of documents and the modified prompt to the second generative AI model. In some embodiments, the prompt evaluation application **124** may determine that classification performance of the modified prompt with respect to the issue has improved over the classification performance of the prompt with respect to the issue when evaluating classification performance of the modified prompt. In some embodiments, the prompt evaluation application **124** may determine that classification performance of the modified prompt with respect to the relevancy requirement has not degraded over the classification performance of the prompt with respect to the relevancy requirement.

Automated Prompting of an Example Generative AI Model

[0136] FIG. **15** depicts an automated prompting approach **1500** for the prompt-based classification model **1102** of FIG. **11** (e.g., the prompt-based classification model used in conjunction with the first generative AI model **125**) for generating modified prompt criteria **1502** based on initial prompt criteria **1106**. More particularly, a sample of documents **1104** from a corpus of documents (e.g., the corpus of documents **105** of FIG. **1**) may be evaluated using a prompt derived from the initial prompt criteria **1106** that is input to the classification model **1102**. Based on the classification performance of the initial prompt criteria **1106**, a generative AI model **1504** (e.g., the first generative AI model **125**) may generate the modified prompt criteria **1502**.

[0137] In some embodiments, the prompt evaluation application **124** may generate classification performance reports and/or recommendations for the prompt criteria **1106** (e.g., performance reports **1108**, individual report recommendations **1110***a*, and aggregated record of reports **1110***b*) based on the classifications output by the classification model **1102**. For example, the prompt evaluation application **124** may generate classification performance reports by applying review data associated with the sample of documents **1104**, and/or corresponding ground truth data, to the classifications output by the classification model **1102**. In some embodiments, the classification performance reports generated by the prompt evaluation application **124** may include indications of misclassifications of the documents from the sample of documents **1104** and/or low-confidence classifications of the documents from the sample of documents **1104**.

[0138] As described herein, prompt criteria may include a set, or sets, of instructions that define how a document should be analyzed and/or classified by the classification model **1102** with respect to relevancy requirements and/or descriptions of one or more issues associated with the corpus of documents. Said another way, the prompt criteria **1106** may include one or more component fields each corresponding to a relevancy requirement or a description of an issue. In some embodiments, the review data and the corresponding ground truth data may be associated with a relevancy requirement and/or a description of an issue defined by the prompt criteria **1106**. Moreover, the classification performance reports may indicate the performance of the classification model **1102** at classifying documents in the sample of documents **1104** with respect to a particular component field of the prompt criteria **1106**. For example, the classification performance reports may indicate that a component field of the prompt criteria **1106** and/or the modified prompt criteria **1502** is associated with a misclassification or low-confidence classification of one or more documents from the sample of documents **1104**.

[0139] In some embodiments, the prompt generation application **123** may generate the modified prompt criteria **1502** by inputting the prompt derived from the initial prompt criteria **1106** and the classification performance reports/recommendations for the initial prompt criteria **1106** (e.g., performance reports **1108**, individual report recommendations **1110***a*, and aggregated record of reports **1110***b*) to the generative AI model **1504**. For example, the prompt generation application **123** may cause the generative AI model **1504** to generate a modified component field by modifying a component field of the initial prompt criteria **1106** that is associated with poor classification performance. In some embodiments, the prompt evaluation application **124** may input, with the prompt and the classification performance reports, additional context to the generative AI model **1504**

including a set of instructions that define how the prompt and the classification performance reports should be analyzed by the generative AI model **1504**.

[0140] In some embodiments, the prompt generation application **123** may generate, via the generative AI model **1504**, one or more modified prompts derived from the modified prompt criteria **1502** including one or more modified component fields. For example, the prompt generation application **123** may generate two modified component fields of the prompt criteria **1106**, each corresponding to poor classification performance, thereby producing at least three sets of prompt criteria (e.g., a first set including a first modified component field, a second set including a second modified component field, and a third set including both the first and the second modified component fields). As another example, based on the classification performance of a first set of modified prompt criteria **1502**, the prompt evaluation application **124** may determine the prompt criteria needs to be modified further (e.g., based on a statistical performance metric, based on poor performance associated with an issue defined by the criteria, etc.) and the prompt generation application **123** may generate a second set of modified prompt criteria **1502**. Moreover, the prompt generation application **123** may iteratively modify the initial prompt criteria **1106** using the generative AI model **1504** to produce multiple modified prompt criteria **1502**.

[0141] At block **1506**, based on the classification performance of the modified prompt criteria **1502** and the initial prompt criteria **1106**, the prompt evaluation application **124** may select or identify preferred component fields from among the modified prompt criteria **1502** and the initial prompt criteria **1106** (e.g., a first component field from the initial prompt criteria **1106**, a second component field from a first set of modified prompt criteria **1502**, and a third component field from a second set of modified prompt criteria **1502**) to generate preferred prompt criteria **1508**. In some embodiments, the prompt evaluation application **124** and/or the review platform **140** may generate an indication of the preferred prompt criteria **1508** and provide the indication as an output of the review platform **140** (e.g., for review by the user **160**). In response to identifying the preferred component fields, the prompt evaluation application **124** may approve the preferred prompt criteria **1508** and obtain classifications of additional documents in the corpus of documents (e.g., documents from the corps of documents **105** not included in the sample of documents **1104**) using the preferred prompt criteria **1508**.

