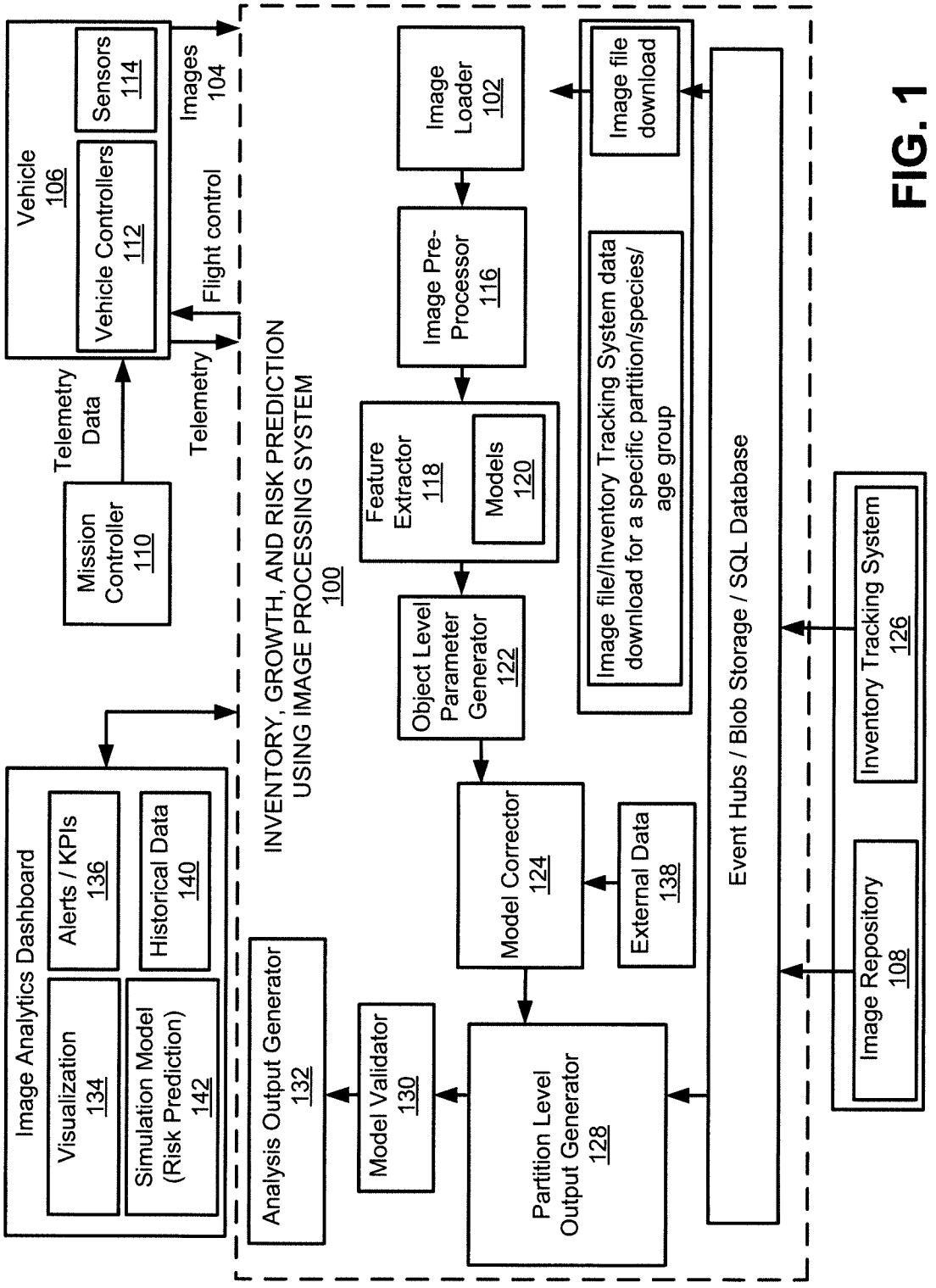
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Vehicle Controllers
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Sensors
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Flight control
Telemetry
Telemetry Data
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108
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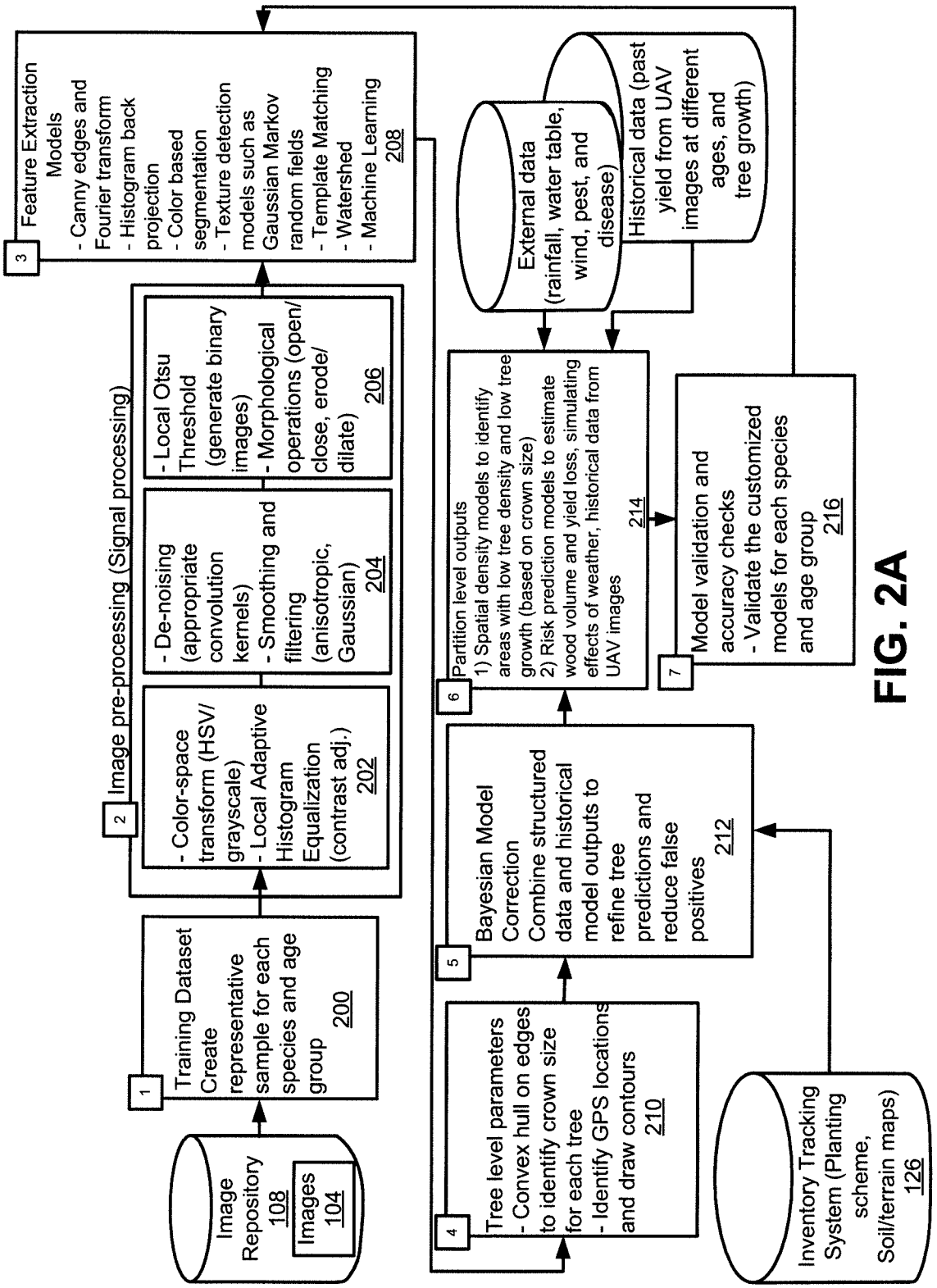
126

