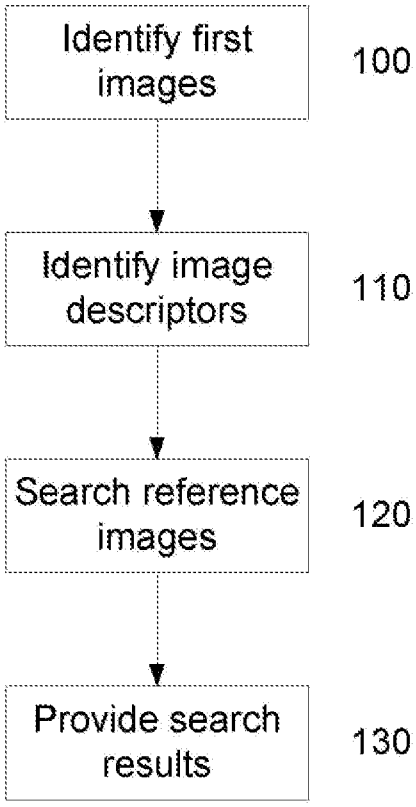

Identify first images
100
Identify image descriptors
110
Search reference images
120
Provide search results
130

Fig. 1A

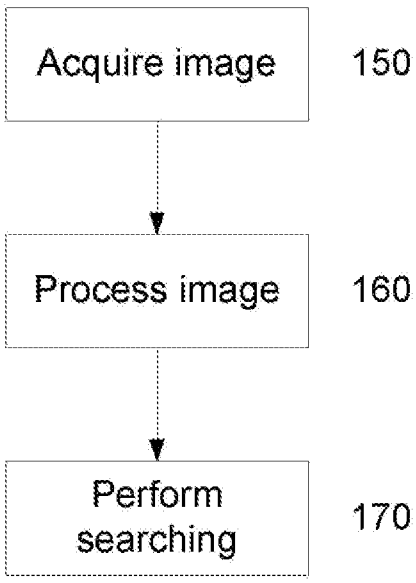

Acquire image
150
Process image
160
Perform searching
170

Fig. 1B

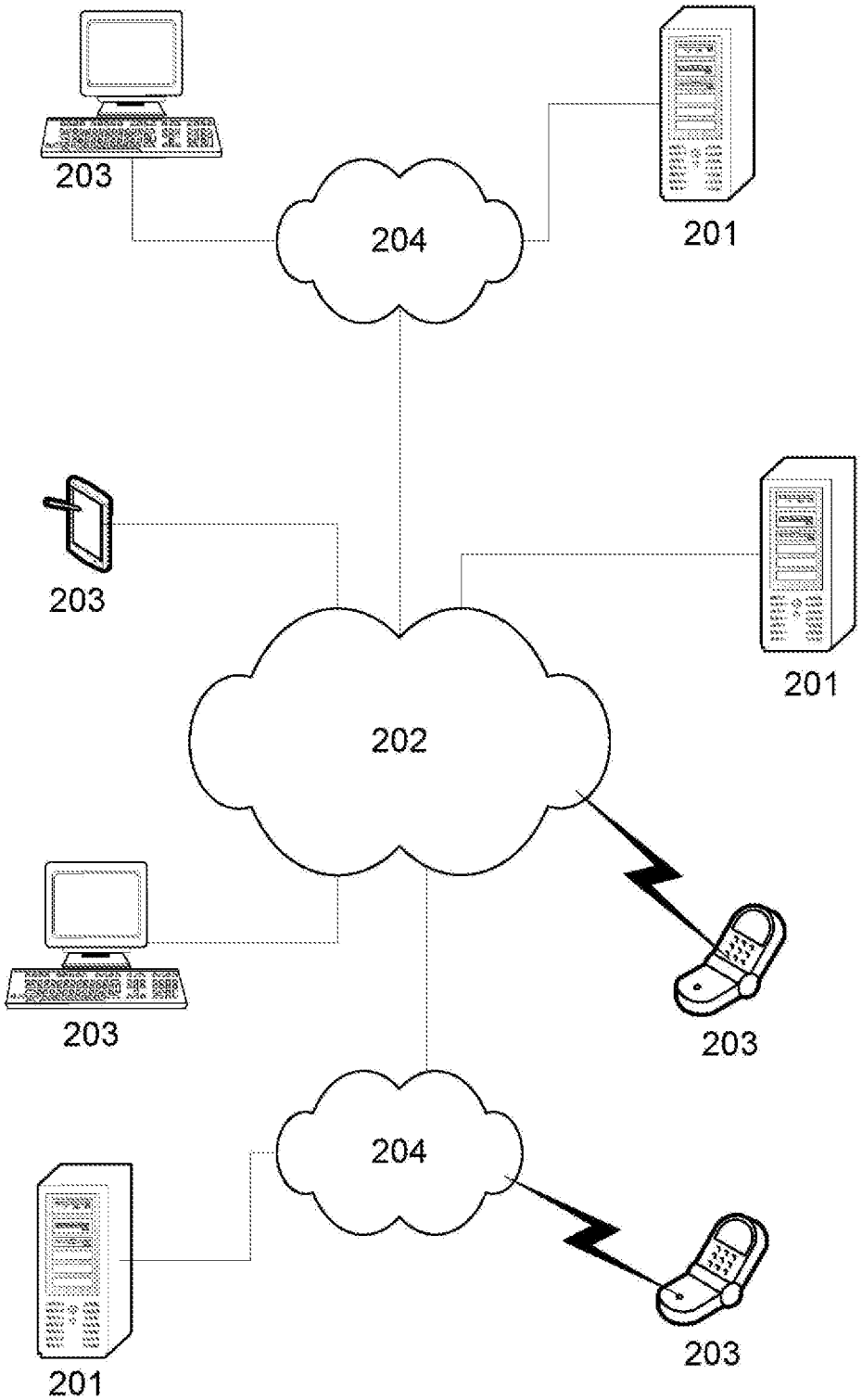


Fig. 2

