

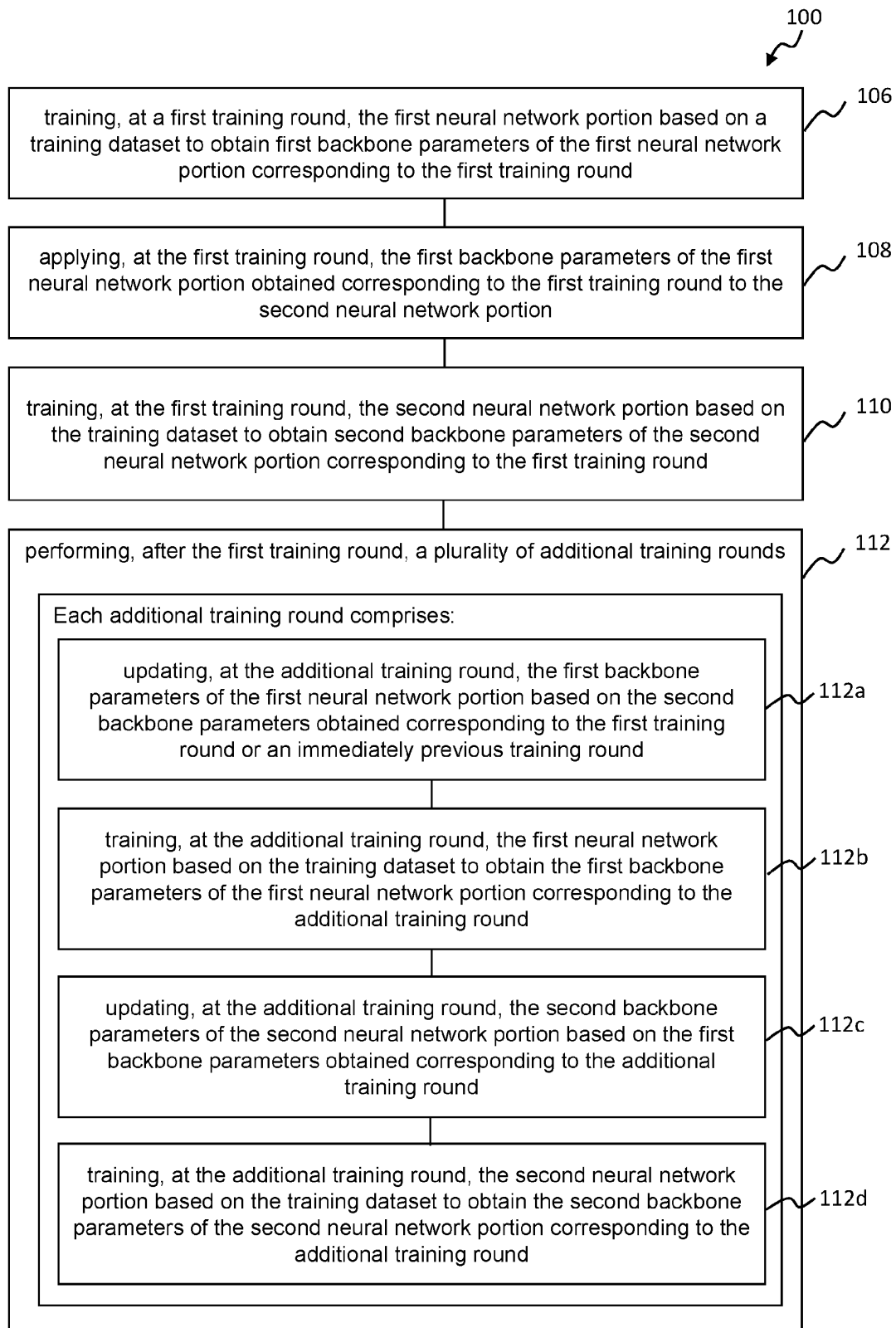


FIG. 1

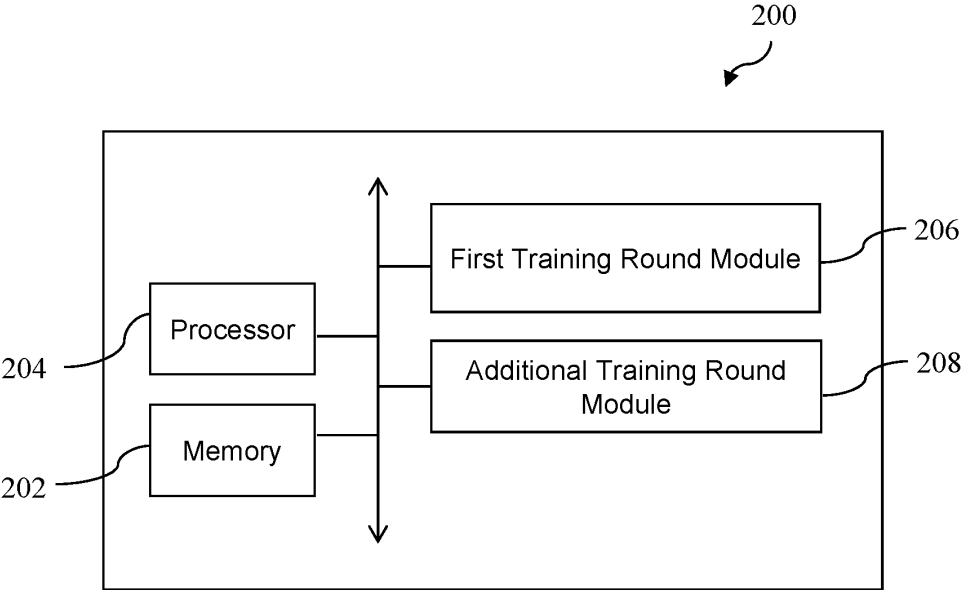


FIG. 2

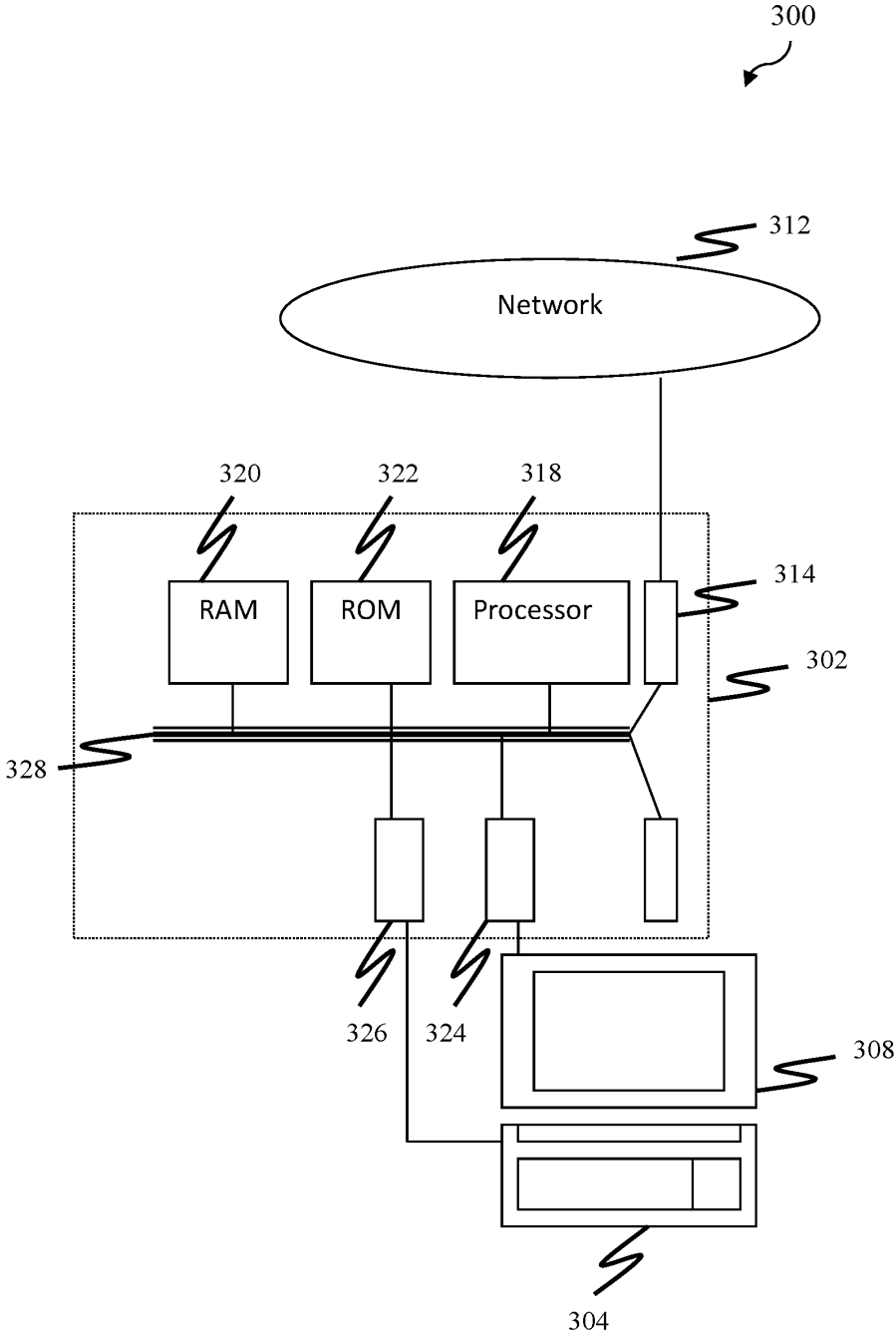


FIG. 3

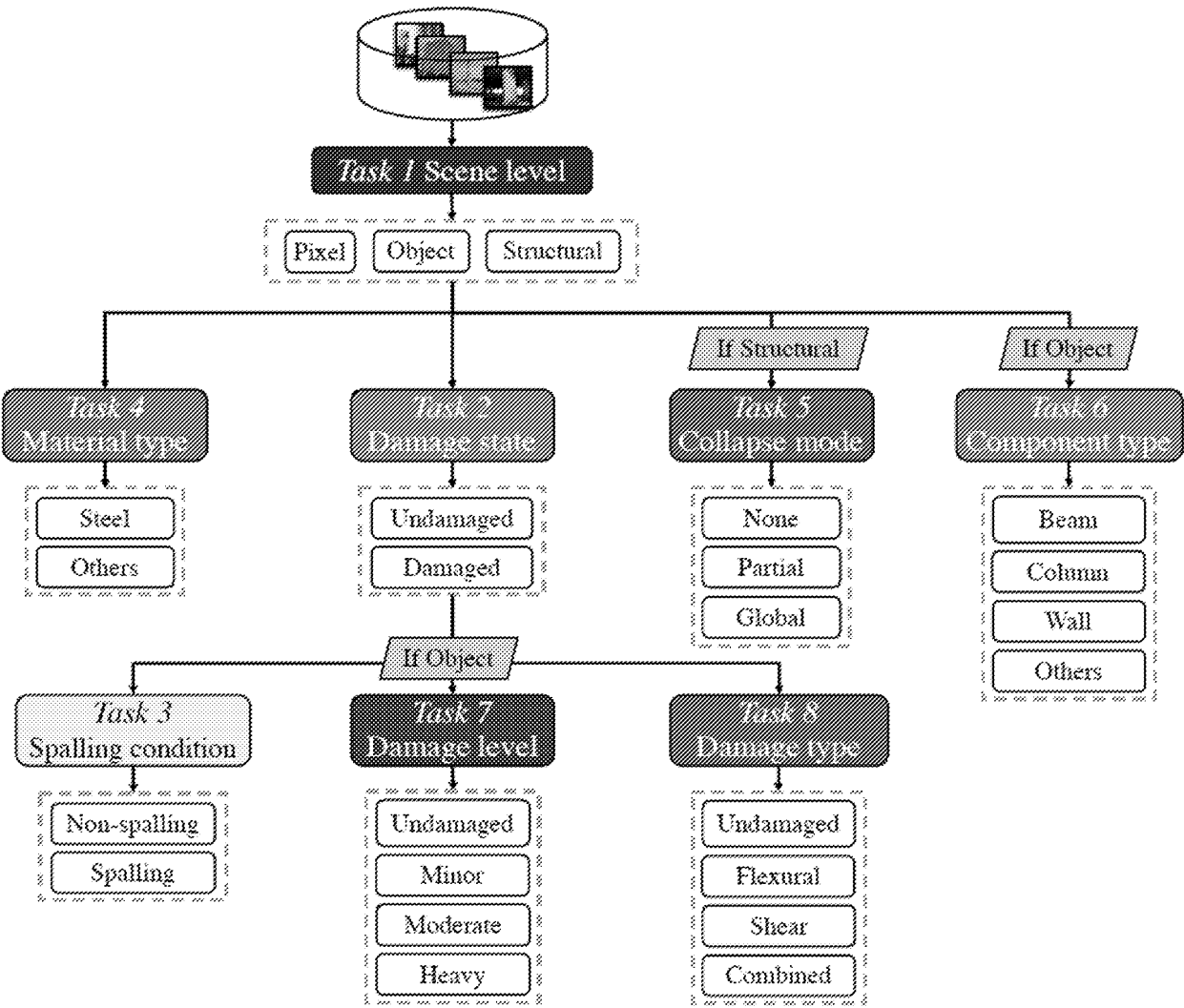


FIG. 4

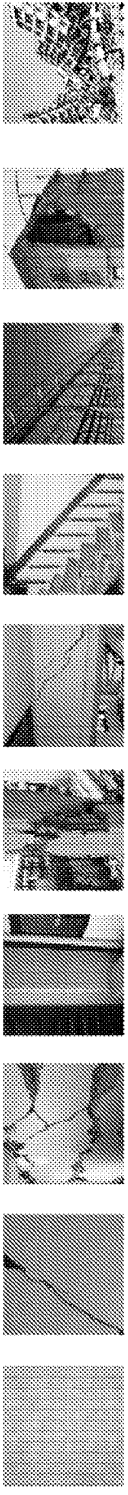
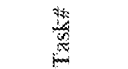