FIG. 1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1
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- Local Adaptive Histogram Equalization (contrast adj.) 202
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- Smoothing and filtering (anisotropic, Gaussian) 204
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6
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7
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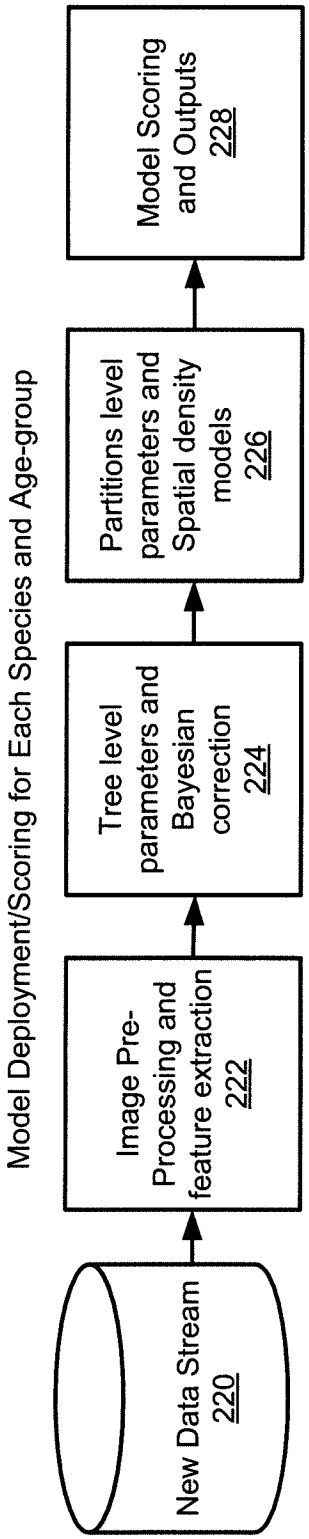
FIG. 2A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222
Tree level parameters and Bayesian correction
224
Partitions level parameters and Spatial density models
226
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228