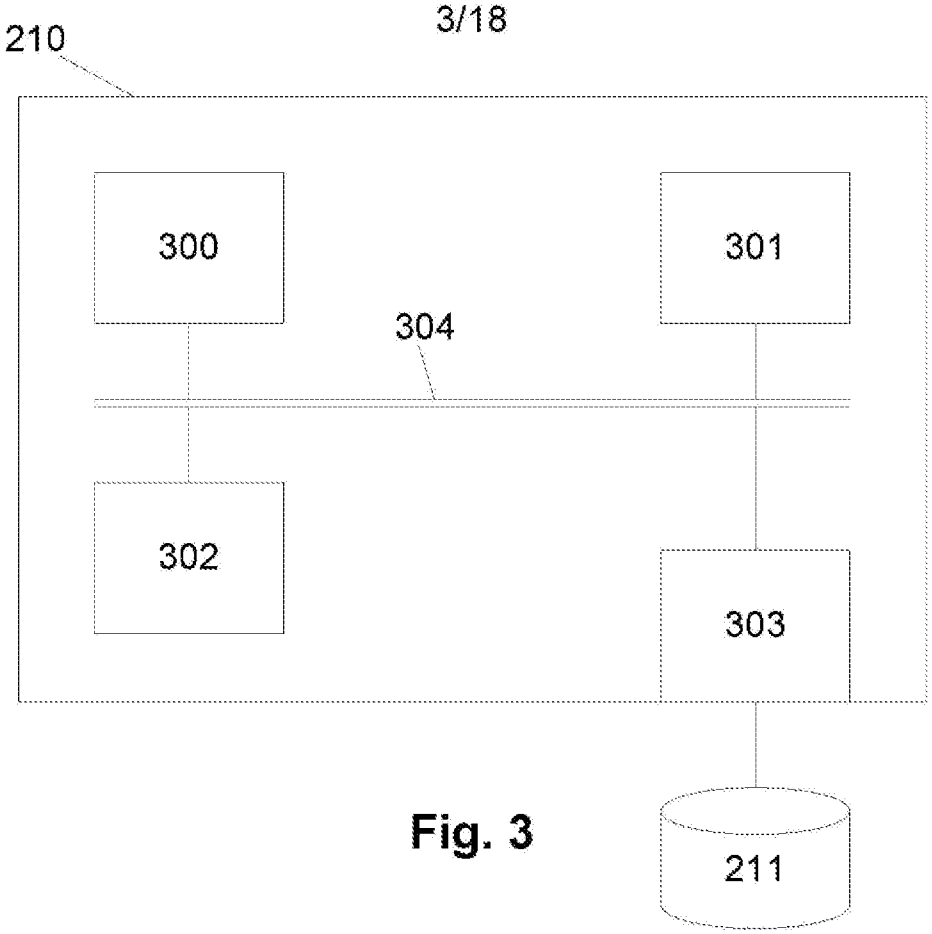


Fig. 3

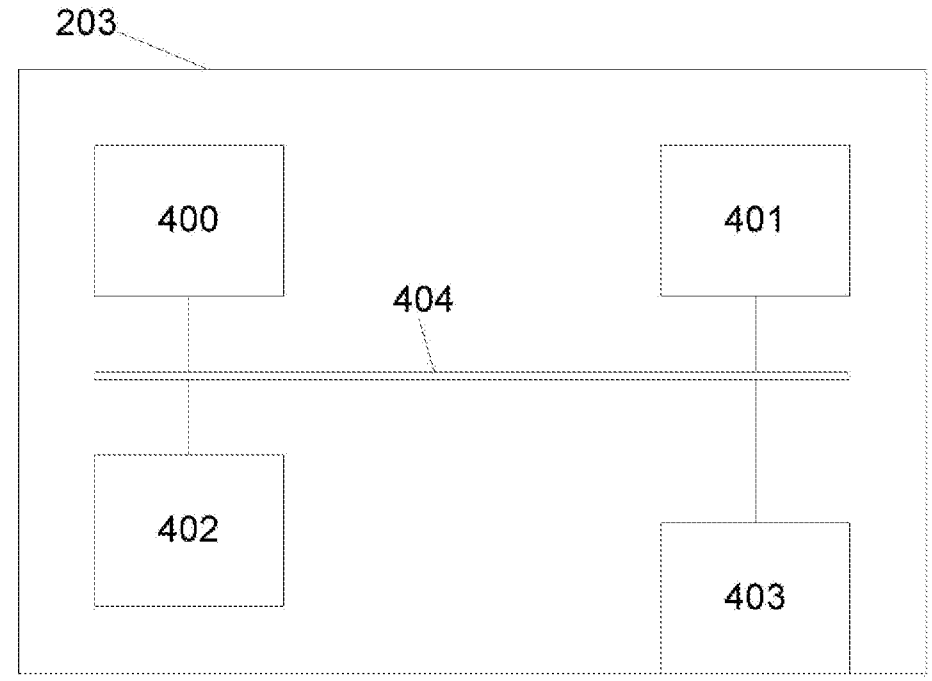


Fig. 4

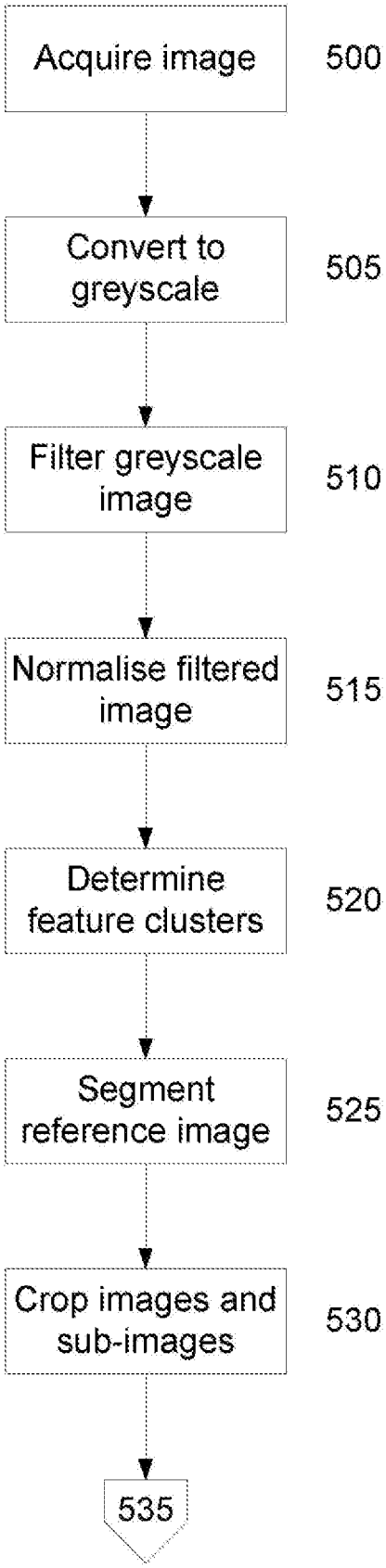

Acquire image
500
Convert to greyscale
505
Filter greyscale image
510
Normalise filtered image
515
Determine feature clusters
520
Segment reference image
525
Crop images and sub-images
530
535