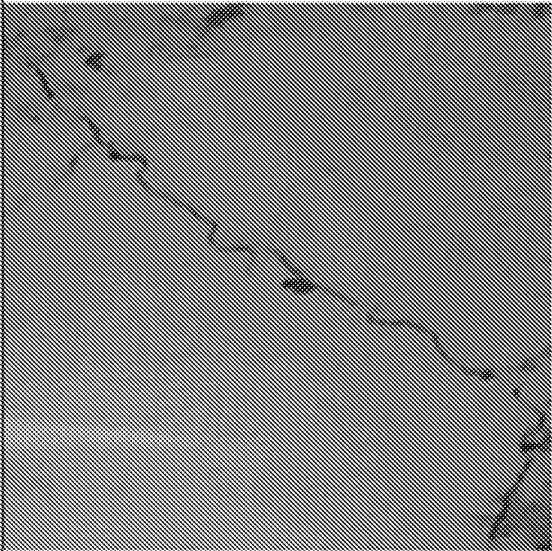
Task#												
	Pixel		Object		Object		Object		Object		Structural	
	Undamaged	Damaged	Non-spalling	Damaged	Non-spalling	Damaged	Non-spalling	Damaged	Non-spalling	Undamaged	Damaged	Damaged
1	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-

FIG. 5

Skip labeling this image



pixel level

object level

structural level

Next

Level Identification	
ID:15180	
Voted	
pixel level:	100%
object level:	0%
structural level:	0%
Your choice	

FIG. 6

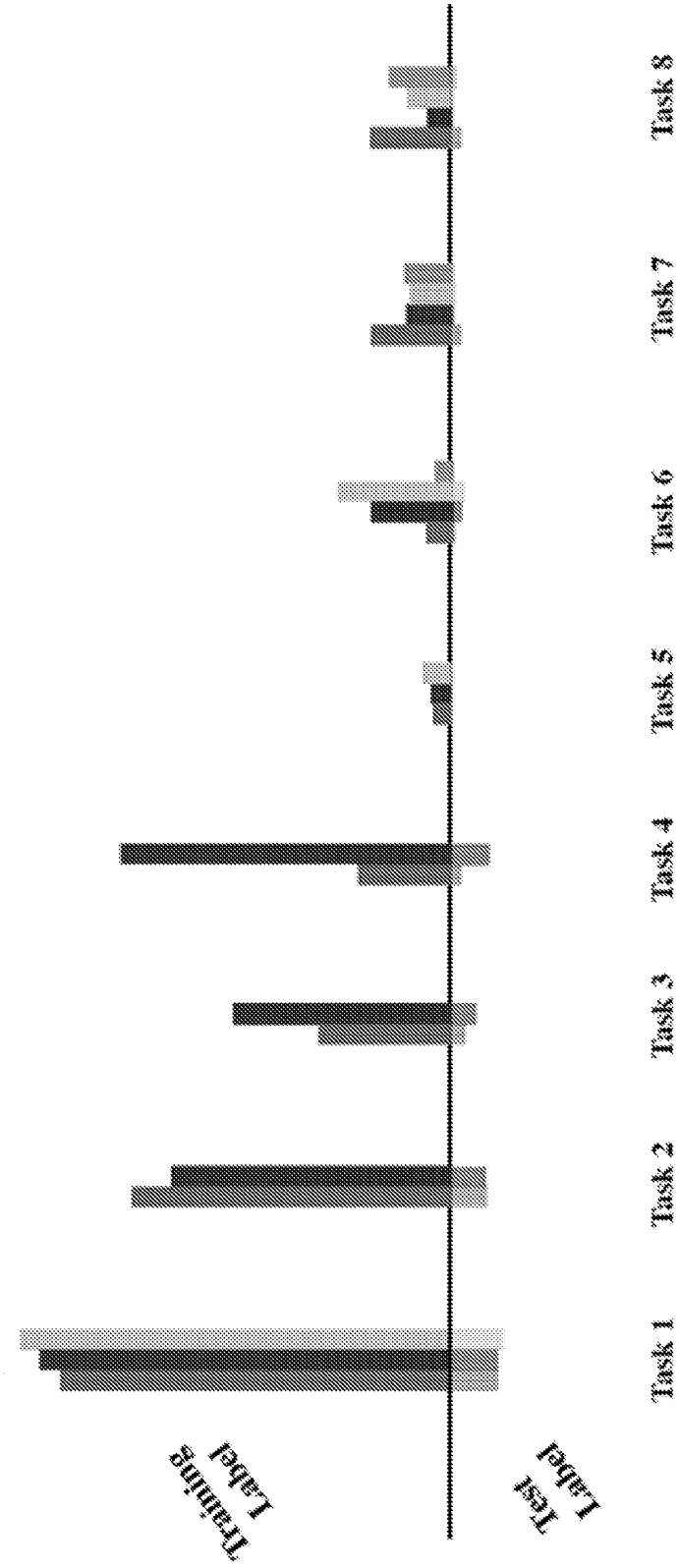


FIG. 7

Table 1: Baseline results (%)