Example Methods

[0142] FIG. **16** illustrates a flow diagram representing an example computer-implemented method **1600** for using a generative artificial intelligence (AI) model to classify documents. The example method **1600** may be implemented by the computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **1600**.

[0143] The example method **1600** may begin at block **1602** when the prompt generation application **123** generates a prompt for input to the generative AI model based on prompt criteria defining an inquiry associated with a corpus of documents. In some embodiments, the prompt criteria include one or more component fields. For example, the prompt evaluation application **124** may evaluate classification performance of the one or more component fields of the prompt criteria based on the ground truth data. In some embodiments, the prompt generation application **123** may generate the prompt criteria by inputting one or more of: a review protocol, a complaint, a request for production, one or more of key documents, one or more background documents, to a generative AI model. In some embodiments, the prompt criteria defining the inquiry are initial prompt criteria. For example, the prompt generation application **123** may obtain a preliminary set of documents associated with the inquiry and the corpus of documents, wherein the preliminary set of documents include at least one of: (i) one or more key documents or (ii) one or more background documents, and generate the initial prompt criteria by inputting the preliminary set of documents to the generative AI model.

[0144] At block **1604**, the prompt evaluation application **124** generates a classification of an initial set of documents from the corpus of documents by inputting the initial set of documents and the prompt to the generative AI model.

[0145] At block **1606**, the prompt evaluation application **124** evaluates classification performance of the prompt based on ground truth data associated with the initial set of documents. In some embodiments, the classification performance of the prompt includes one or more of: one or more respective indications of one or more misclassifications of documents from the initial set of documents, and/or one or more respective indications of one or more low-confidence classifications of documents from the initial set of documents.

[0146] At block **1608**, the prompt generation application **123** generates one or more modified prompt criteria based on the evaluation of the classification performance of the prompt. For example, the prompt generation application **123** may generate one or more modified component fields each corresponding to a component field of the one or more component fields by inputting the prompt and the classification performance of the one or more modified component fields to the generative AI model. Continuing with this example, the prompt generation application**123** may generate the modified prompt criteria based on the one or more modified component fields. For example, the prompt generation application **123** may determine one or more component fields of the prompt criteria associated with at least one of the one or more misclassifications of documents and modify, by the generative AI model, the one or more component fields to generate the one or more modified component fields. As another example, the prompt generation application **123** may determine one or more component fields of the prompt criteria associated with at least one of the one or more low confidence classifications of documents and modify, by the generative AI model, the one or more component fields to generate the one or more modified component fields.

[0147] At block **1610**, the prompt generation application **123** generates one or more modified prompts respectively associated with the one or more modified prompt criteria.

[0148] At block **1612**, the prompt evaluation application **124** generates one or more respective classifications of the initial set of documents associated with each of the one or more modified prompts by inputting the initial set of documents and each of the one or more modified prompts to the generative AI model.

[0149] At block **1614**, the prompt evaluation application **124** evaluates classification performance of the one or more modified prompts based on the ground truth data. For example, the prompt evaluation application **124** may evaluate classification performance of one or more respective component fields of each of the one or more modified prompt criteria based on the ground truth data.

[0150] At block **1616**, the prompt evaluation application **124** selects a preferred prompt from among the prompt and the one or more modified prompts based on the evaluation of the classification performance of the one or more modified prompts. For example, the prompt evaluation application **124** may select, based on the evaluation, one or more first preferred component fields from among the one or more component fields of the prompt criteria and one or more second preferred component fields from among the one or more respective component fields of each of the one or more modified prompt criteria.

[0151] At block **1618**, the review platform **140** provides an indication of preferred prompt criteria associated with the preferred prompt.

Sampling of Documents for an Example Generative AI Model

[0152] FIG. **17** depicts an iterative sampling approach **1700** for the prompt-based classification model **1102** of FIG. **11** (e.g., the prompt-based classification model used in conjunction with the first generative AI model **125**) for refining samples of documents input to the classification model **1102**. Generally, the classification model **1102**, and moreover the iterative sampling approach **1700**, may be implemented for responding to a request for production during litigation. Similar to the iterative prompting approach **1100** of FIG. **11**, a sample of documents **1104**, from a corpus of documents **1702** (e.g., the corpus of documents **105** of FIG. **1**), may be processed using the classification model **1102**. More particularly, the sample of documents **1104** may be evaluated using a prompt derived from the prompt criteria **1106** that is input to the classification model **1102**. In response to the input prompt, the classification model **1102** may output a classification of each input document (e.g., each document in the sample of documents **1104**).

[0153] Based upon the classifications output by the classification model **1102**, the prompt evaluation application **124** may generate classification performance reports and/or recommendations for the prompt criteria **1106** (e.g., performance reports **1108**, individual report recommendations **1110***a*, and aggregated record of reports **1110***b*). As mentioned above, the prompt criteria **1106** may include a set, or sets, of instructions that define how a document should be analyzed and/or classified by the classification model **1102** with respect to relevancy requirements and/or the descriptions of the issues. In some embodiments, the classification performance reports may indicate the performance of the classification model **1102** at classifying documents in the sample of documents **1104** with respect to the relevancy requirements and/or the descriptions of the issue defined by the prompt criteria **1106**. In some embodiments, generating the classification performance reports/recommendations includes generating statistical metrics for each of the issues and/or relevancy requirements defined by the prompt criteria **1106**. For example, the statistical metrics may include accuracy metrics, precision metrics, recall metrics, elusion metrics, and/or other classification metrics known in the art. In some embodiments, review data and/or corresponding ground truth data may be applied (e.g., to the sample of documents **1104** and/or to the associated classifications for the sample of documents **1104**) to determine the classification performance of the prompt with respect to the issues and/or relevancy requirements defined by the prompt criteria **1106**.