Fig. 5A

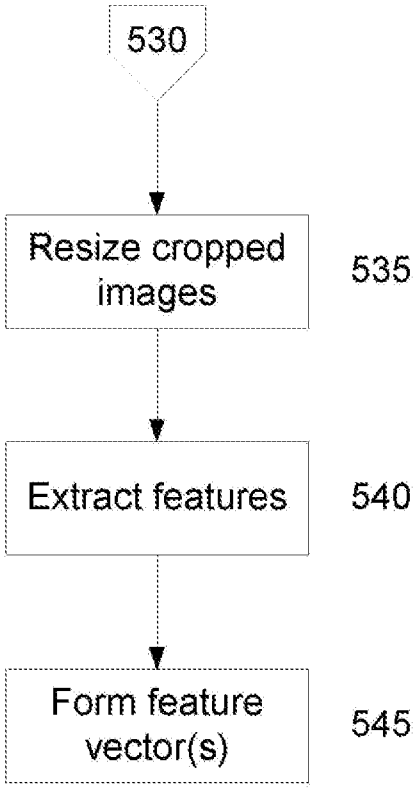

530
Resize cropped images
535
Extract features
540
Form feature vector(s)
545

Fig. 5B

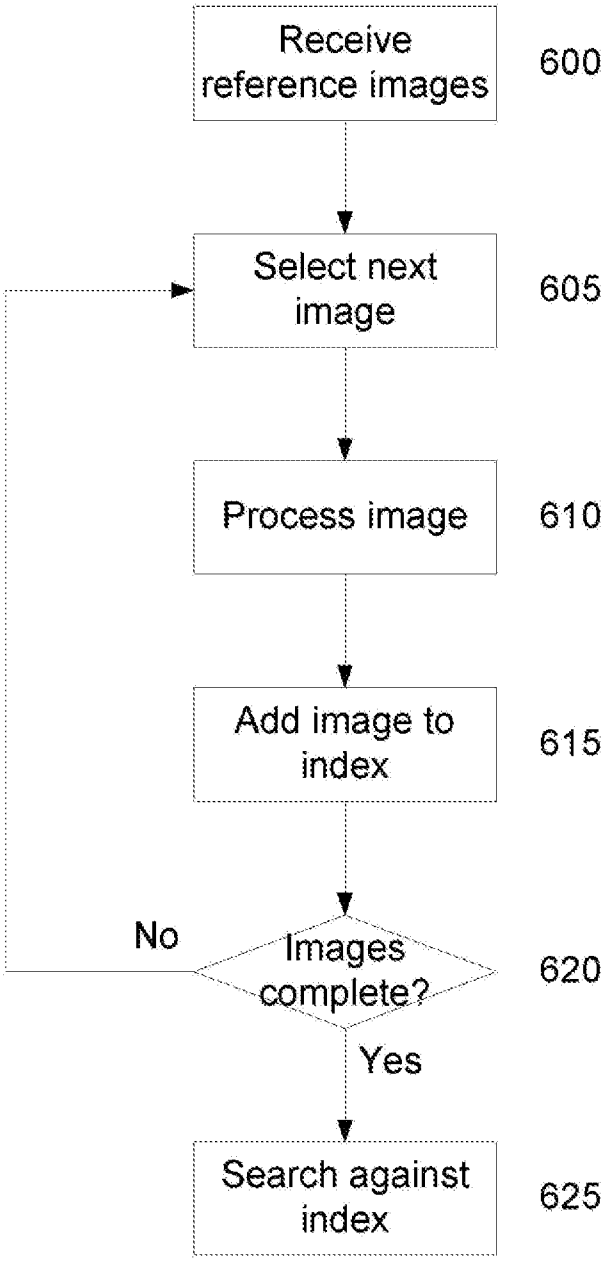

Receive reference images
600
Select next image
605
Process image
610
Add image to index
615
No
Images complete?
620
Yes
Search against index
625

Fig. 6

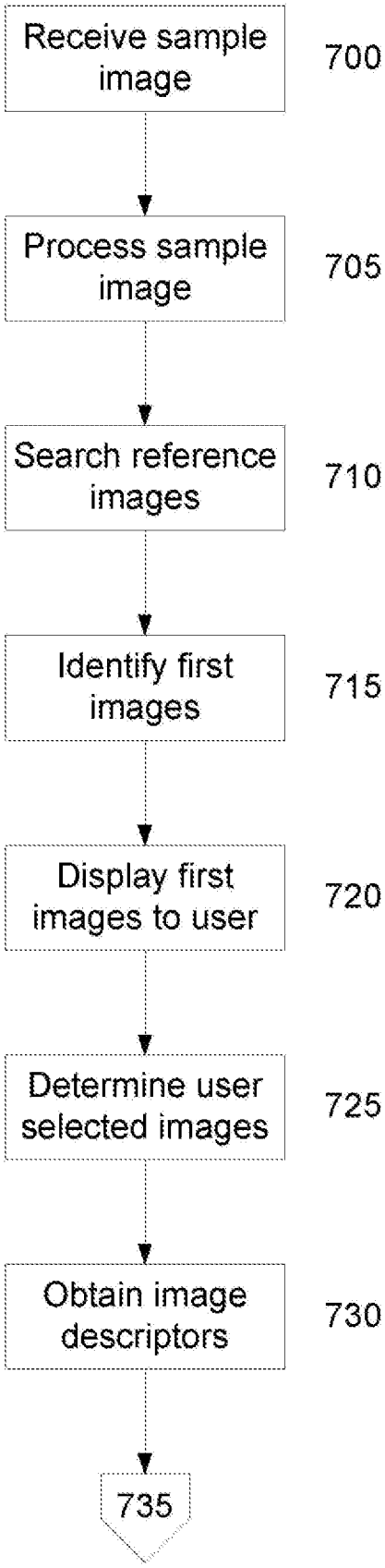

Receive sample image
700
Process sample image
705
Search reference images
710
Identify first images
715
Display first images to user
720
Determine user selected images
725
Obtain image descriptors
730
735

Fig. 7A

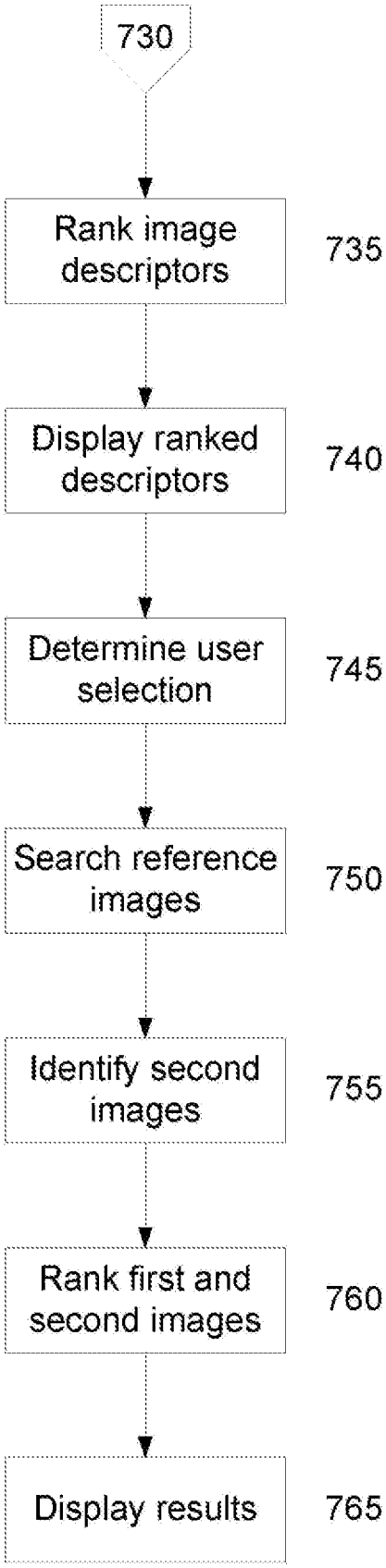

730
Rank image descriptors
735
Display ranked descriptors
740
Determine user selection
745
Search reference images
750
Identify second images
755
Rank first and second images
760
Display results
765