Model	VGG16		VGG19		ResNet50	
Task	BSL	BSL-DA	BSL	BSL-DA	BSL	BSL-DA
1	87.3	85.4	87.4	84.0	87.7	88.0
2	64.0	60.7	62.7	60.7	76.7	75.3
3	63.0	63.0	63.0	63.0	75.7	77.1
4	93.9	90.8	94.4	90.3	95.1	93.1
5	46.9	45.9	45.9	45.9	65.1	61.7
6	64.8	64.8	65.1	65.1	69.8	68.2
7	41.6	41.6	41.6	41.6	54.6	58.4
8	43.7	43.7	43.7	43.7	54.3	56.1

FIG. 8A

Table 2: Transfer learning results (%)

Model	VGG16		VGG19		ResNet50	
Task	TL	TL-DA	TL	TL-DA	TL	TL-DA
1	91.9	92.5	92.9	92.1	93.4	93.0
2	87.3	87.6	87.3	87.4	87.3	88.9
3	81.6	81.6	81.2	81.8	81.2	83.0
4	97.0	97.0	96.5	96.9	98.3	98.5
5	75.3	71.9	70.6	72.6	78.1	74.7
6	75.1	76.9	77.0	76.9	75.8	76.3
7	69.9	72.7	70.7	64.7	74.5	72.7
8	70.7	70.5	71.1	72.4	68.9	68.1

FIG. 8B

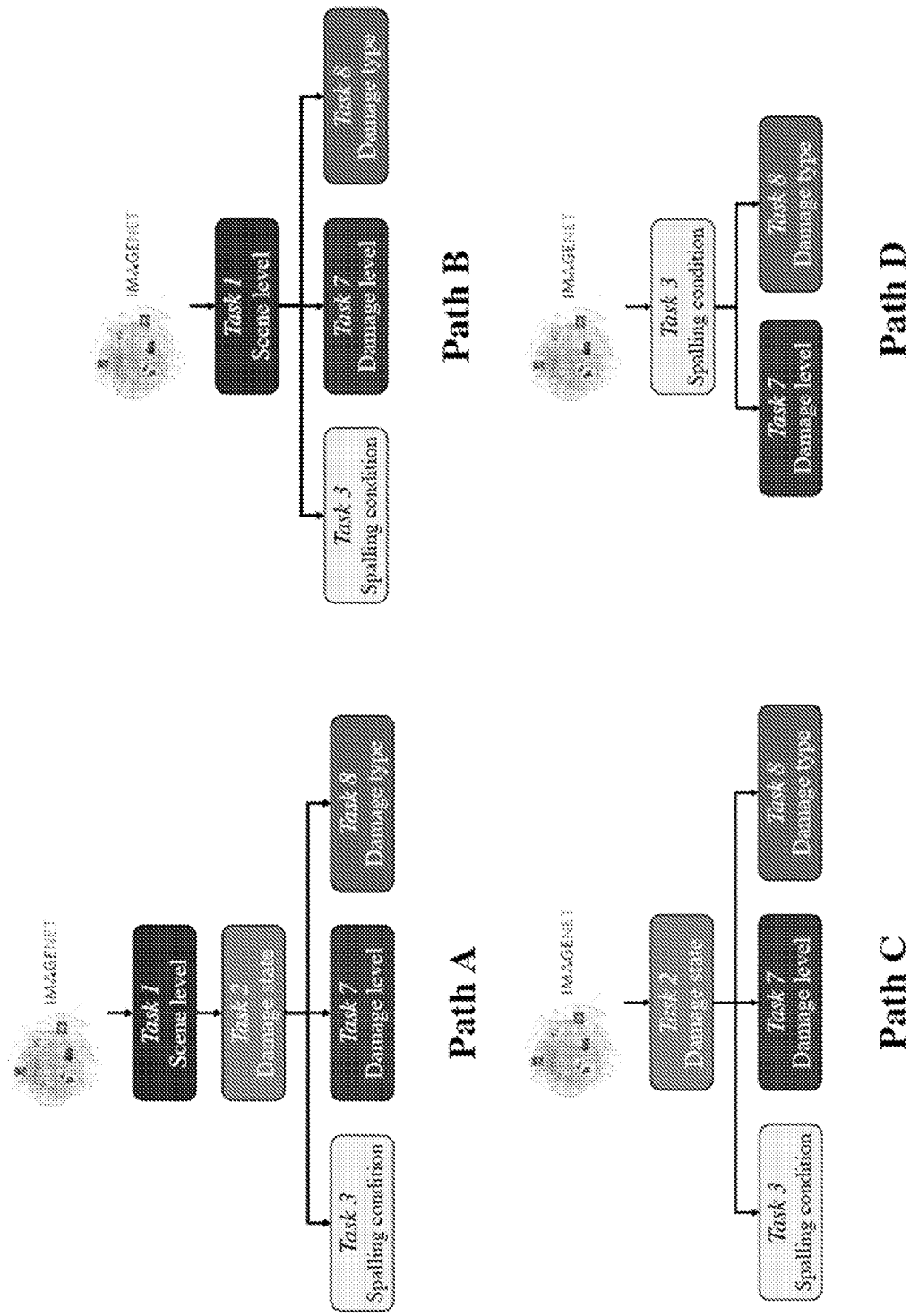


FIG. 9

Table 3: Hierarchical transfer learning results (%)

Path	Source task	Target task	HTL	Over TL
A	ImageNet → 1	2	88.3	+1.0
	ImageNet → 1 → 2	3	83.3	+2.1
	ImageNet → 1 → 2	7	74.1	-0.4
	ImageNet → 1 → 2	8	70.9	+2.0
B	ImageNet → 1	3	82.6	+1.4
	ImageNet → 1	7	72.1	-2.4
	ImageNet → 1	8	70.5	+1.6
C	ImageNet → 2	3	82.6	+1.4
	ImageNet → 2	7	70.3	-1.4
	ImageNet → 2	8	70.3	+1.4
D	ImageNet → 3	7	74.1	-0.4
	ImageNet → 3	8	69.7	+0.8