[0154] At block **1704**, based on the performance reports **1108**, the individual report recommendations **1110***a*, and the aggregated record of reports **1110***b*, the document sampling application **130** and/or the prompt evaluation application **124** may determine whether important documents (e.g., documents identified in the prompt criteria **1106**), or types of important documents, have not been evaluated using the classification model **1102**. In some embodiments, based on the outputs of the classification model **1102**, the document sampling application **130** and/or the prompt evaluation application **124** may identify that the sample of documents **1104** does not include enough documents associated with a description of an issue defined by the prompt criteria **1106**. For example, identifying that the sample of documents **1104** does not include enough documents associated with a description of an issue defined by the prompt criteria **1106** may include evaluating statistical metrics associated with an issue defined by the prompt criteria to identify statistical metrics that are statistically insignificant based on the amount of documents in the sample of documents **1104** associated with the issue. In some embodiments, based on the outputs of the classification model **1102**, the document sampling application **130** and/or the prompt evaluation application **124** may identify that the corpus of documents **1702** is associated a new issue that is not defined by the prompt criteria **1106**.

[0155] When the document sampling application **130** and/or the prompt evaluation application **124** determines that the sample of documents **1104** does not include a sufficient variety of documents, does not include enough documents of a particular type, and/or does not include particular documents, the document sampling application **130** may generate a query **1706** for the corpus of documents **1702**. In some embodiments, the query **1706** may include indications (e.g., if query **1706** is a vector search, the indications may be vector embeddings/representations) of key terms associated with important documents or document types, a description of an issue defined by the prompt criteria **1106**, and/or a new issue not defined by the prompt criteria **1106**. For example, the key terms may be associated with an entity involved in a matter being litigated and the sample of documents **1104** may not include any documents associated with the entity. The document sampling application **130** may send the query **1706** to a search index **1708** for the corpus of documents **1702** and/or associated identifying information for the documents. For example, query **1706** may be a vector search and search index **1708** may be a vector database, and the search index **1708** may store vector embeddings and/or vector representations of the documents in the corpus of documents **1702**. Based on the documents that are responsive to the query **1706**, the document sampling application **130** and/or the search index **1708** may retrieve a set of additional documents **1710**. It should be noted that the document sampling application **130** may generate any suitable request for documents from the corpus of documents (e.g., query **1706**), such as a vector search, a database query, a keyword search, a Boolean search, etc., and the document sampling

application **130** may send the request for documents to any suitable datastore, such as a vector database, a search engine, a structured query language (SQL) database, another relational database, etc.

[0156] In some embodiments, the corpus of documents **1702** may be associated with a vector space (e.g., the search index **1708** is a vector database) and the document sampling application **130** may evaluate the vector space to identify clusters of documents in the corpus of documents (e.g., groups of similar vector representations of the documents in the corpus of documents **1702**). Further, the document sampling application **130** may evaluate the vector space to identify that one or more clusters of documents are associated with misclassifications and/or low-confidence classifications of documents from the sample of documents **1104** (e.g., identify clusters of documents that include at least one misclassified document). For example, the document sampling application **130** may evaluate the one or more identified clusters of documents to determine whether the sample of documents **1104** does not include enough documents from the identified clusters of documents to satisfy a confidence threshold. As another example, the document sampling application **130** may evaluate the one or more identified clusters of documents to determine that whether a cluster of documents is not associated with at least one issue defined by the prompt criteria **1106**.

[0157] In some embodiments, the issues, the relevancy requirements, and/or the corpus of documents **1702** may be associated with a knowledge graph of facts (e.g., a structured representation/visualization of known facts and relationships between the facts). Further, the document sampling application **130** may evaluate the knowledge graph of facts to determine whether the sample of documents **1104** is sufficient. For example, the document sampling application **130** may evaluate the knowledge graph of facts and the prompt criteria **1106** to identify one or more new issues and/or one or more new relevancy requirements associated with the corpus of documents **1702**. Continuing with this example, the document sampling application **130** may obtain additional documents from the corpus of documents **1702** associated with one or more new issues and/or one or more new relevancy requirements. As another example, the document sampling application **130** may identify that the sample of documents **1104** does not include enough documents associated with a particular issue (e.g., the sample of documents **1104** does not include a sufficient variety of documents, does not include enough documents of a particular type, and/or does not include particular documents) based on identifying one or more regions of the knowledge graph of facts associated with the particular issue and one or more misclassifications of documents in the sample of documents **1104**.