Fig. 7B

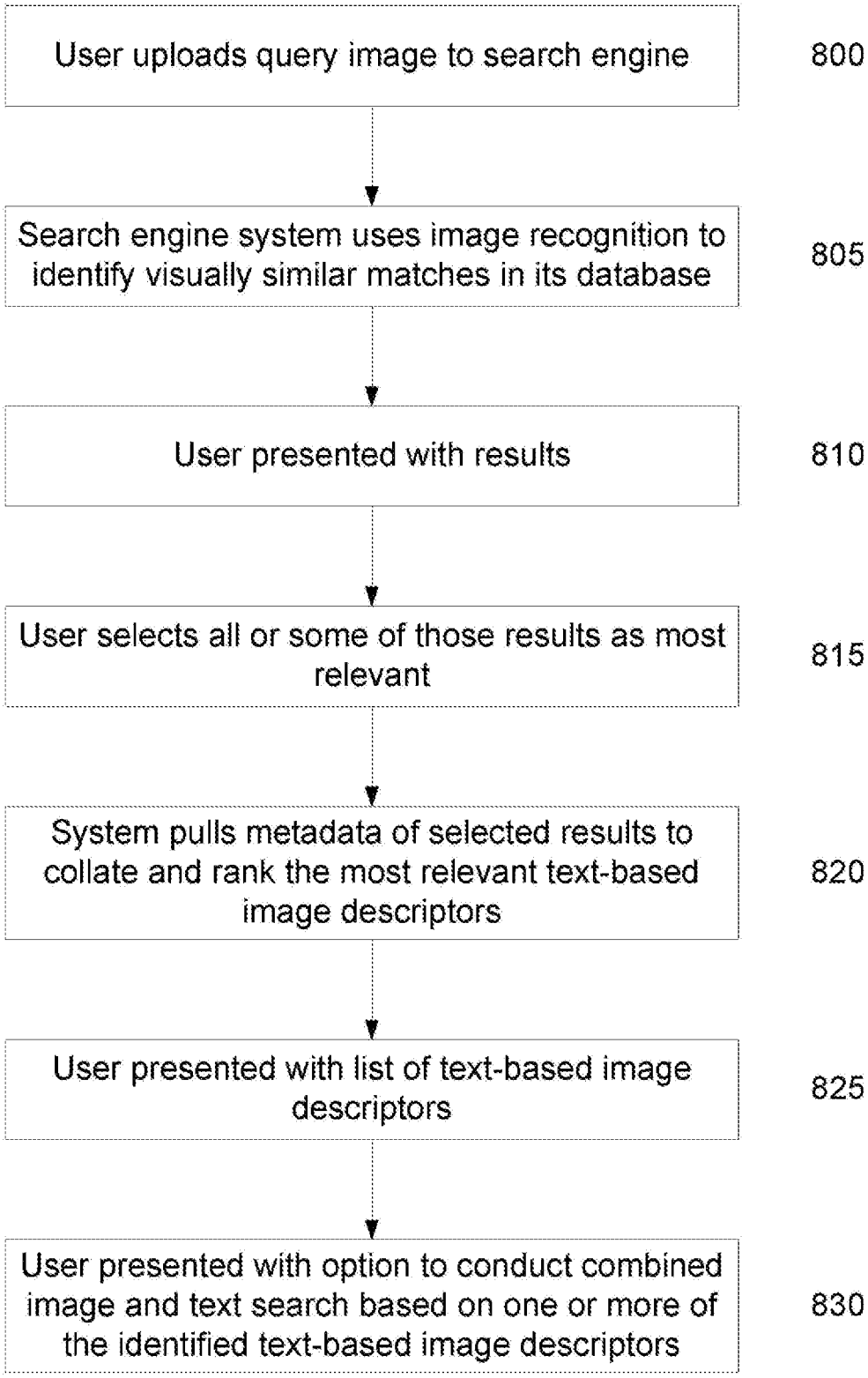

User uploads query image to search engine
800
Search engine system uses image recognition to identify visually similar matches in its database
805
User presented with results
810
User selects all or some of those results as most relevant
815
System pulls metadata of selected results to collate and rank the most relevant text-based image descriptors
820
User presented with list of text-based image descriptors
825
User presented with option to conduct combined image and text search based on one or more of the identified text-based image descriptors
830

Fig. 8

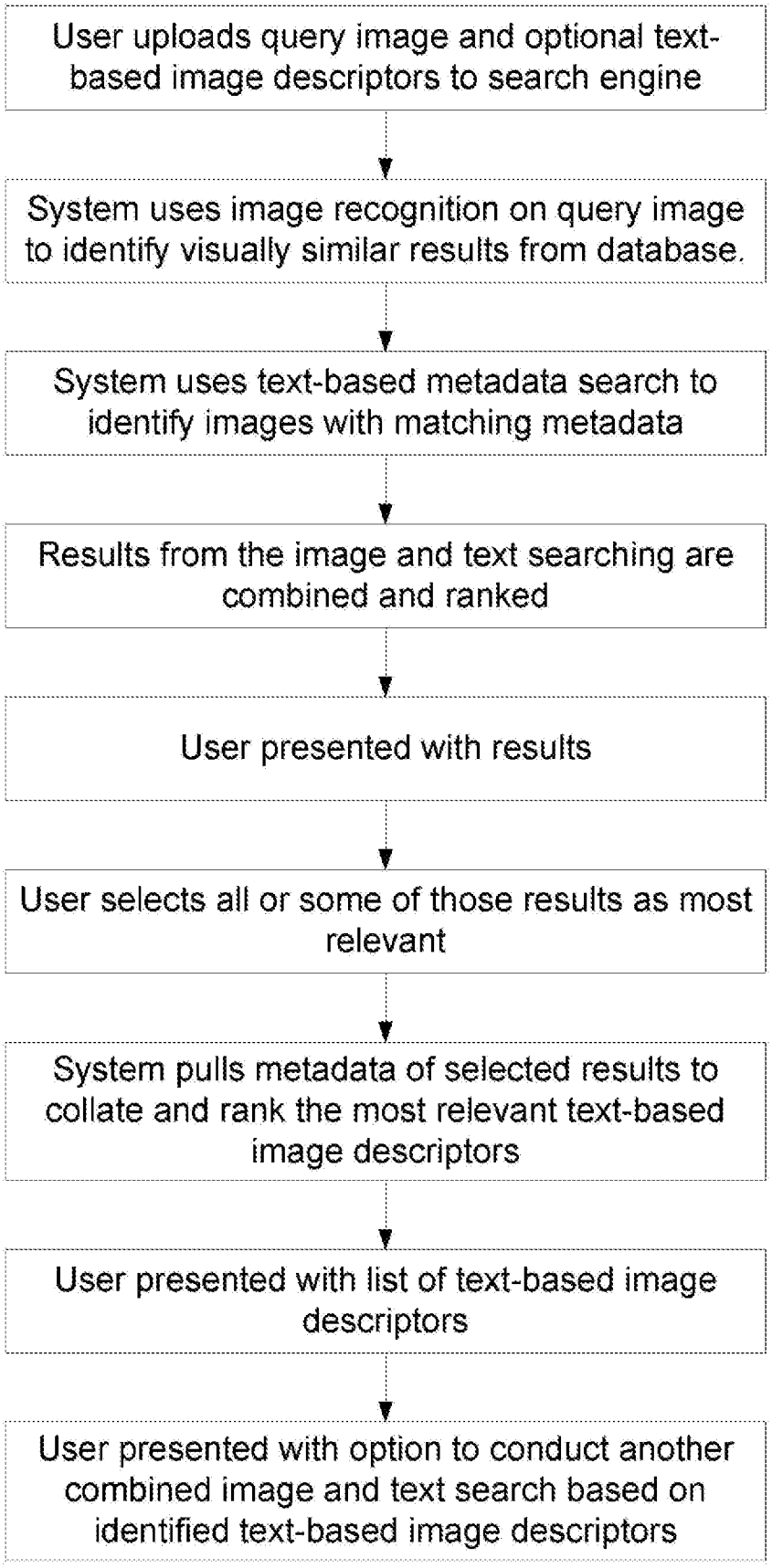

User uploads query image and optional text-based image descriptors to search engine
900
System uses image recognition on query image to identify visually similar results from database.
905
System uses text-based metadata search to identify images with matching metadata
910
Results from the image and text searching are combined and ranked
915
User presented with results
920
User selects all or some of those results as most relevant
925
System pulls metadata of selected results to collate and rank the most relevant text-based image descriptors
930
User presented with list of text-based image descriptors
935
User presented with option to conduct another combined image and text search based on identified text-based image descriptors
940