FIG. 2B

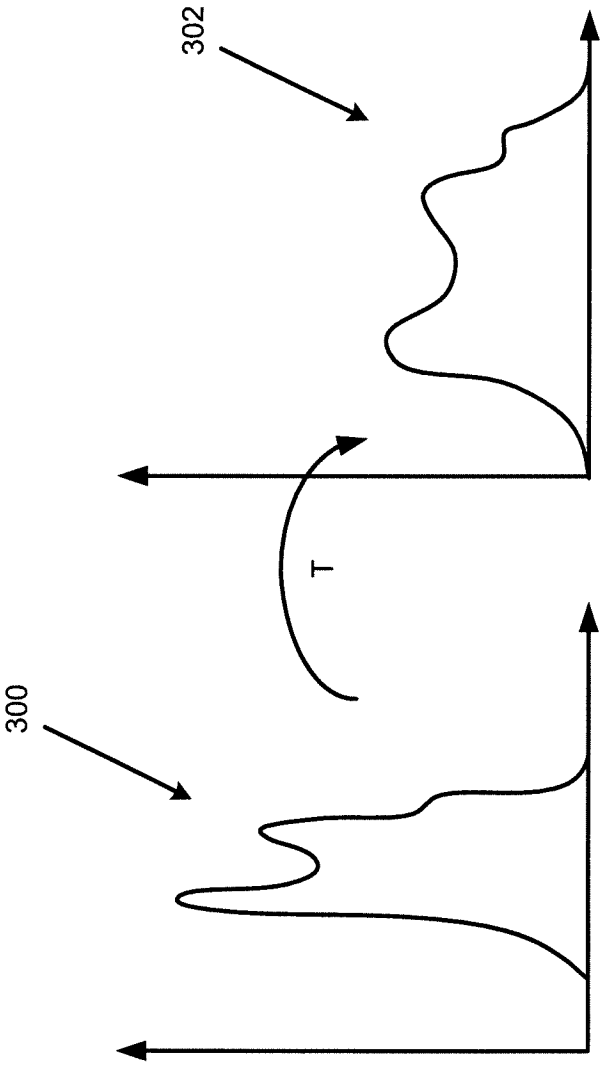
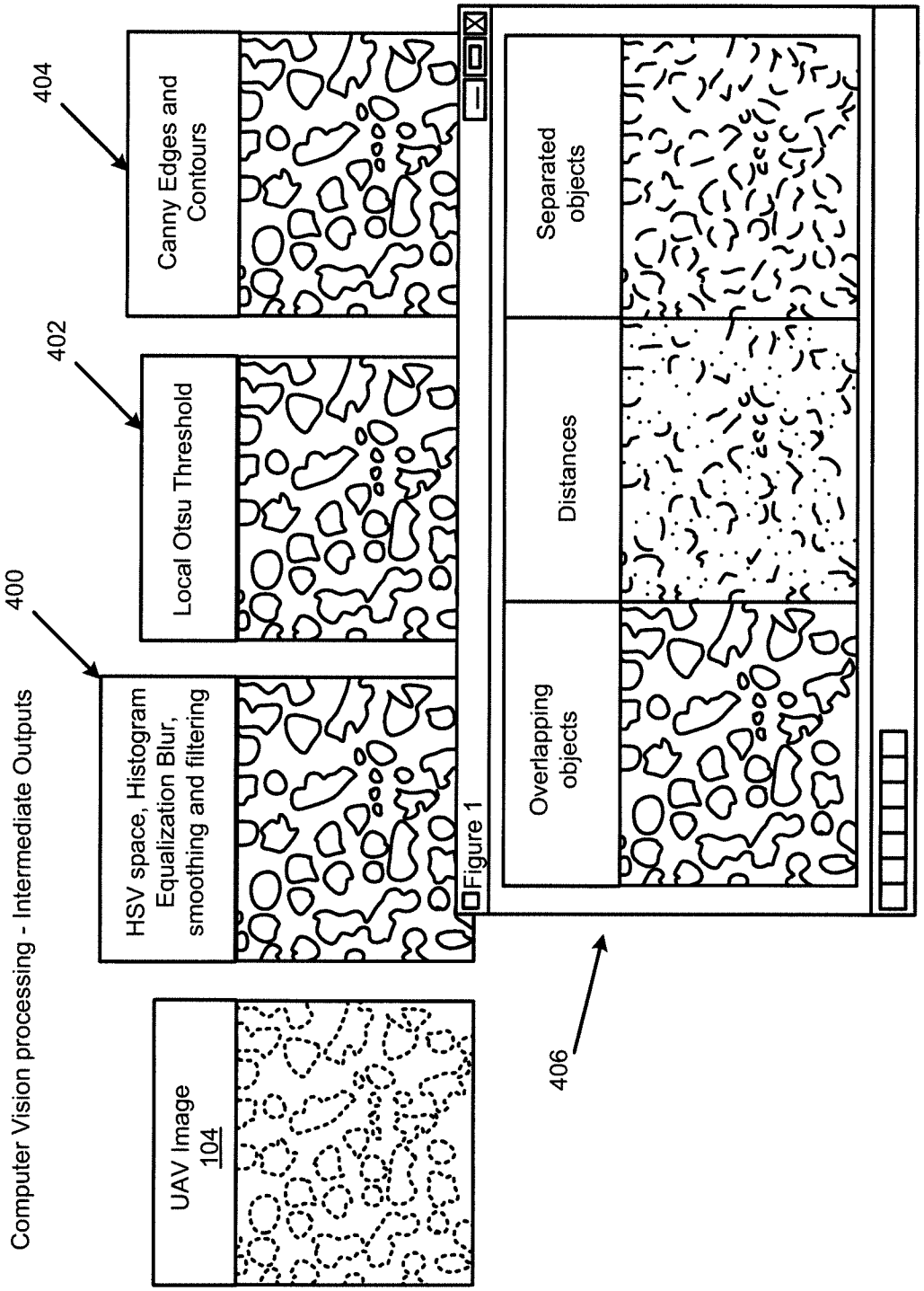


FIG. 3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400
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402
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Figure 1
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FIG. 4