[0158] Further, a second sample of documents including the additional documents **1710** and the sample of documents **1104** may be evaluated using a prompt (e.g., a prompt derived from the prompt criteria **1106**, another version of the prompt criteria **1106**, and/or other prompt criteria) that is input to the classification model **1102**. The classifications for each document in the second sample of documents, and corresponding classification performance reports, output by the classification model **1102** may be processed by one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** executing in the computing environment **100** to determine whether the second sample of documents is sufficient (e.g., sufficient for further evaluation of the prompt criteria **1106** and/or subsequent refinement of the prompt criteria **1106**). In response, the functionality described with respect to blocks **1102-20** and blocks **1702-1710** may be repeated with respect to subsequent samples of documents from the corpus of documents **1702**.

Example Methods

[0159] FIG. **18** illustrates a flow diagram representing an example computer-implemented method **1800** for using a generative artificial intelligence (AI) model to classify documents. The example method **1800** may be implemented by the computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **1800**.

[0160] The example method **1800** may begin at block **1802** when the document sampling application **130** obtains an initial set of documents from a corpus of documents. In some embodiments, the corpus of documents is associated with a vector space.

[0161] At block **1804**, the prompt evaluation application **124** obtains prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents. In some embodiments, the one or more issues are associated a knowledge graph of facts.

[0162] At block **1806**, the prompt generation application **123** generates a prompt based on the prompt criteria.

[0163] At block **1808**, the prompt evaluation application **124** classifies documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model.

[0164] At block **1810**, the prompt evaluation application **124** evaluates classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue. For example, the prompt evaluation application **124** may identify one or more respective clusters of documents in the vector space associated with one or more low-confidence classifications of documents of the initial set of documents. In some embodiments, the one or more low-confidence classifications of documents are one or more of: weak classifications of documents, or documents with no classifications. As another example, the prompt evaluation application **124** may evaluate the vector space associated with the corpus of documents to identify one or more clusters of documents. As yet another example, the prompt evaluation application **124** may identify one or more respective clusters of documents in the vector space associated with one or more misclassifications of documents of the initial set of documents. As still yet another example, the prompt evaluation application **124** may generate one or more respective statistical metrics for each of the one or more issues, wherein the one or more respective statistical metrics each include one or more of: an accuracy metric, a precision metric, a recall metrics, or an elusion metric. In some embodiments, the prompt evaluation application **124** may obtain review data associated with the initial set of documents including ground truth data associated the one or

more issues and apply the review data to determine classification performance of the prompt with respect to the one or more issues.

[0165] In some embodiments, the prompt evaluation application **124** may evaluate the one or more respective clusters of documents associated with the one or more misclassifications of documents and the corpus of documents to identify that the initial set of documents does not include enough documents from the one or more respective clusters of documents, to identify that the initial set of documents does not include enough documents associated with the first issue of the one or more issues. For example, the prompt evaluation application **124** may generate one or more respective statistical metrics for each of the one or more issues, wherein the one or more respective statistical metrics each include one or more of: an accuracy metric, a precision metric, a recall metrics, or an elusion metric. Further, the prompt evaluation application **124** may evaluate one or more statistical metrics of the one or more respective statistical metrics associated with the first issue to identify that at least one statistical metric is statistically insignificant based on the amount of documents of the initial set of documents associated with the first issue. In some embodiments, the prompt evaluation application **124** may evaluate the one or more respective clusters of documents associated with the one or more misclassified documents and the prompt criteria to identify that at least one cluster of documents is not associated with at least one issue of the one or more issues, to identify that the corpus of documents is associated with the new issue. In some embodiments, the prompt evaluation application **124** may evaluate the knowledge graph of facts and the prompt criteria to identify the new issue. In some embodiments, the prompt evaluation application **124** may identify one or more regions of the knowledge graph of facts associated with one or more misclassifications of documents of the initial set of documents and the first issue of the one or more issues, to identify that the initial set of documents does not include enough documents associated with a first issue of the one or more issues.

[0166] At block **1812**, the document sampling application **130** generates a request for documents from the corpus of documents based on the first issue or the new issue. For example, the document sampling application **130** may identify one or more key terms associated with (1) the first issue of the one or more issues or (2) the new issue associated with the corpus of documents and generate the request for documents based on the one or more key terms. In some embodiments, the one or more key terms may be associated with one or more entities.

[0167] At block **1814**, the document sampling application **130** obtains documents responsive to the request for documents. In some embodiments, the prompt evaluation application **124** may classify the obtained documents responsive to the request for documents by inputting the prompt and the obtained documents into the generative AI model. In some embodiments, the prompt evaluation application **124** may evaluate classification performance of the prompt based on ground truth data associated with the obtained documents.

[0168] At block **1816**, the document sampling application **130** adds the obtained documents to the initial set of documents.

Training of an Example Classifier

[0169] FIG. **19** depicts a training process **1900** for a machine learning classifier using the prompt-based classification model **1102** of FIG. **11** (e.g., the prompt-based classification model used in conjunction with the first generative AI model **125**). Generally, the machine learning classifier, and moreover the training process **1900**, may be implemented for responding to a request for production during litigation.

[0170] As described above, during an active learning process, documents from a corpus of documents **1702** (e.g., the corpus of documents **105** of FIG. **1**) are manually reviewed by reviewers to provide ground truth data for training a classifier (e.g., a classifier trained via the active learning application **150** of FIG. **1**). In some aspects, if the reviewers are provided particularly relevant documents and/or documents near the classifier hyperplane, the active learning process may be completed faster, as the classifier is trained using the documents that are most useful for discriminating between potential classes. However, without manual review, it may be difficult to identify these documents to improve the training speed of an active learning process. Thus, instant techniques relate to using a machine learning model (e.g., the classification model **1102**) to classify documents within the corpus of documents such that the appropriate documents can be included in batches of documents reviewed by reviewers. As a result, the reviewers are more likely to review documents that assist in segmenting the classes, thereby reducing the number of documents that must be manually reviewed to train the active learning classifier. This saves both time and cost with respect to responding to a request for production.