Fig. 9

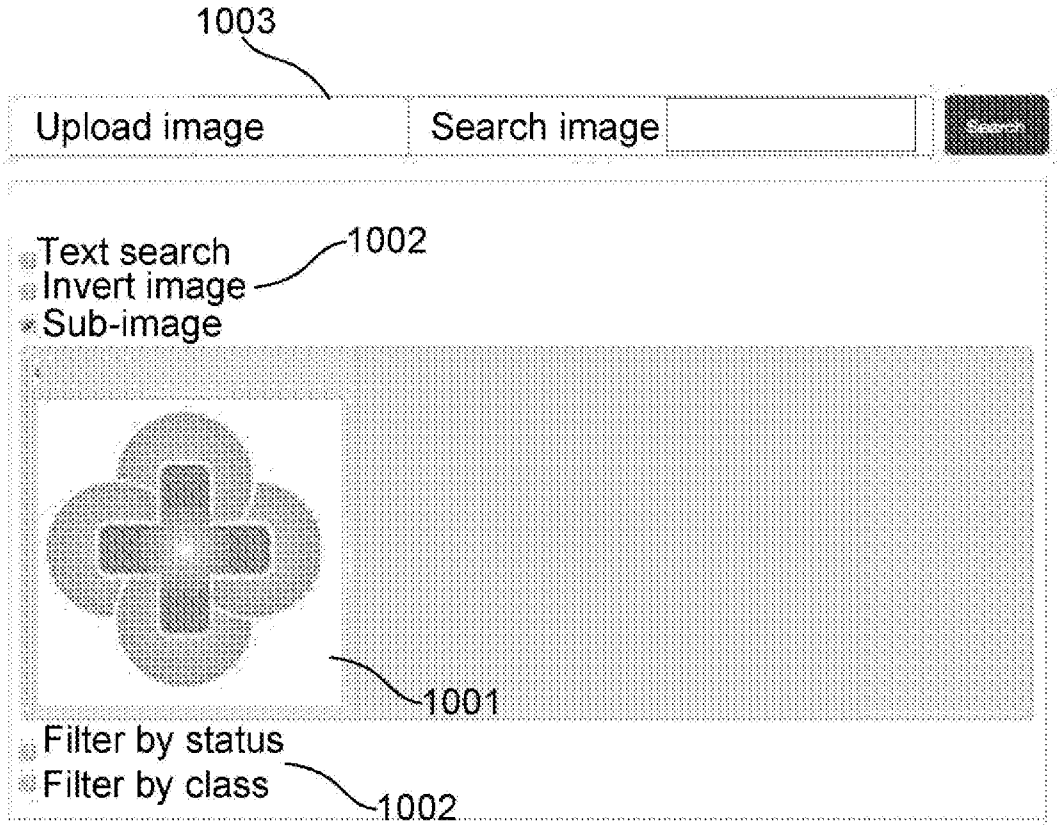

1003
Upload image
Search image
Text search
Invert image
Sub-image
1002
1001
Filter by status
Filter by class
1002

Fig. 10

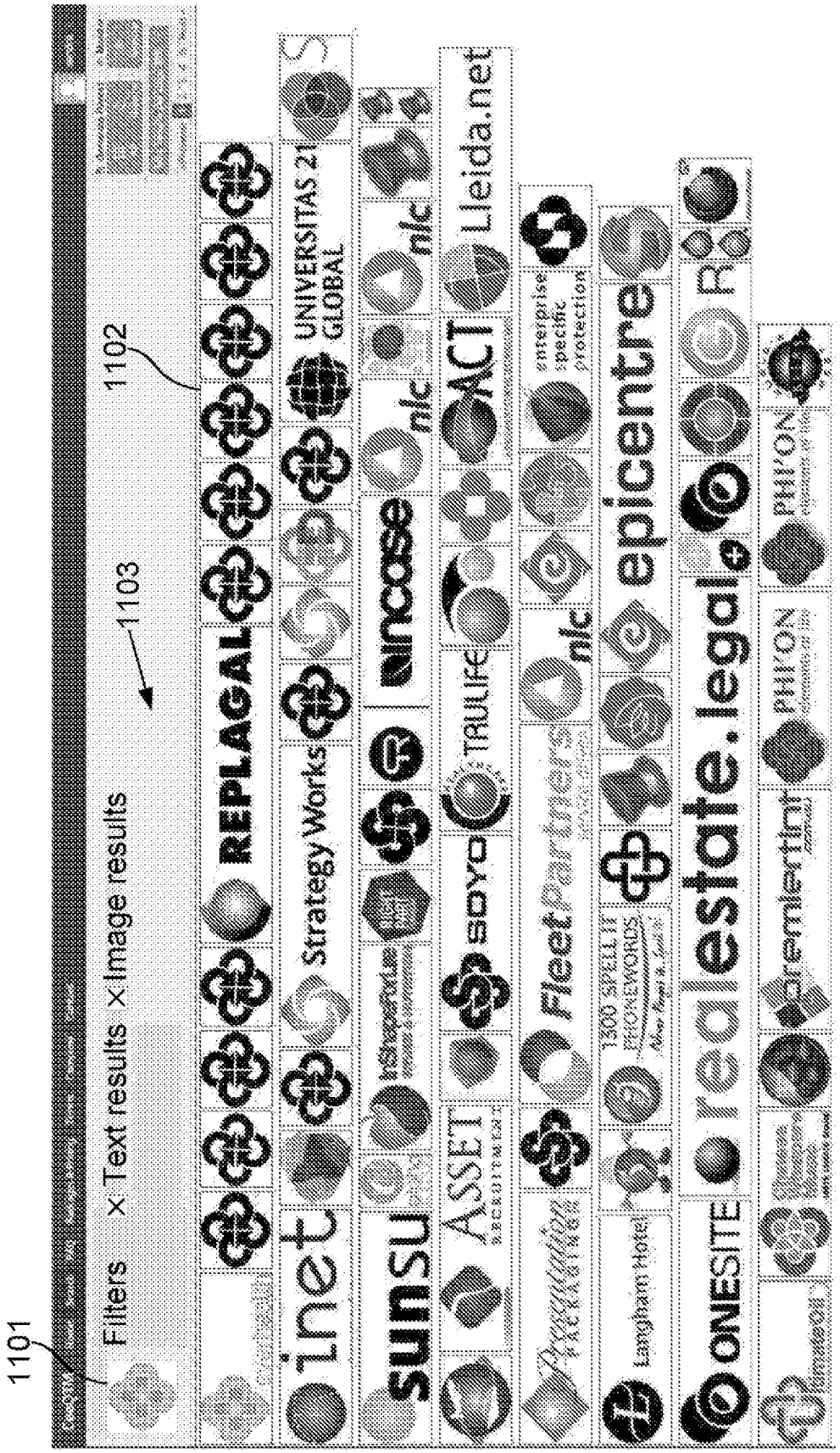

1101
Filters
Text results
Image results
1102
1103
REPLAGAL
Strategy Works
UNIVERSITAS 21 GLOBAL
nlc
ACT
Lleida.net
FleetPartners
epicentre
ONESITE
realestate.legal
PHI'ON