FIG. 10

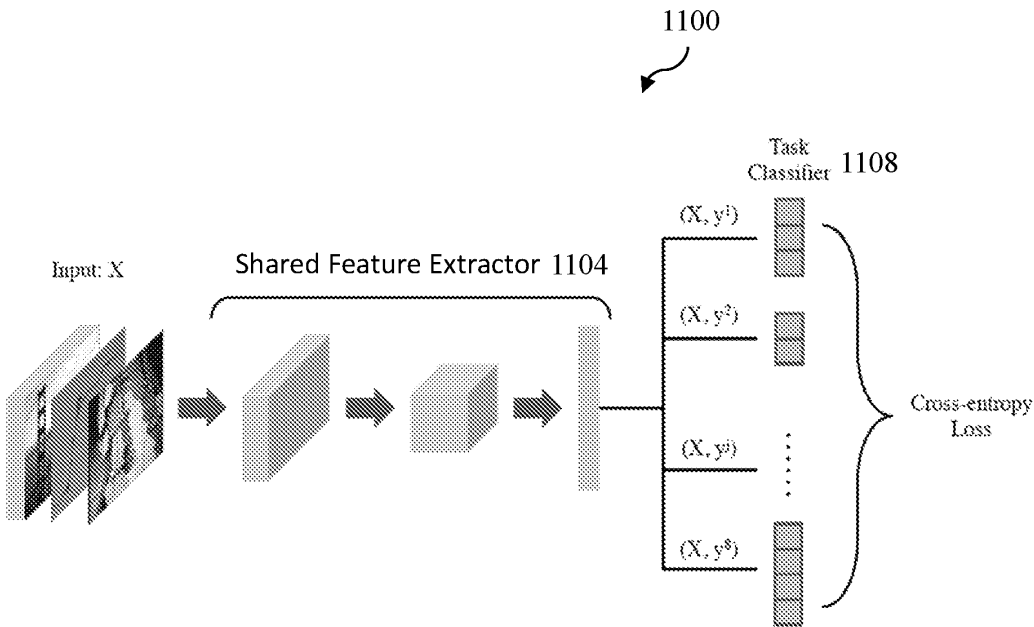


FIG. 11

Table 4: Multi-task transfer learning results (%)

Task	MTL	MTL-DA	over TL	Over TL-DA
1	94.2	93.2	+0.8	+0.2
2	89.7	88.3	+2.4	-0.6
3	83.4	85.1	+2.2	+2.1
4	99.1	98.7	+0.8	+0.2
5	75.3	74.0	-2.8	-0.7
6	80.0	78.6	+4.2	+2.3
7	76.5	76.3	+2.0	+3.6
8	73.2	74.0	+4.3	+5.9