[0171] As illustrated, to begin the process **1900**, a sample of documents **1104**, from the corpus of documents **1702** may be processed using the classification model **1102**. More particularly, the sample of documents **1104** may be evaluated using a prompt derived from the prompt criteria **1106** that is input to the classification model **1102**. In response to the input prompt, the classification model **1102** may output a classification of each input document (e.g., each input document in the sample of documents **1104**). For example, the classification may include a responsiveness score related to the request for production. In these examples, the responsiveness score may be a score on a scale of 1-5 where 5 is highly relevant, 3 is borderline, and 1 is not relevant at all and corresponding instructions for performing the evaluation. Of course, in other examples, different classification scales may be implemented (e.g., a score on a scale of 1-10 or 1-100). Based on the responsiveness scores, the disclosed systems are able to identify the subset of the corpus of documents that are most likely to response (e.g., a 5) or borderline (e.g., a 3) such that batches presented to the reviewer are formed in manner that reduces training time for the active learning classifier.

[0172] In addition to instructions for performing the classification, the prompt input to the classification model **1102** may include a set of instructions that cause the classification model **1102** to generate additional context related to the classification decision. For example, the instruction may instruct the classification model **1102** to identify relevant document portions (e.g., citations, excerpts, etc.) in support of the classification decision. For example, the relevant document portions for a document may be the portions most indicative of responsiveness to an inquiry defined by the

prompt criteria **1106**. Moreover, the set of instructions included in the prompt, or the prompt criteria **1106**, may guide and/or cause the classification model **1102** to reach intermediate conclusions and provide explanations for why the classification model **1102** generated a particular classification (e.g., as described with respect to FIG. **1** and FIG. **6**) and/or why the classification may be incorrect. In some embodiments, the set of instructions may cause the classification model **1102** to extract relevant document portions from a document and as metadata associated with the document. The relevant document portions, as well as any other additional context generated by the classification model **1102**, may be presented to the user via the review platform **140** to facilitate faster manual review of the document.

[0173] Based upon the classifications output by the classification model **1102** (block **1910**), the review platform **140** may generate a priority ranking for documents input to the classification model **1102**. For example, the classifications may include the responsiveness score, and/or other relevancy metrics/scores for the respective documents, and the review platform **140** may rank and/or sort documents based on respective scores. Generally, the review platform **140** may generate batches of the sample of documents **1104** based on one or more queues of documents. In the instant embodiments, a queue may be established corresponding to each classification to a reviewer based (e.g., based on the priority ranking and/or the respective scores for each document). Accordingly, the review platform **140** may select documents from the appropriate queues when generating batches of documents for reviewers. The review platform **140** may then present documents from the assigned batches to the reviewer to obtain review data for training the active learning classifier.

[0174] The review platform **140** may provide a set of coded documents **1920** (e.g., documents for which review data and/or ground truth data was provided by a reviewer) to the active learning application **150**. Generally, the active learning application **150** may train a machine learning classifier to predict the responsiveness and/or relevance for documents in the corpus of documents **1702** (e.g., as described with respect to FIG. **1**) based on the review data received via the review platform **140**.

[0175] It should be appreciated in a typical active learning process, the review data is used in conjunction with the complete document to train the active learning classifier. However, documents often have information not related to the relevant inquiry. This may result in a classifier model increasing the weights of irrelevant features during the training process, potentially resulting in a larger number of training epochs needed to train the active learning classifier. To further reduce training time, techniques described herein may only associate the review data with the relevant portion of the document (and/or other additional context derived by the classification model). That is, when training the active learning classifier, only features derived from the relevant portions may influence the model weights. As a result, the use of the classification model **1102** to extract relevant portions of the document for training an active learning classifier may further reduce the amount of time it takes to train a classifier via an active learning process.

[0176] It should be appreciated that while the foregoing describes using the classifications provided by the classification model **1102** as ground truth data to train an active learning classifier, similar techniques may be applied to train other types of machine learning models. As one example, the classifications may be used to train or fine-tune a second generative AI model (such as the model **126**). In this example, the second generative AI model may be a lightweight model that has a smaller feature space than the classification model **1102**. Accordingly, the trained/tuned second model is able to perform inferences faster than the classification model **1102**, which further speeds up the classification of the corpus of documents. As another example, the classifications generated by the classification model **1102** may be used to train other types of classification models, such a SVM classifier, a random forest classifier, or a gradient boosting machine (GBM) model, a regression model, etc., such that the trained model is able to classify documents faster than the classification model **1102**.

Example Methods

[0177] FIG. **20** illustrates a flow diagram representing an example computer-implemented method **2000** for using a generative artificial intelligence (AI) model to train a classifier. The example method **2000** may be implemented by the computing environment **100** hosting the workspace **110**. For example, the computing environment **100** may execute one or more of the applications **123**, **124**, **125**, **126**, **128**, **130**, **140**, or **150** to perform functions described with respect to the method **2000**.