Fig. 11

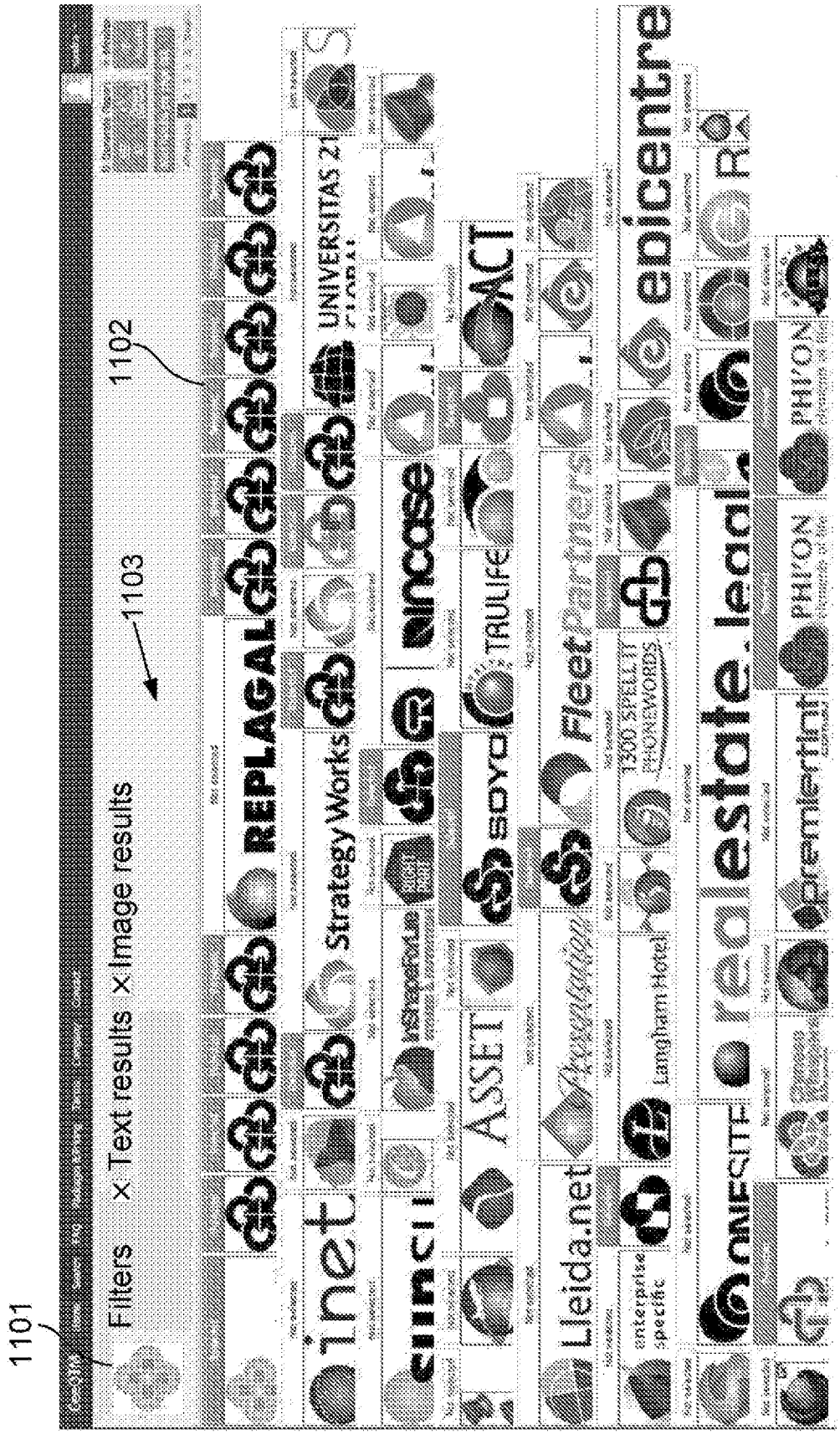

1101
Filters
Text results
Image results
1102
1103
REPLAGAL
Strategy Works
UNIVERSITAS 21
ASSET
soya
TRULIFE
ACT
FleetPartners
Lleida.net
1300 SPELLIT
PHONEWORDS
Langham Hotel
enicentre
realestate.legal
premiertint
PHI'ON

Fig. 12

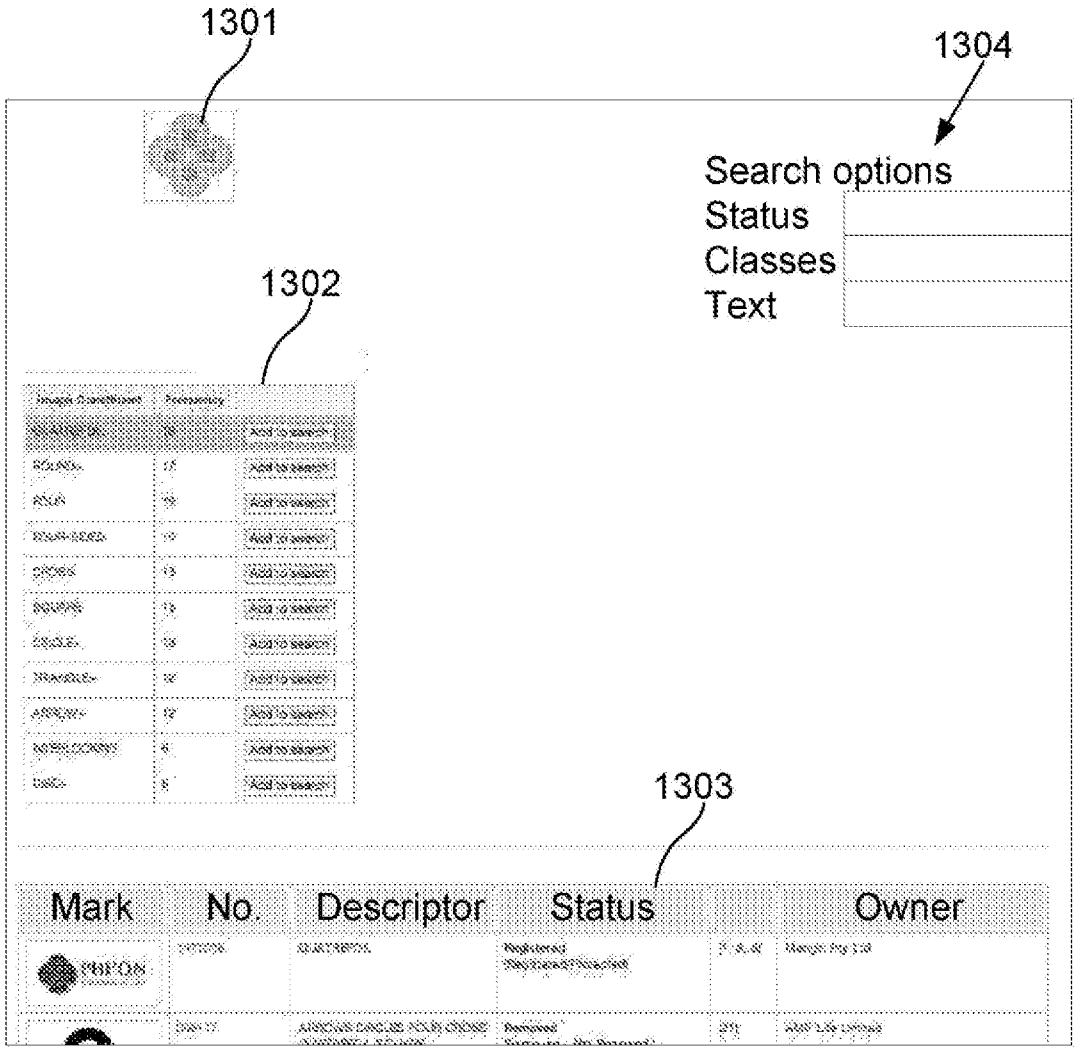

1301
1304
Search options
Status
Classes
Text
1302
1303
Mark
No.
Descriptor
Status
Owner