FIG. 12

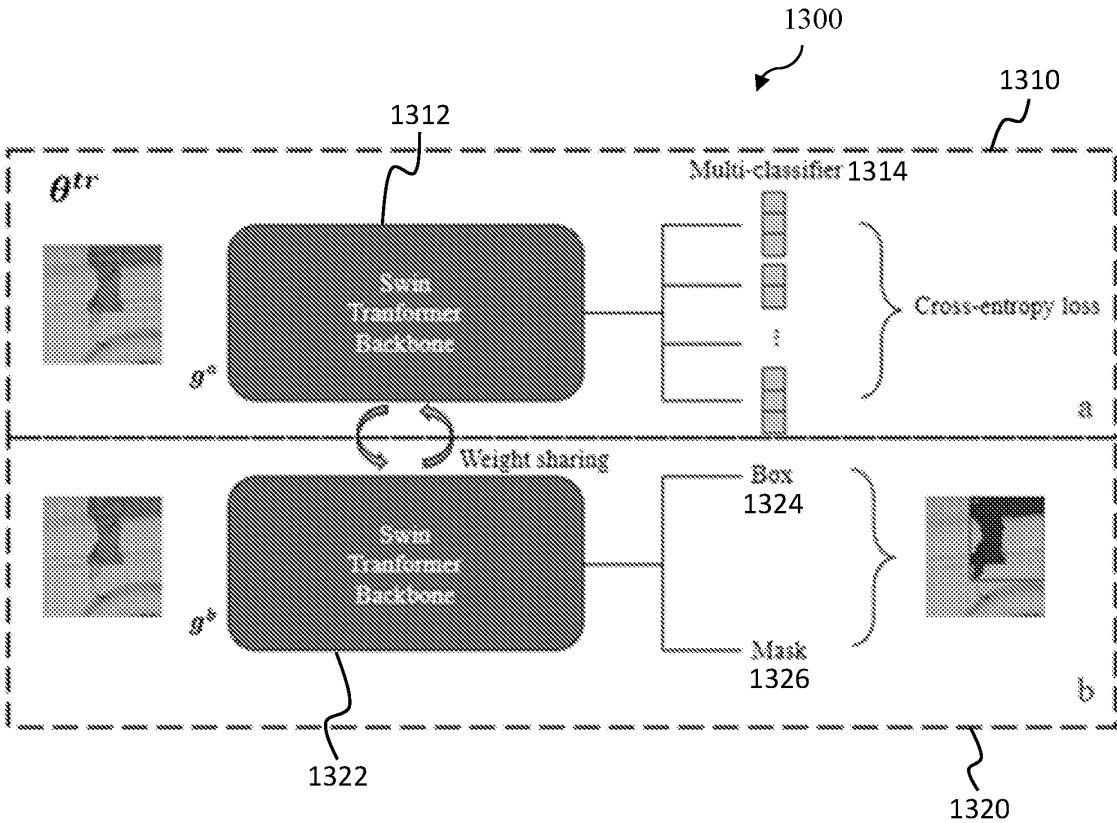


FIG. 13

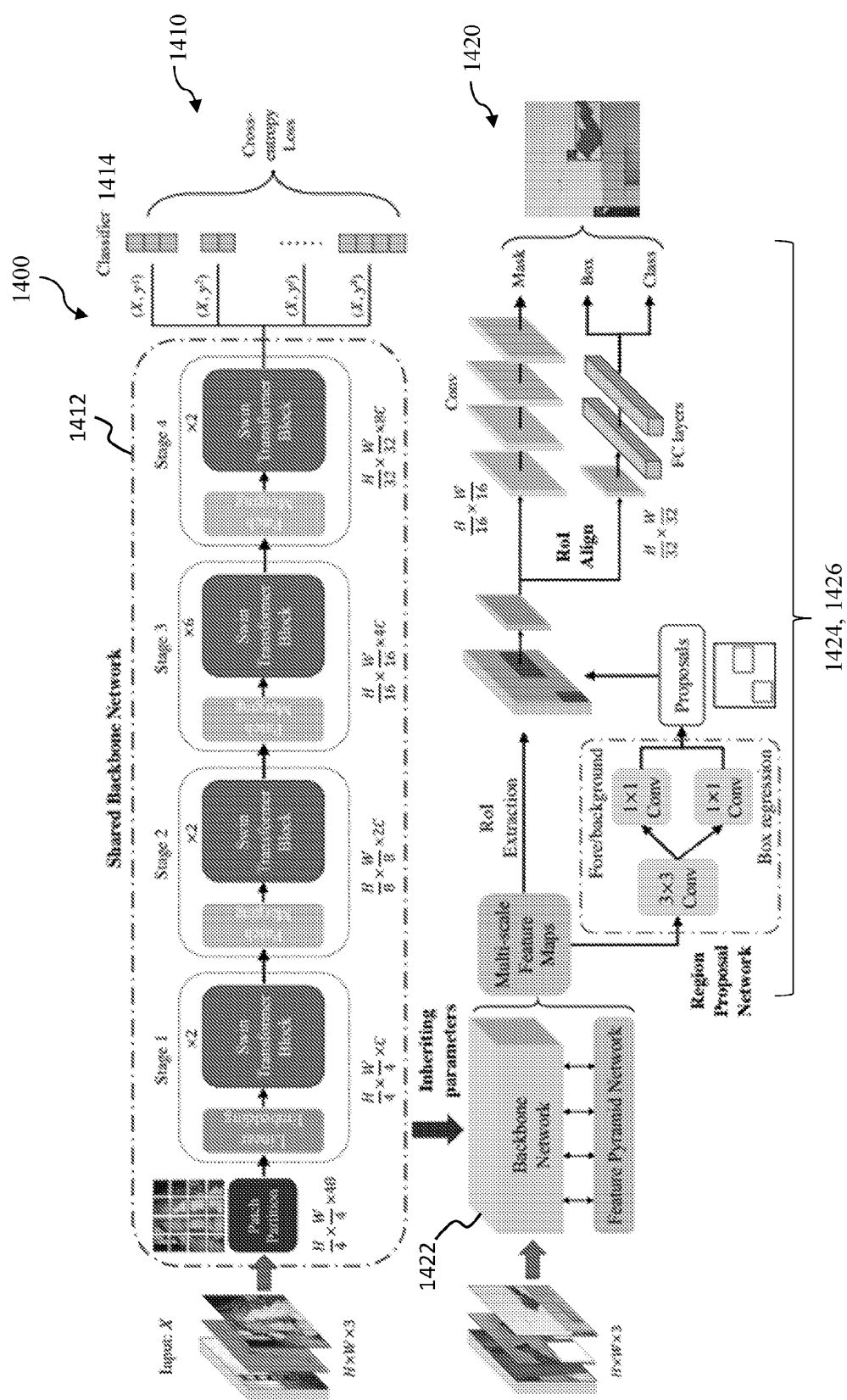


FIG. 14

Table 5: Localization and segmentation results (%)

Metric	Localization		Segmentation	
	HL	MR-CNN	HL	MR-CNN
AP^{50}	80.6	72.5	83.1	70.3
AP^{75}	67.4	55.0	59.9	52.0
AP^S	45.5	43.2	42.6	37.5
AP^M	65.2	55.2	63.1	52.6
AP^L	80.2	59.7	74.2	59.4
AR^{50}	67.9	59.5	62.6	54.8
AR^{75}	68.2	59.5	64.0	54.8
AR^S	56.2	50.1	48.9	45.2
AR^M	71.4	66.4	70.2	61.6
AR^L	88.9	71.1	81.5	67.2