[0178] The example method **2000** may begin at block **2002** when the prompt generation application **123** generates a prompt for input to the generative AI model (e.g., the classification model **1102** of FIG. **11**) based on prompt criteria defining at least an inquiry associated with a corpus of documents (e.g., the corpus of documents **105** of FIG. **1**).

[0179] At block **2004**, the prompt evaluation application **124** and/or the active learning application **150** may generate classification for a set of documents from the corpus of documents by inputting the set of documents and the prompt to the generative AI model. In some embodiments, the prompt and/or the prompt criteria may include one or more sets of instructions. For example, a set of instructions included in the prompt may cause the generative AI model to generate, based on outputs of the generative AI model, explanations of why the generative AI model generated the classifications for the set of documents. As another example, the prompt may include a set of instruction that cause the generative AI model to identify and/or extract the relevant document portions from documents. In some embodiments, the generated explanations include indications of the relevant document portions.

[0180] At block **2006**, the generative AI model may extract, from the set of documents, relevant document portions related to the inquiry and correlated with the classifications. For example, generating the classification for the set of documents may include determining, via the generative AI model, one or more relevant document portions related to the inquiry for each document of the set of documents.

[0181] At block **2008**, the prompt evaluation application **124** and/or the active learning application **150** may provide, based on the classifications, the set of documents to a review platform **140** for manual review by a reviewer. In some embodiments, the review platform **140** generates a priority ranking for the set of documents based on the classification. For example, the classifications may include responsiveness

scores and the subset of documents may be associated with a particular responsiveness score. Further, the documents may be presented via the review platform **140** for manual review by a reviewer in an ordered configuration based on the priority ranking.

[0182] At block **2010**, the review platform **140** may obtain review data associated with a subset of documents from the set of documents. For example, the method **2000** may further include presenting, the review platform and on a display, documents included in the subset of documents to a reviewer. In some embodiments, presenting the provided documents includes presenting, via review platform **140** and with the provided documents, additional context derived from the generative AI model for each document of the provided documents. For example, the additional context may include one or more of: generated explanations, the classifications for the set of documents, a summary of the classifications for the set of documents, classification considerations, the priority ranking, and/or the indications of the relevant document portions.

[0183] At block **2012**, the active learning application **150** may train, by executing a training algorithm (e.g., as described with respect to FIG. **19**), the classifier using the review data as ground truth data. In some embodiments, the training algorithm is configured to analyze extracted relevant document portions of the subset of documents to train the classifier.

Other Matters

[0184] Although the text herein sets forth a detailed description of numerous different embodiments, it should be understood that the legal scope of the invention is defined by the words of the claims set forth at the end of this patent. The detailed description is to be construed as exemplary only and does not describe every possible embodiment, as describing every possible embodiment would be impractical, if not impossible. One could implement numerous alternate embodiments, using either current technology or technology developed after the filing date of this patent, which would still fall within the scope of the claims.

[0185] It should also be understood that, unless a term is expressly defined in this patent using the sentence "As used herein, the term '_____' is hereby defined to mean . . . " or a similar sentence, there is no intent to limit the meaning of that term, either expressly or by implication, beyond its plain or ordinary meaning, and such term should not be interpreted to be limited in scope based upon any statement made in any section of this patent (other than the language of the claims). To the extent that any term recited in the claims at the end of this disclosure is referred to in this disclosure in a manner consistent with a single meaning, that is done for sake of clarity only so as to not confuse the reader, and it is not intended that such claim term be limited, by implication or otherwise, to that single meaning.

[0186] Throughout this specification, plural instances may implement components, operations, or structures described as a single instance. Although individual operations of one or more methods are illustrated and described as separate operations, one or more of the individual operations may be performed concurrently, and nothing requires that the operations be performed in the order illustrated. Structures and functionality presented as separate components in example configurations may be implemented as a combined structure or component. Similarly, structures and functionality presented as a single component may be implemented as separate components. These and other variations, modifications, additions, and improvements fall within the scope of the subject matter herein.

[0187] Additionally, certain embodiments are described herein as including logic or a number of routines, subroutines, applications, or instructions. These may constitute either software (code embodied on a non-transitory, tangible machine-readable medium) or hardware. In hardware, the routines, etc., are tangible units capable of performing certain operations and may be configured or arranged in a certain manner. In example embodiments, one or more computer systems (e.g., a standalone, client or server computer system) or one or more hardware modules of a computer system (e.g., a processor or a group of processors) may be configured by software (e.g., an application or application portion) as a hardware module that operates to perform certain operations as described herein.

[0188] In various embodiments, a hardware module may be implemented mechanically or electronically. For example, a hardware module may comprise dedicated circuitry or logic that is permanently configured (e.g., as a special-purpose processor, such as a field programmable gate array (FPGA) or an application-specific integrated circuit (ASIC) to perform certain operations). A hardware module may also comprise programmable logic or circuitry (e.g., as encompassed within a general-purpose processor or other programmable processor) that is temporarily configured by software to perform certain operations. It will be appreciated that the decision to implement a hardware module mechanically, in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software) may be driven by cost and time considerations.