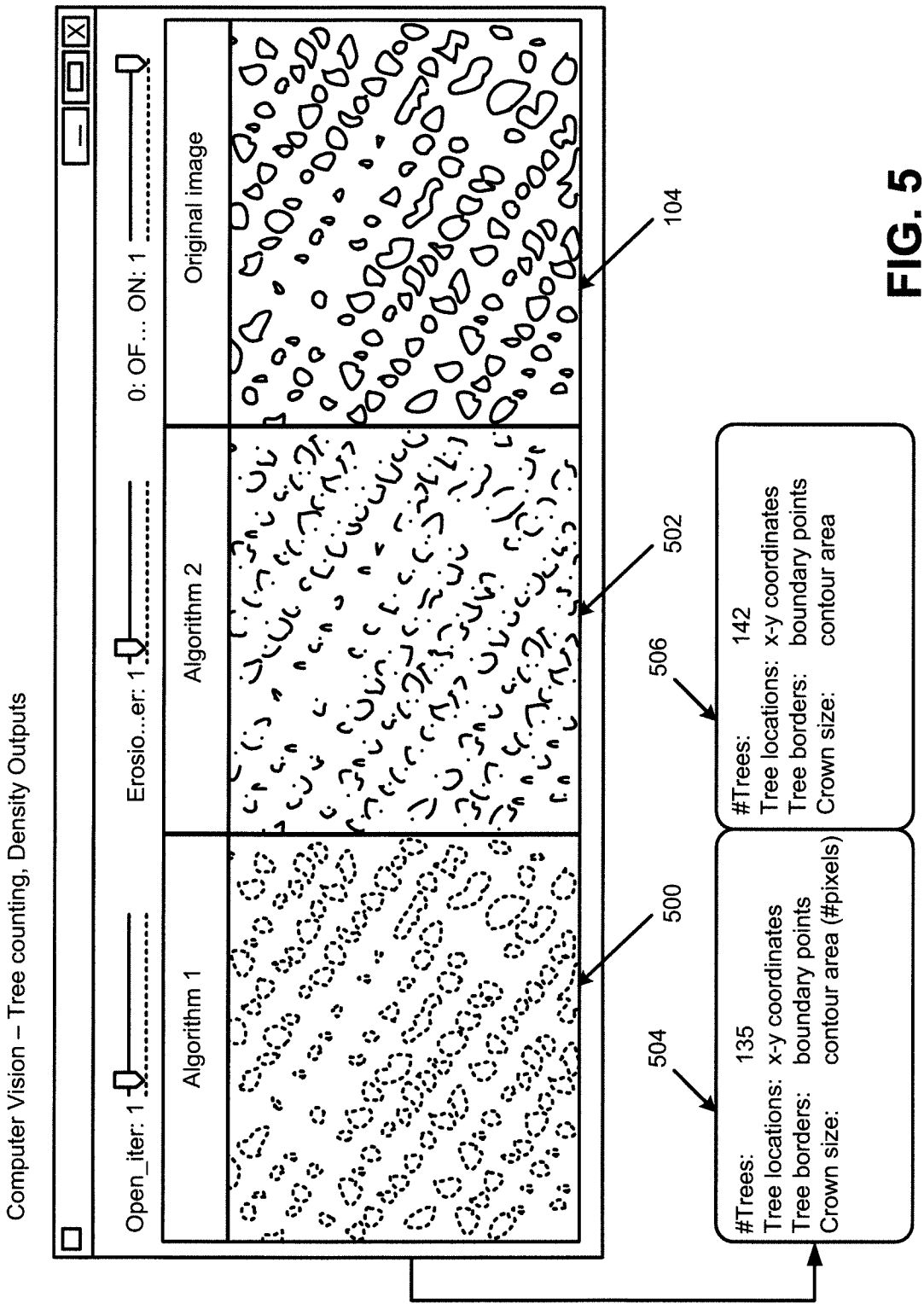

Computer Vision – Tree counting, Density Outputs
Open_iter: 1
Erosio...er: 1
0: OF... ON: 1
Algorithm 1
Algorithm 2
Original image
#Trees: 135
Tree locations: x-y coordinates
Tree borders: boundary points
Crown size: contour area (#pixels)
#Trees: 142
Tree locations: x-y coordinates
Tree borders: boundary points
Crown size: contour area
500
502
504
506
104

FIG. 5

Automated computer vision processing for one partition in cloud-
Input Image to tree count/location in < 5 mins