FIG. 15

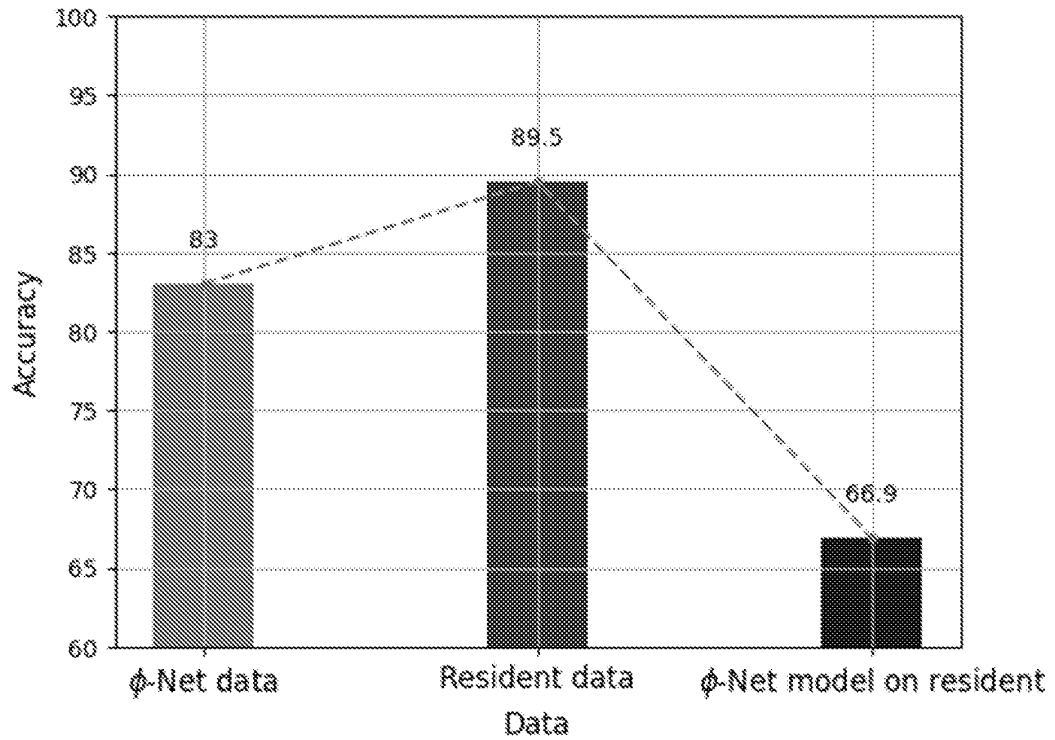


FIG. 16

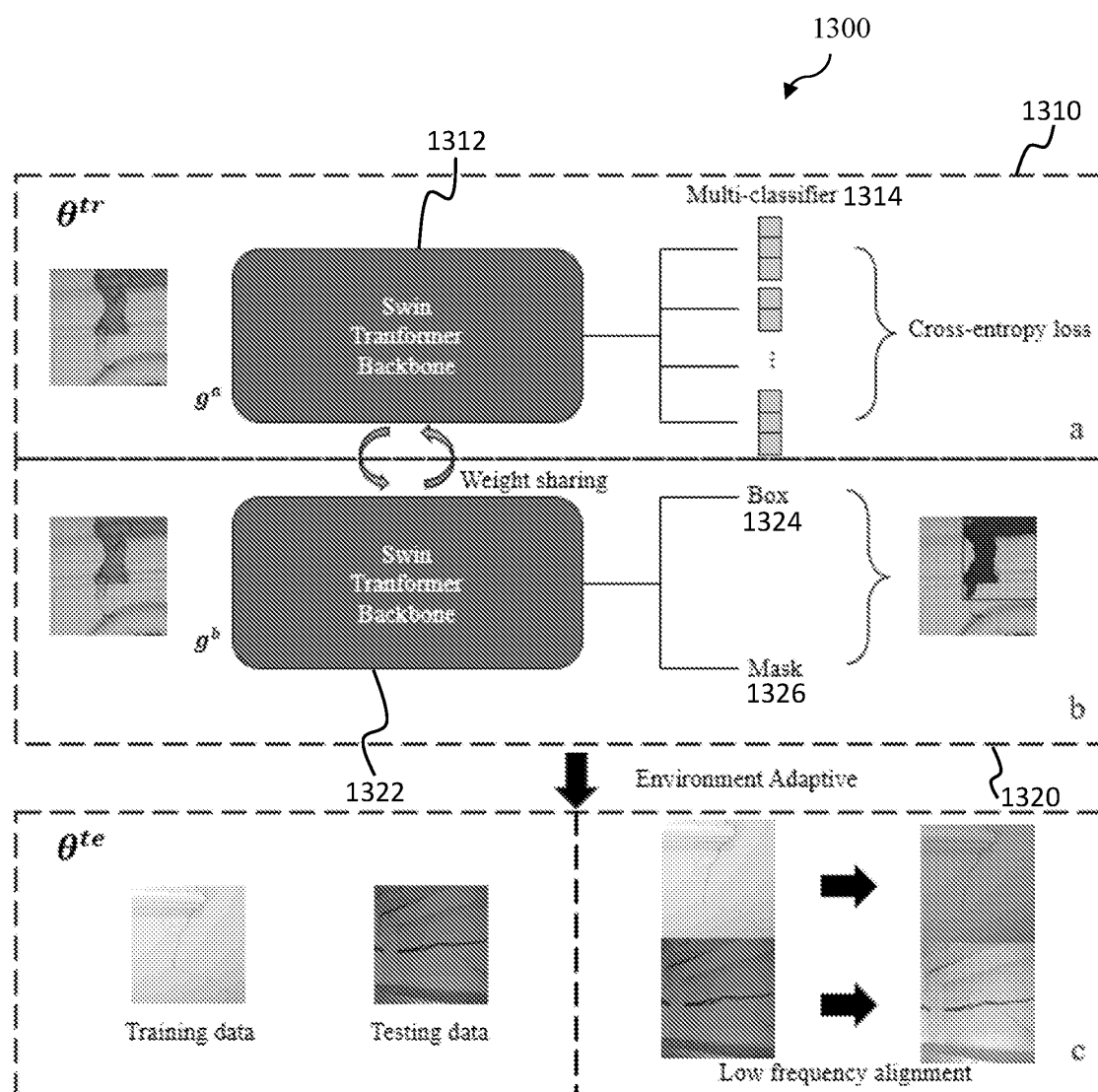


FIG. 17

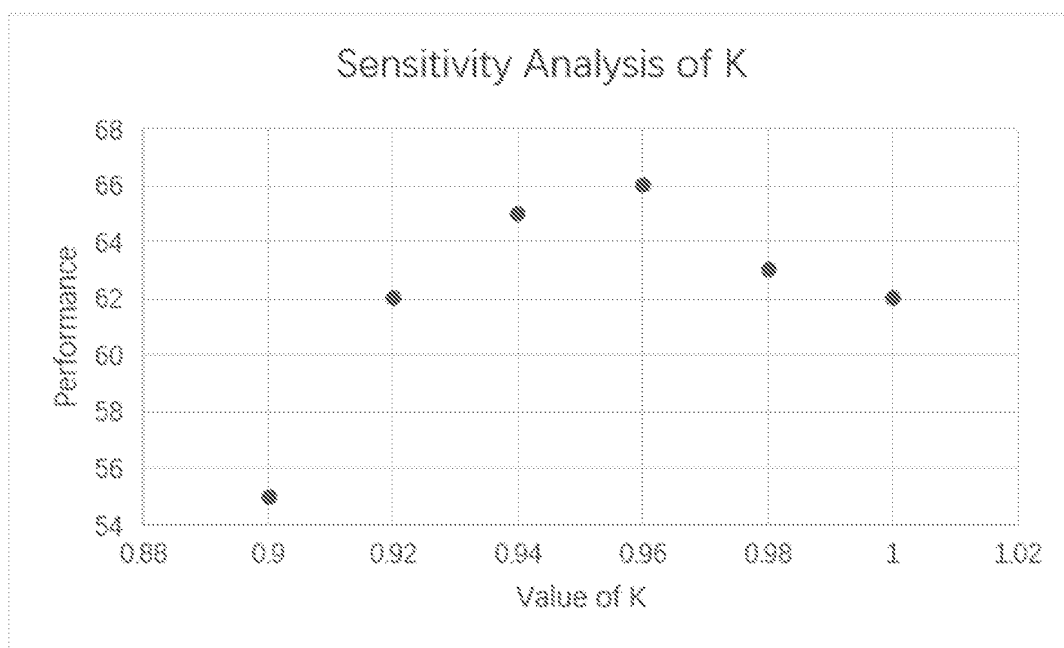


FIG. 18

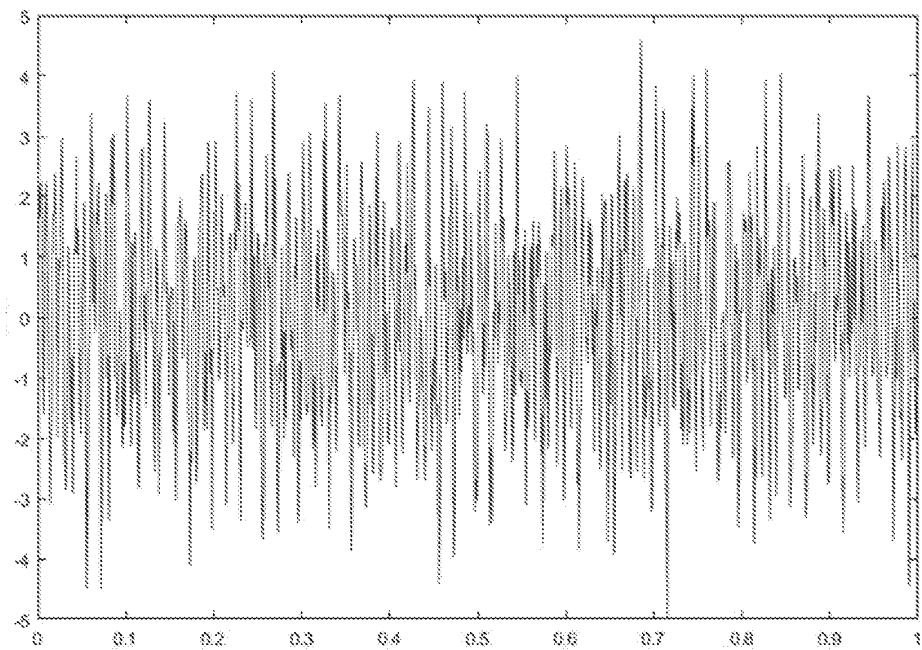


FIG. 19A

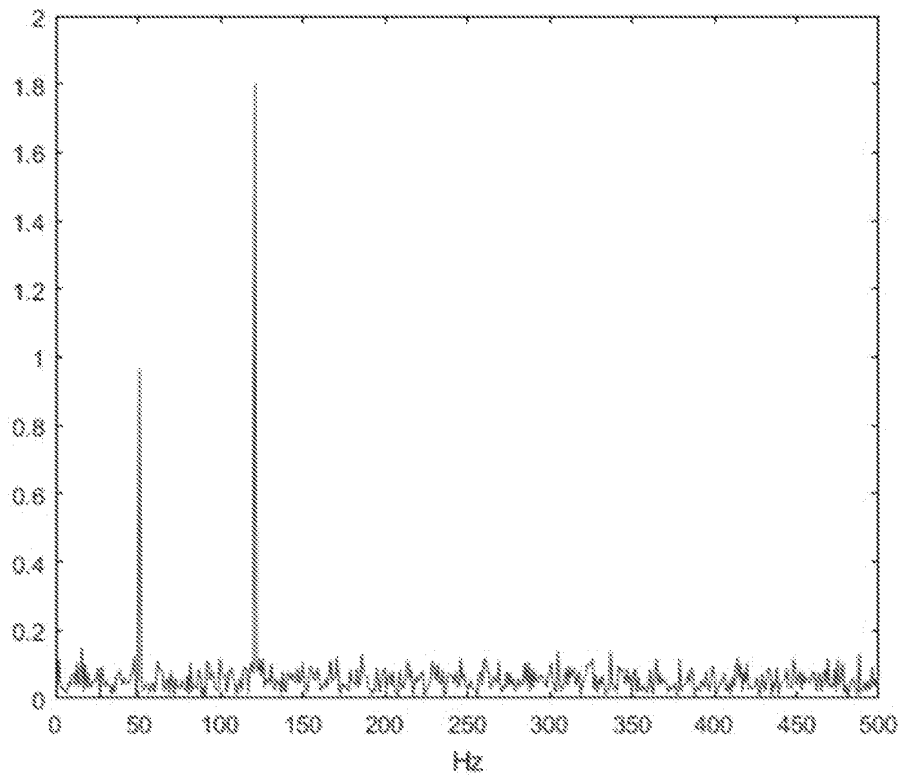


FIG. 19B

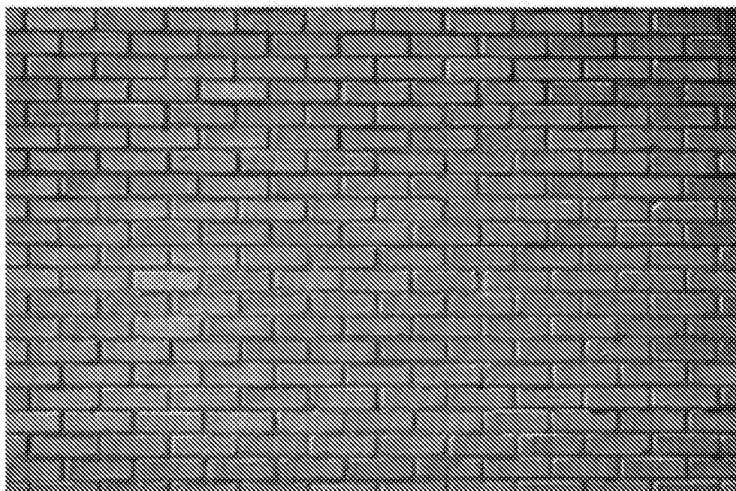


FIG. 20A

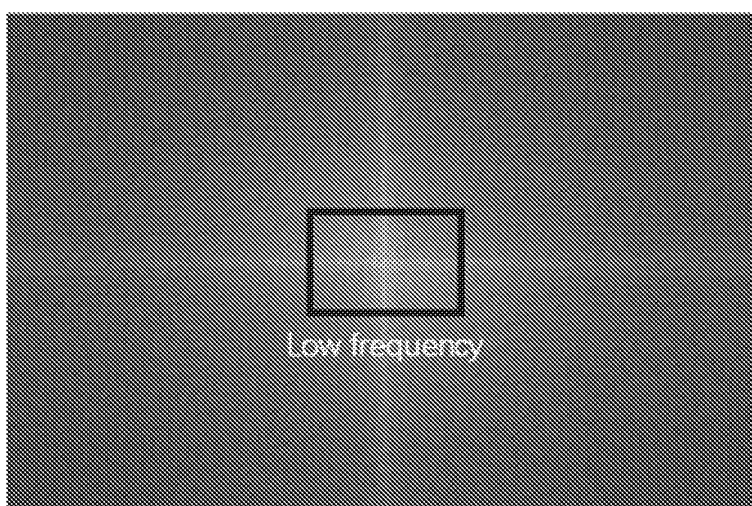


FIG. 20B

Table 6: Comparing the classification performance of different models on a residential dataset (%).

Task	Original model	Environment adaptive
1	60.7	80.4
2	55.2	78.5
3	66.9	85.8
4	71.0	89.9
5	75.3	91.4
6	69.2	85.3
7	60.3	84.2
8	65.7	87.0

FIG. 21A

Table 7: Comparing the localization performance of different models on a residential dataset (%).

Metric	Original model	Environment adaptive
AP^{50}	50.5	78.5
AP^{75}	41.2	65.4
AP^S	29.8	43.9
AP^M	48.8	64.2
AP^L	58.5	78.3

FIG. 21B

Table 8: Comparing the segmentation performance of different models on a residential dataset (%).

Metric	Original model	Environment adaptive
AP^{50}	46.0	75.0
AP^{75}	38.2	65.0
AP^S	17.5	42.5
AP^M	40.2	62.5
AP^L	51.8	76.7

FIG. 21C