[0189] Accordingly, the term "hardware module" should be understood to encompass a tangible entity, be that an entity that is physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations described herein. Considering embodiments in which hardware modules are temporarily configured (e.g., programmed), each of the hardware modules need not be configured or instantiated at any one instance in time. For example, where the hardware modules comprise a general-purpose processor configured using software, the general-purpose processor may be configured as respective different hardware modules at different times. Software may accordingly configure a processor, for example, to constitute a particular hardware module at one instance of time and to constitute a different hardware module at a different instance of time.

[0190] Hardware modules can provide information to, and receive information from, other hardware modules. Accordingly, the described hardware modules may be regarded as being communicatively coupled. Where multiple of such hardware modules exist contemporaneously, communications may be achieved through signal transmission (e.g., over appropriate circuits and buses) that connect the hardware modules. In embodiments in which multiple hardware modules are configured or instantiated at different times, communications between such hardware modules may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple hardware modules have access. For example, one hardware

module may perform an operation and store the output of that operation in a memory device to which it is communicatively coupled. A further hardware module may then, at a later time, access the memory device to retrieve and process the stored output. Hardware modules may also initiate communications with input or output devices, and can operate on a resource (e.g., a collection of information).

[0191] The various operations of example methods described herein may be performed, at least partially, by one or more processors that are temporarily configured (e.g., by software) or permanently configured to perform the relevant operations. Whether temporarily or permanently configured, such processors may constitute processor-implemented modules that operate to perform one or more operations or functions. The modules referred to herein may, in some example embodiments, comprise processor-implemented modules.

[0192] Similarly, the methods or routines described herein may be at least partially processor-implemented. For example, at least some of the operations of a method may be performed by one or more processors or processor-implemented hardware modules. The performance of certain of the operations may be distributed among the one or more processors, not only residing within a single machine, but deployed across a number of machines. In some example embodiments, the processor or processors may be located in a single location (e.g., within a home environment, an office environment or as a server farm), while in other embodiments the processors may be distributed across a number of geographic locations.

[0193] Unless specifically stated otherwise, discussions herein using words such as "processing," "computing," "calculating," "determining," "presenting," "displaying," or the like may refer to actions or processes of a machine (e.g., a computer) that manipulates or transforms data represented as physical (e.g., electronic, magnetic, or optical) quantities within one or more memories (e.g., volatile memory, non-volatile memory, or a combination thereof), registers, or other machine components that receive, store, transmit, or display information.

[0194] As used herein any reference to "one embodiment" or "an embodiment" means that a particular element, feature, structure, or characteristic described in connection with the embodiment may be included in at least one embodiment. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment.

[0195] Some embodiments may be described using the expression "coupled" and "connected" along with their derivatives. For example, some embodiments may be described using the term "coupled" to indicate that two or more elements are in direct physical or electrical contact. The term "coupled," however, may also mean that two or more elements are not in direct contact with each other, but yet still co-operate or interact with each other. The embodiments are not limited in this context.

[0196] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0197] In addition, use of the "a" or "an" are employed to describe elements and components of the embodiments herein. This is done merely for convenience and to give a general sense of the description. This description, and the claims that follow, should be read to include one or at least one and the singular also includes the plural unless it is obvious that it is meant otherwise.

[0198] Upon reading this disclosure, those of skill in the art will appreciate still additional alternative structural and functional designs for the approaches described herein. Thus, while particular embodiments and applications have been illustrated and described, it is to be understood that the disclosed embodiments are not limited to the precise construction and components disclosed herein. Various modifications, changes and variations, which will be apparent to those skilled in the art, may be made in the arrangement, operation and details of the method and apparatus disclosed herein without departing from the spirit and scope defined in the appended claims.

[0199] The particular features, structures, or characteristics of any specific embodiment may be combined in any suitable manner and in any suitable combination with one or more other embodiments, including the use of selected features without corresponding use of other features. In addition, many modifications may be made to adapt a particular application, situation or material to the essential scope and spirit of the present invention. It is to be understood that other variations and modifications of the embodiments of the present invention described and illustrated herein are possible in light of the teachings herein and are to be considered part of the spirit and scope of the present invention.

[0200] While the preferred embodiments of the invention have been described, it should be understood that the invention is not so limited and modifications may be made without departing from the invention. The scope of the invention is defined by the appended claims, and all devices that come within the meaning of the claims, either literally or by equivalence, are intended to be embraced therein.

[0201] It is therefore intended that the foregoing detailed description be regarded as illustrative rather than limiting, and that it be understood that it is the following claims, including all equivalents, that are intended to define the spirit and scope of this invention.

[0202] Furthermore, the patent claims at the end of this patent application are not intended to be construed under 35 U.S.C. § 112 (f) unless traditional means-plus-function language is expressly recited, such as "means for" or "step for" language being explicitly recited in the claim(s). The systems and methods described herein are directed to an improvement to computer functionality, and improve the functioning of conventional computers.

What is claimed:

1. A computer-implemented method for using a generative artificial intelligence (AI) model to classify documents, the method comprising:

obtaining, via one or more processors, an initial set of documents from a corpus of documents;

obtaining, via the one or more processors, prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents;

generating, via the one or more processors, a prompt based on the prompt criteria;

classifying, via the one or more processors, documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model;

evaluating, via the one or more processors, classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue;

generating, via the one or more processors, a request for documents from the corpus of documents based on the first issue or the new issue;

obtaining, via the one or more processors, documents responsive to the request for documents; and

adding, via the one or more processors, the obtained documents to the initial set of documents.