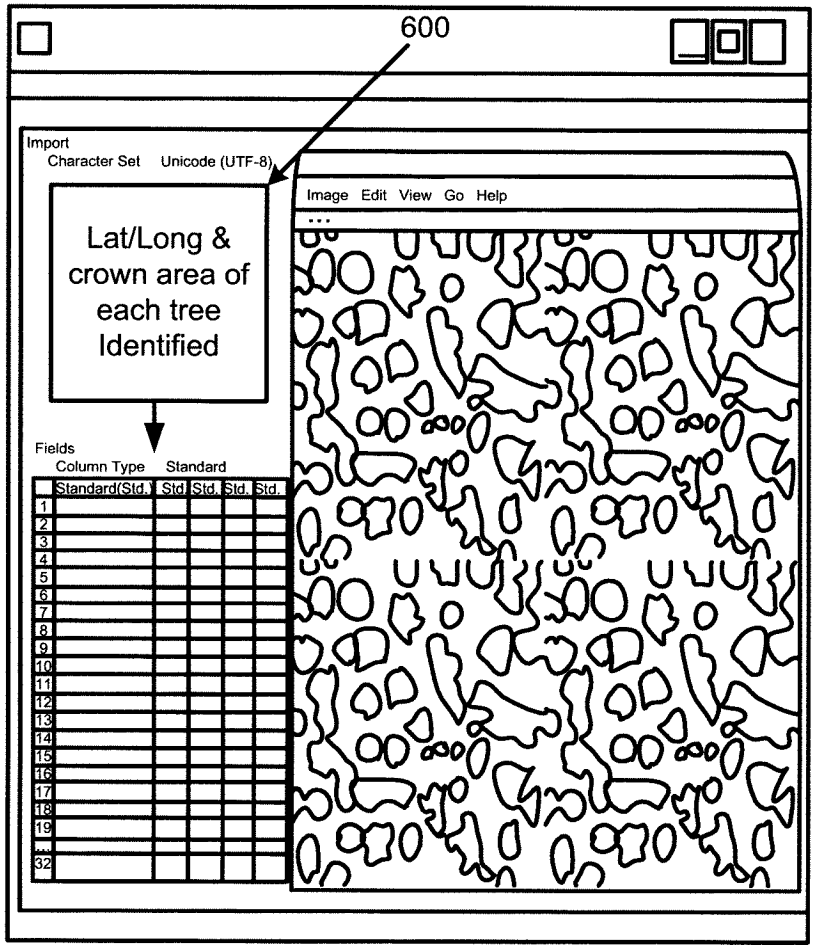
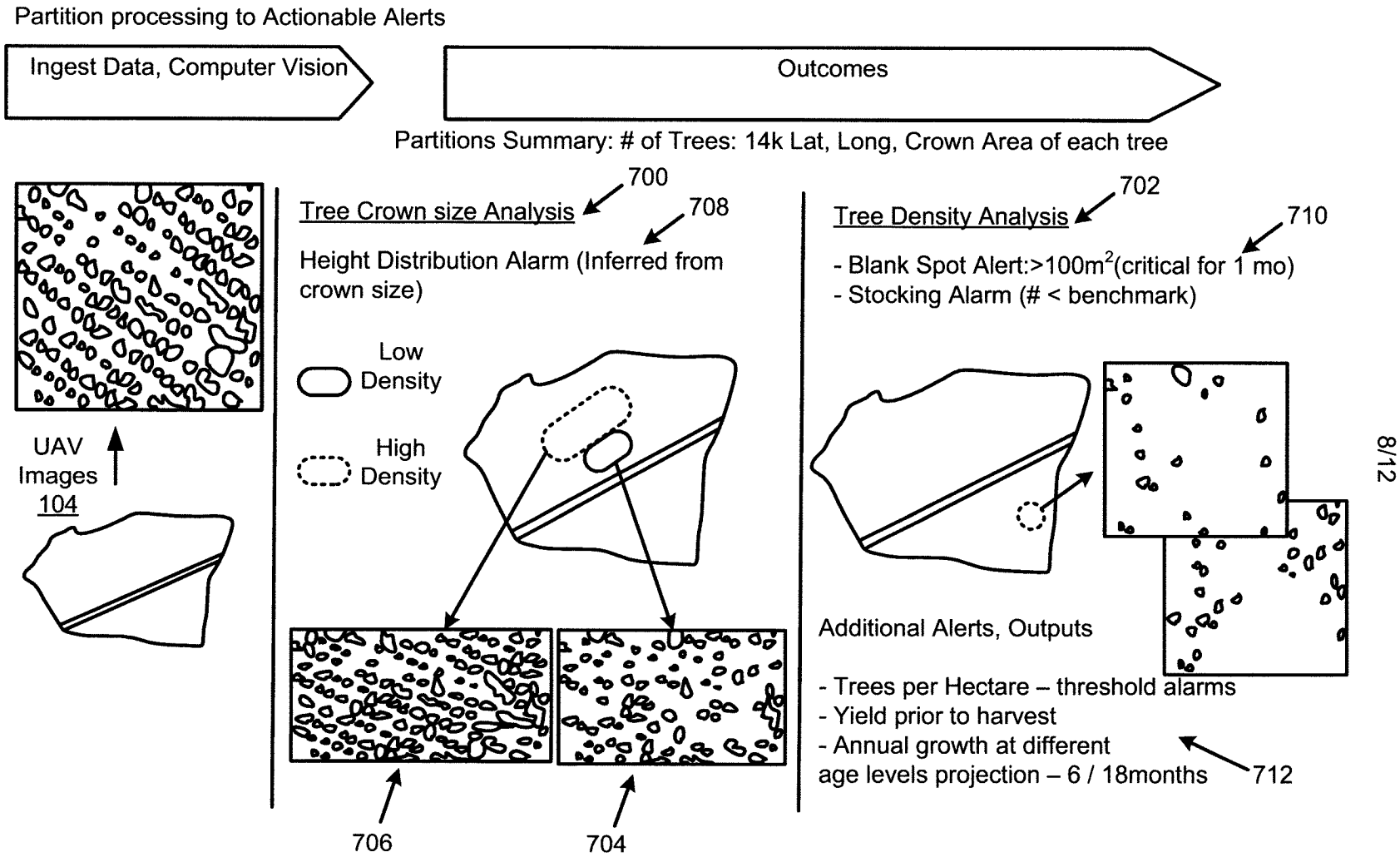