Fig. 13

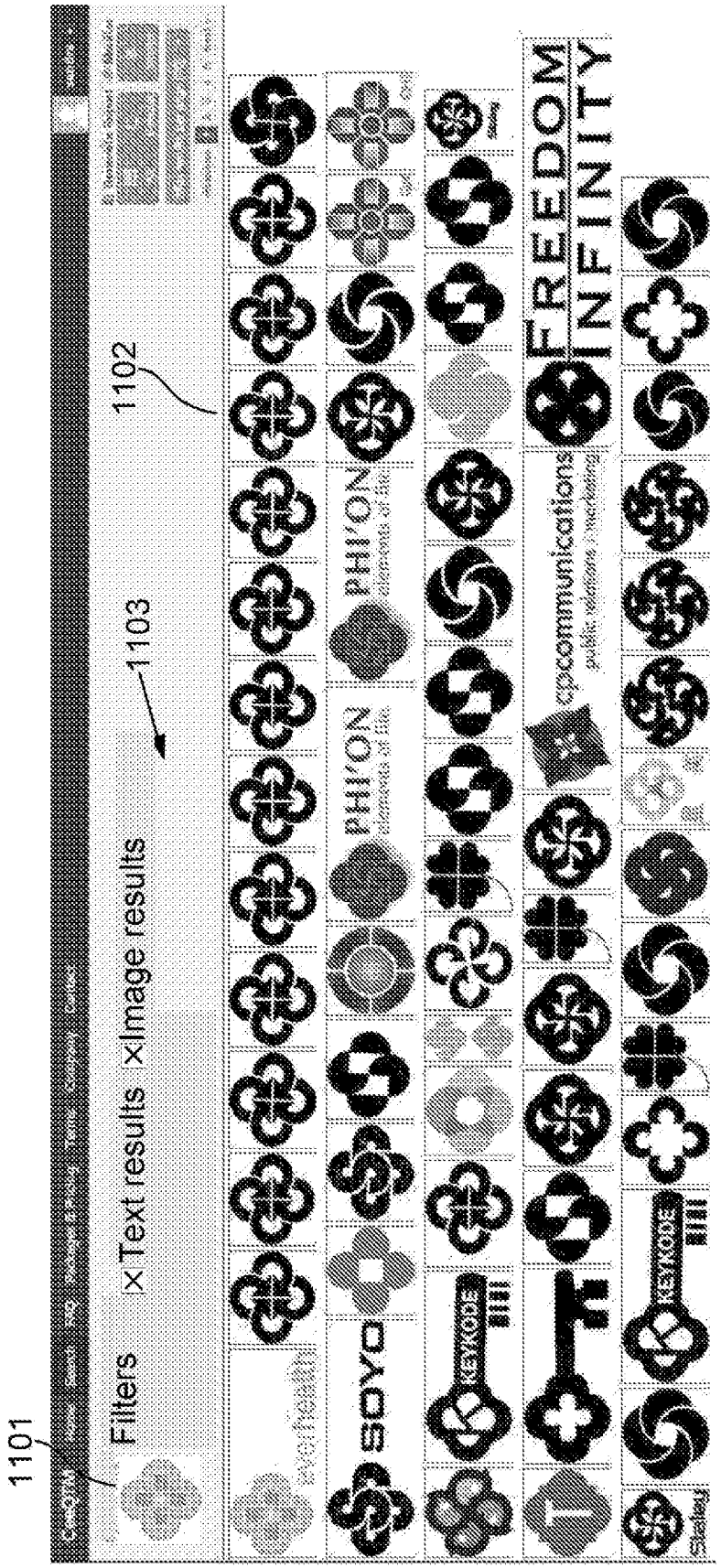

1101
Filters
Text results
Image results
1102
1103
PHI'ON
FREEDOM
INFINITY
KEYKODE

Fig. 14

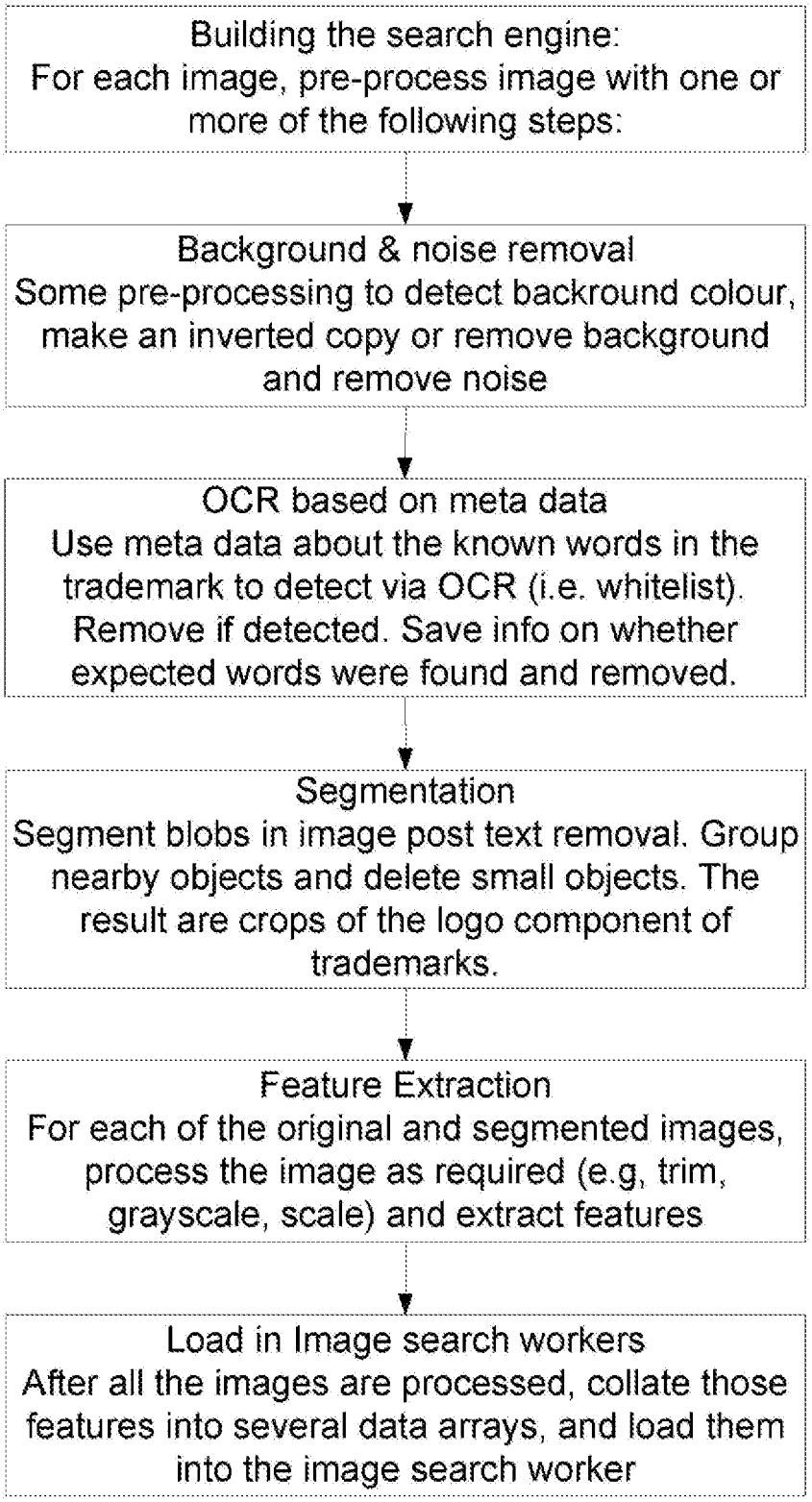

Building the search engine:
For each image, pre-process image with one or more of the following steps:
1500
Background & noise removal
Some pre-processing to detect backround colour, make an inverted copy or remove background and remove noise
1505
OCR based on meta data
Use meta data about the known words in the trademark to detect via OCR (i.e. whitelist). Remove if detected. Save info on whether expected words were found and removed.
1510
Segmentation
Segment blobs in image post text removal. Group nearby objects and delete small objects. The result are crops of the logo component of trademarks.
1515
Feature Extraction
For each of the original and segmented images, process the image as required (e.g, trim, grayscale, scale) and extract features
1520
Load in Image search workers
After all the images are processed, collate those features into several data arrays, and load them into the image search worker
1525