2. The computer-implemented method of claim **1**, wherein the corpus of documents is associated with a vector space.

3. The computer-implemented method of claim **2**, wherein generating the request for documents comprises:

identifying, via the one or more processors, one or more key terms associated with (1) the first issue of the one or more issues or (2) the new issue associated with the corpus of documents; and

generating, via the one or more processors, the request for documents based on the one or more key terms.

4. The computer-implemented method of claim **3**, wherein the one or more key terms are associated with one or more entities.

5. The computer-implemented method of claim **2**, wherein evaluating classification performance of the prompt comprises:

evaluating, via the one or more processors, the vector space to identify one or more clusters of documents.

6. The computer-implemented method of claim **5**, wherein evaluating classification performance of the prompt further comprises:

identifying, via the one or more processors, one or more respective clusters of documents in the vector space associated with one or more misclassifications of documents of the initial set of documents.

7. The computer-implemented method of claim **6**, wherein identifying that the initial set of documents does not include enough documents associated with the first issue of the one or more issues comprises:

evaluating, via the one or more processors, the one or more respective clusters of documents associated with the one or more misclassifications of documents and the corpus of documents to identify that the initial set of documents does not include enough documents from the one or more respective clusters of documents.

8. The computer-implemented method of claim **6**, wherein identifying that the corpus of documents is associated with the new issue comprises:

evaluating, via the one or more processors, the one or more respective clusters of documents associated with the one or more misclassifications of documents and the prompt criteria to identify that at least one cluster of documents is not associated with at least one issue of the one or more issues.

9. The computer-implemented method of claim **5**, wherein evaluating classification performance of the prompt further comprises:

identifying, via the one or more processors, one or more respective clusters of documents in the vector space associated with one or more low-confidence classifications of documents of the initial set of documents.

10. The computer-implemented method of claim **9**, wherein the one or more low-confidence classifications of documents are one or more of: weak classifications of documents, or documents with no classifications.

11. The computer-implemented method of claim **1**, wherein evaluating classification performance of the prompt includes:

generating, via the one or more processors, one or more respective statistical metrics for each of the one or more issues, wherein the one or more respective statistical metrics each include one or more of: an accuracy metric, a precision metric, a recall metrics, or an elusion metric.

12. The computer-implemented method of claim **11**, wherein identifying that the initial set of documents does not include enough documents associated with the first issue of the one or more issues comprises:

evaluating, via the one or more processors, one or more statistical metrics of the one or more respective statistical metrics associated with the first issue to identify that at least one statistical metric is statistically insignificant based on the amount of documents of the initial set of documents associated with the first issue.

13. The computer-implemented method of claim **1**, wherein evaluating classification performance of the prompt comprises:

obtaining, via the one or more processors, review data associated with the initial set of documents including ground truth data associated the one or more issues; and

applying, via the one or more processors, the review data to determine classification performance of the prompt with respect to the one or more issues.

14. The computer-implemented method of claim **1**, further comprising:

classifying, via the one or more processors, the obtained documents responsive to the request for documents by inputting the prompt and the obtained documents into the generative AI model.

15. The computer-implemented method of claim **14**, further comprising:

evaluating, via the one or more processors, classification performance of the prompt based on ground truth data associated with the obtained documents.

16. The computer-implemented method of claim **1**, wherein the one or more issues are associated a knowledge graph of facts.

17. The computer-implemented method of claim **16**, further comprising:

evaluating, via the one or more processors, the knowledge graph of facts and the prompt criteria to identify the new issue.

18. The computer-implemented method of claim **16**, wherein identifying that the initial set of documents does not

include enough documents associated with a first issue of the one or more issues comprises:

identifying, via the one or more processors, one or more regions of the knowledge graph of facts associated with one or more misclassifications of documents of the initial set of documents and the first issue of the one or more issues.

19. A computer system for using a generative artificial intelligence (AI) model to classify documents, the computer system comprising:

one or more processors; and

one or more non-transitory memories, the one or more non-transitory memories having stored thereon computer-executable instructions that, when executed by the one or more processors, cause the one or more processors to:

obtain an initial set of documents from a corpus of documents;

obtain prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents;

generate a prompt based on the prompt criteria;

classify documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into the generative AI model;

evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue;

generate a request for documents from the corpus of documents based on the first issue or the new issue;

obtain documents responsive to the request for documents; and

add the obtained documents to the initial set of documents.

20. A tangible, non-transitory computer readable medium storing computer-readable instructions that, when executed by one or more processors of a computer system, cause the computer system to:

obtain an initial set of documents from a corpus of documents;

obtain prompt criteria defining an inquiry associated with the corpus of documents, wherein the prompt criteria define one or more issues associated with the corpus of documents;

generate a prompt based on the prompt criteria;

classify documents within the initial set of documents by inputting the prompt and the documents within the initial set of documents into a generative artificial intelligence (AI) model;

evaluate classification performance of the prompt to identify (i) that the initial set of documents does not include enough documents associated with a first issue of the one or more issues, or (ii) that the corpus of documents is associated with a new issue;

generate a request for documents from the corpus of documents based on the first issue or the new issue;

obtain documents responsive to the request for documents; and

add the obtained documents to the initial set of documents.

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