FIG. 6


Partition processing to Actionable Alerts
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700
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708
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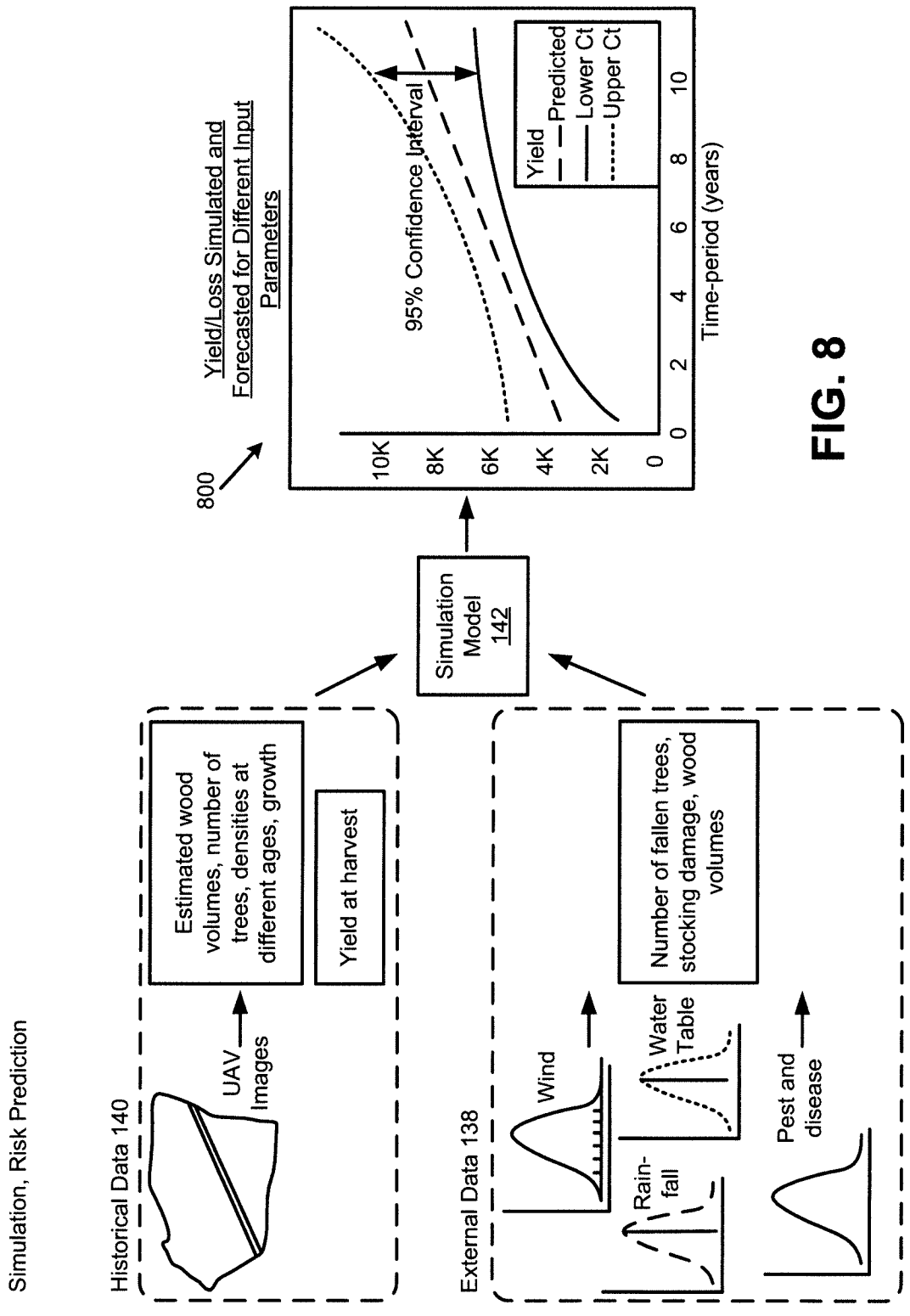
706
704
702
Tree Density Analysis
710
- Blank Spot Alert:>100m2(critical for 1 mo)
- Stocking Alarm (# < benchmark)
Additional Alerts, Outputs
- Trees per Hectare – threshold alarms
- Yield prior to harvest
- Annual growth at different age levels projection – 6 / 18months
712