Fig. 15

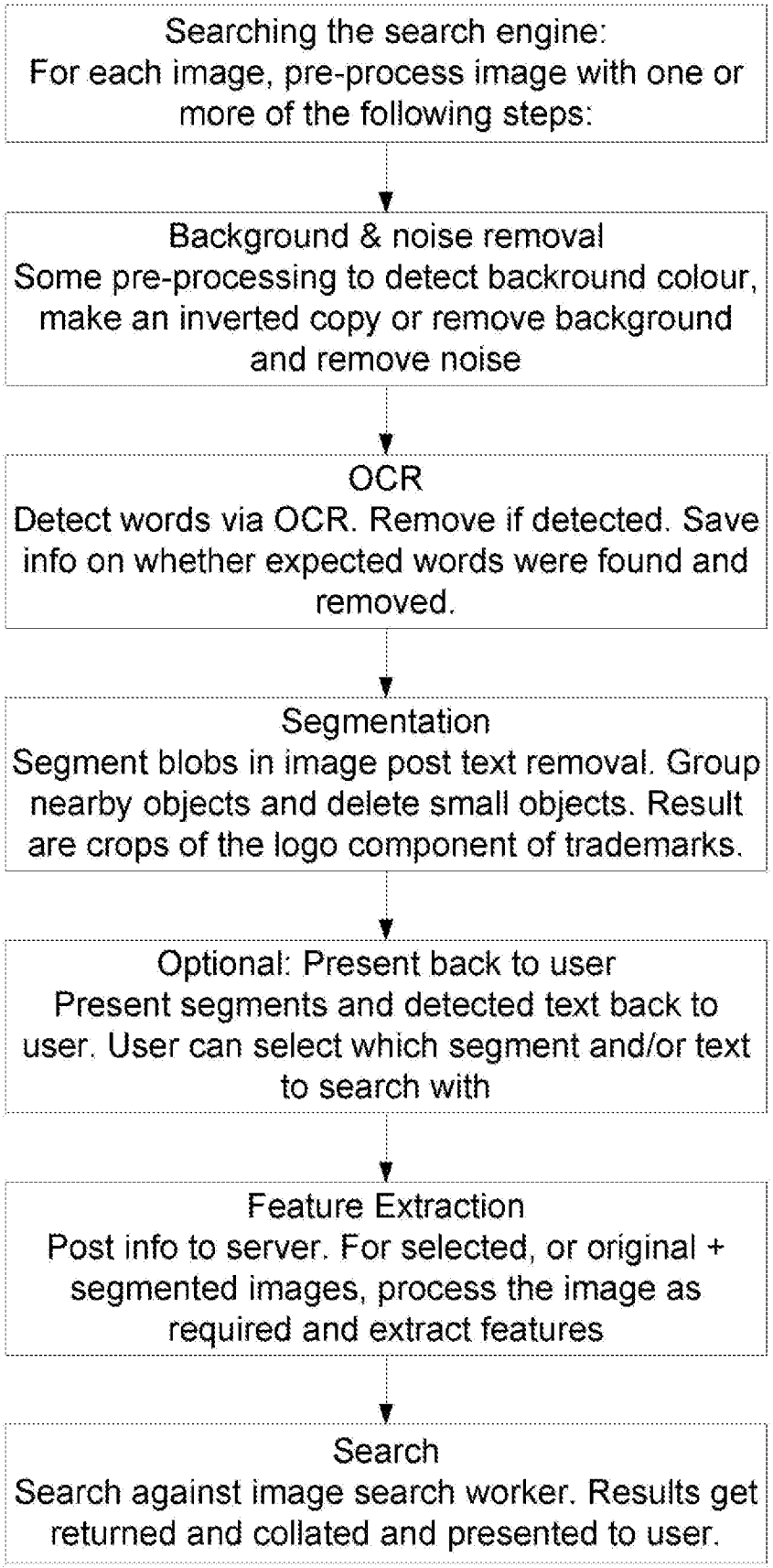

Searching the search engine:
For each image, pre-process image with one or more of the following steps:
1600
Background & noise removal
Some pre-processing to detect backround colour, make an inverted copy or remove background and remove noise
1605
OCR
Detect words via OCR. Remove if detected. Save info on whether expected words were found and removed.
1610
Segmentation
Segment blobs in image post text removal. Group nearby objects and delete small objects. Result are crops of the logo component of trademarks.
1615
Optional: Present back to user
Present segments and detected text back to user. User can select which segment and/or text to search with
1620
Feature Extraction
Post info to server. For selected, or original + segmented images, process the image as required and extract features
1625
Search
Search against image search worker. Results get returned and collated and presented to user.
1630

Fig. 16

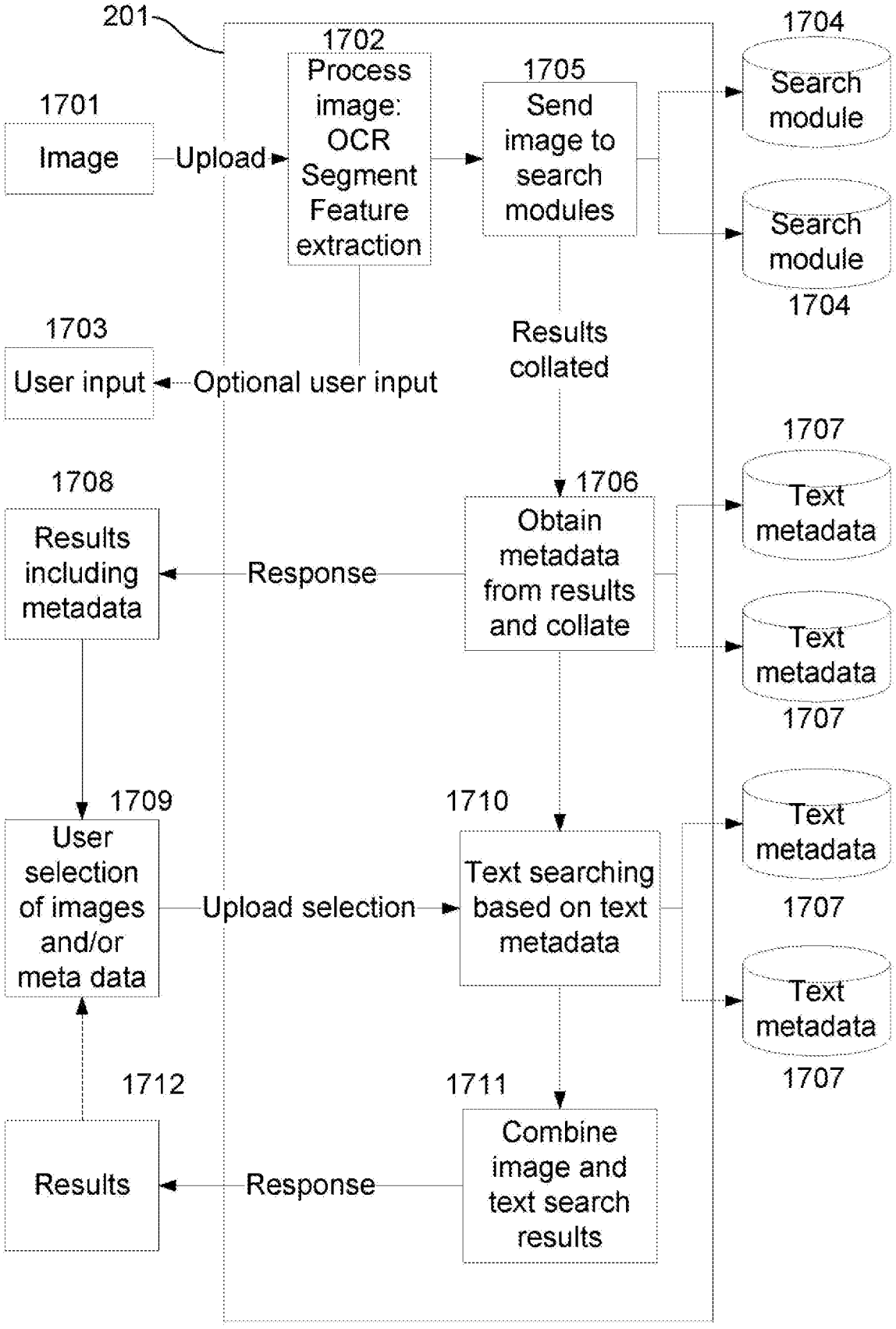

201
1701
Image
Upload
1702
Process image: OCR Segment Feature extraction
1705
Send image to search modules
1704
Search module
Search module
1704
1703
User input
Optional user input
Results collated
1707
1708
Results including metadata
Response
1706
Obtain metadata from results and collate
Text metadata
Text metadata
1707
1709
User selection of images and/or meta data
Upload selection
1710
Text searching based on text metadata
Text metadata
1707
Text metadata
1707
1712
Results
Response
1711
Combine image and text search results

Fig. 17