FIG. 7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Yield at harvest
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Rain-fall
Water Table
Pest and disease
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800
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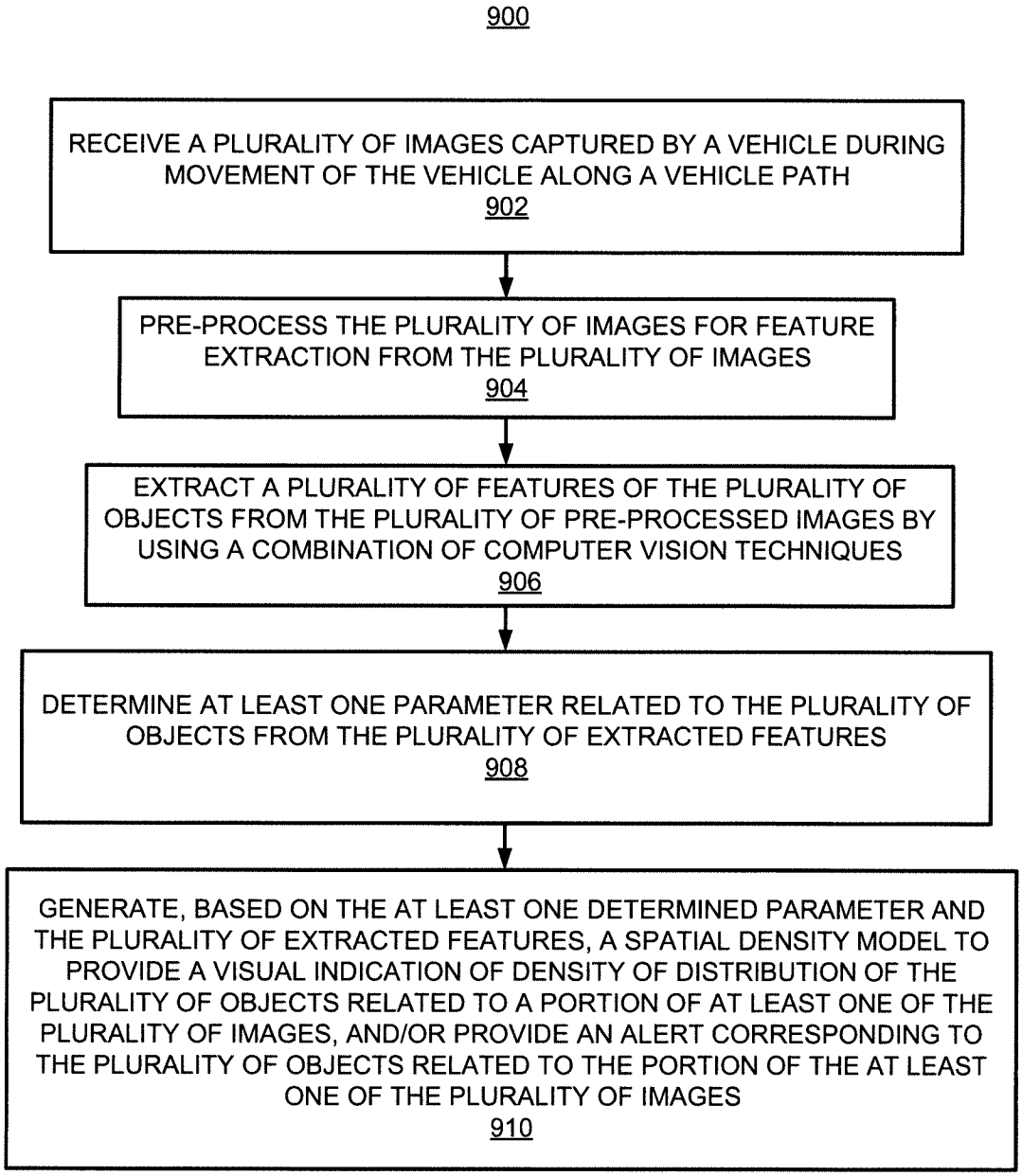
95% Confidence Interval
Yield
Predicted
Lower Ct
Upper Ct
10K
8K
6K
4K
2K
0
0
2
4
6
8
10
Time-period (years)

FIG. 8


900
RECEIVE A PLURALITY OF IMAGES CAPTURED BY A VEHICLE DURING MOVEMENT OF THE VEHICLE ALONG A VEHICLE PATH
902
PRE-PROCESS THE PLURALITY OF IMAGES FOR FEATURE EXTRACTION FROM THE PLURALITY OF IMAGES
904
EXTRACT A PLURALITY OF FEATURES OF THE PLURALITY OF OBJECTS FROM THE PLURALITY OF PRE-PROCESSED IMAGES BY USING A COMBINATION OF COMPUTER VISION TECHNIQUES
906
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908
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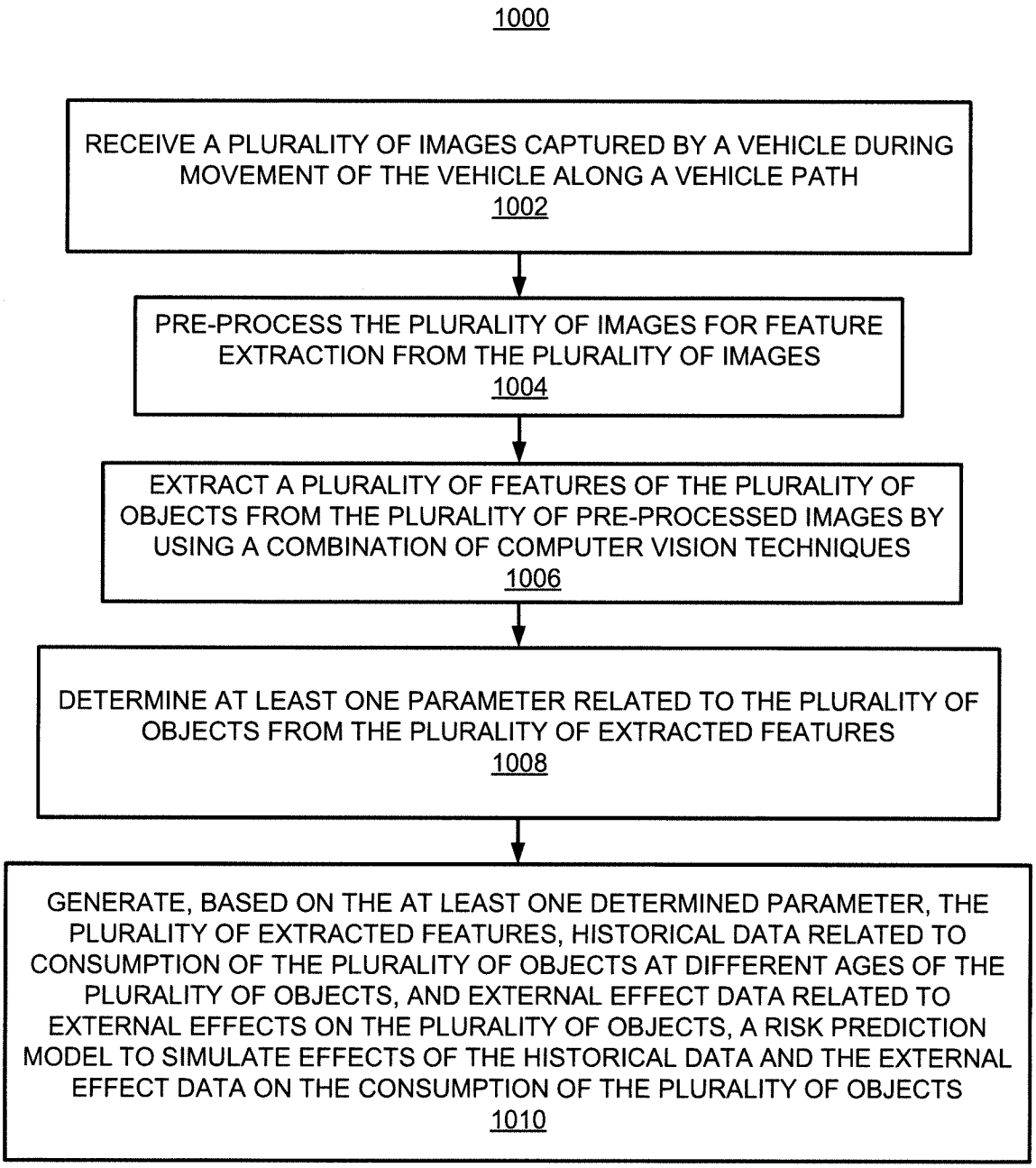
FIG. 9


1000
RECEIVE A PLURALITY OF IMAGES CAPTURED BY A VEHICLE DURING MOVEMENT OF THE VEHICLE ALONG A VEHICLE PATH
1002
PRE-PROCESS THE PLURALITY OF IMAGES FOR FEATURE EXTRACTION FROM THE PLURALITY OF IMAGES
1004
EXTRACT A PLURALITY OF FEATURES OF THE PLURALITY OF OBJECTS FROM THE PLURALITY OF PRE-PROCESSED IMAGES BY USING A COMBINATION OF COMPUTER VISION TECHNIQUES
1006
DETERMINE AT LEAST ONE PARAMETER RELATED TO THE PLURALITY OF OBJECTS FROM THE PLURALITY OF EXTRACTED FEATURES
1008
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1010

FIG. 10

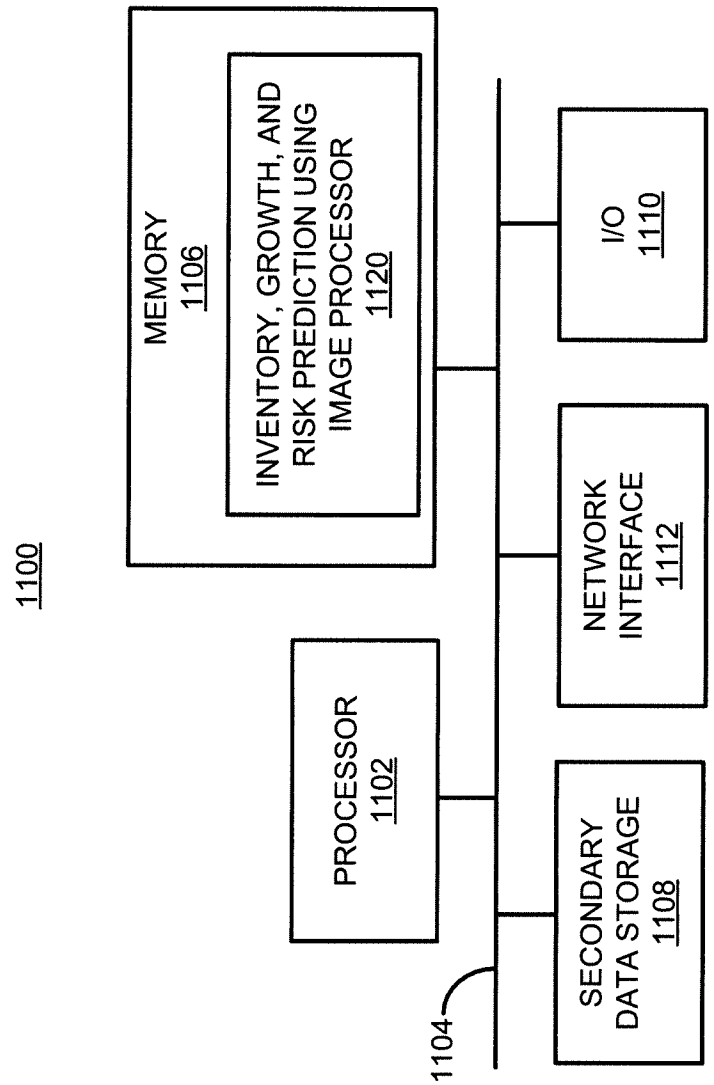
1100
MEMORY
1106
INVENTORY, GROWTH, AND
RISK PREDICTION USING
IMAGE PROCESSOR
1120
PROCESSOR
1102
NETWORK
INTERFACE
1112
I/O
1110
SECONDARY
DATA STORAGE
1108
1104

FIG. 11