Figure 1

Figure 2

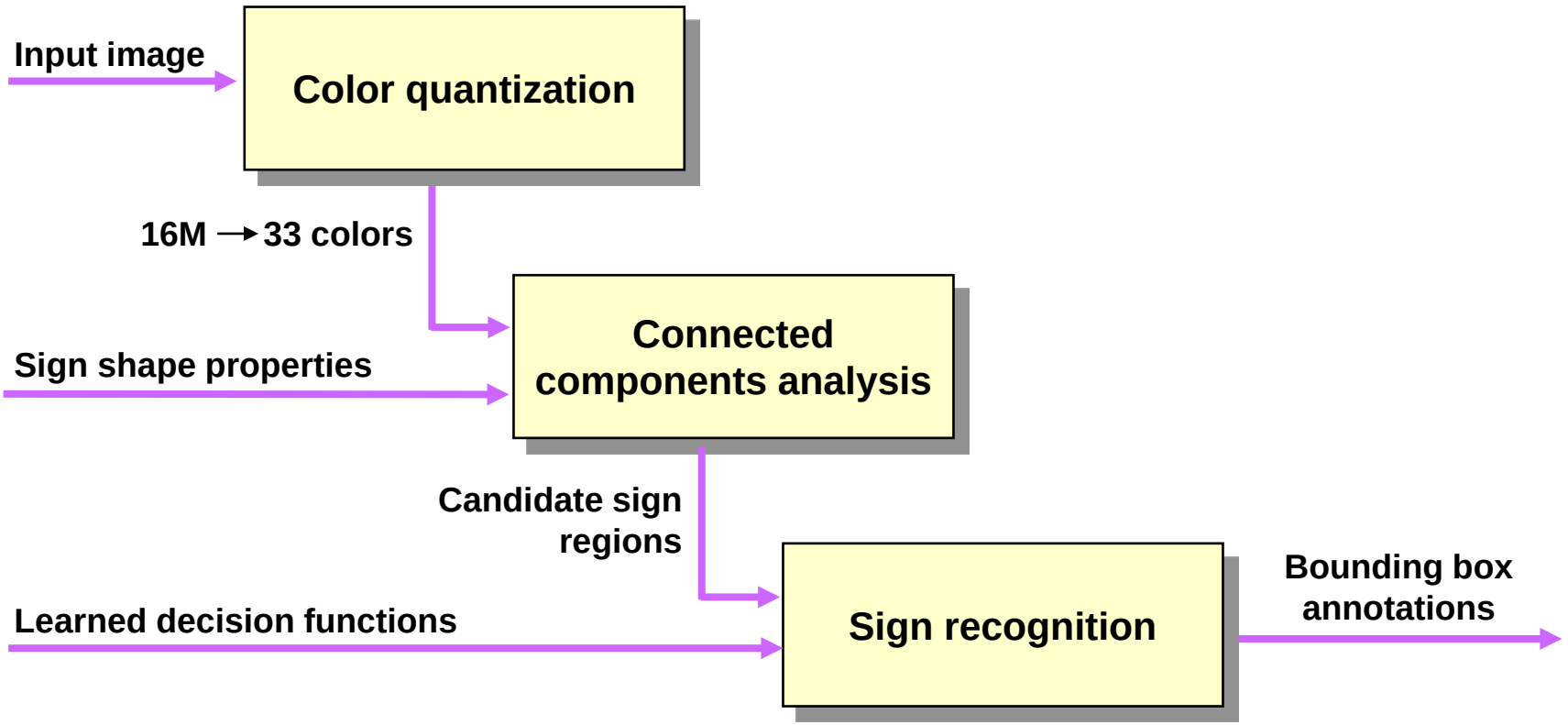

Input image
Color quantization
16M → 33 colors
Sign shape properties
Connected components analysis
Candidate sign regions
Learned decision functions
Sign recognition
Bounding box annotations

Figure 3

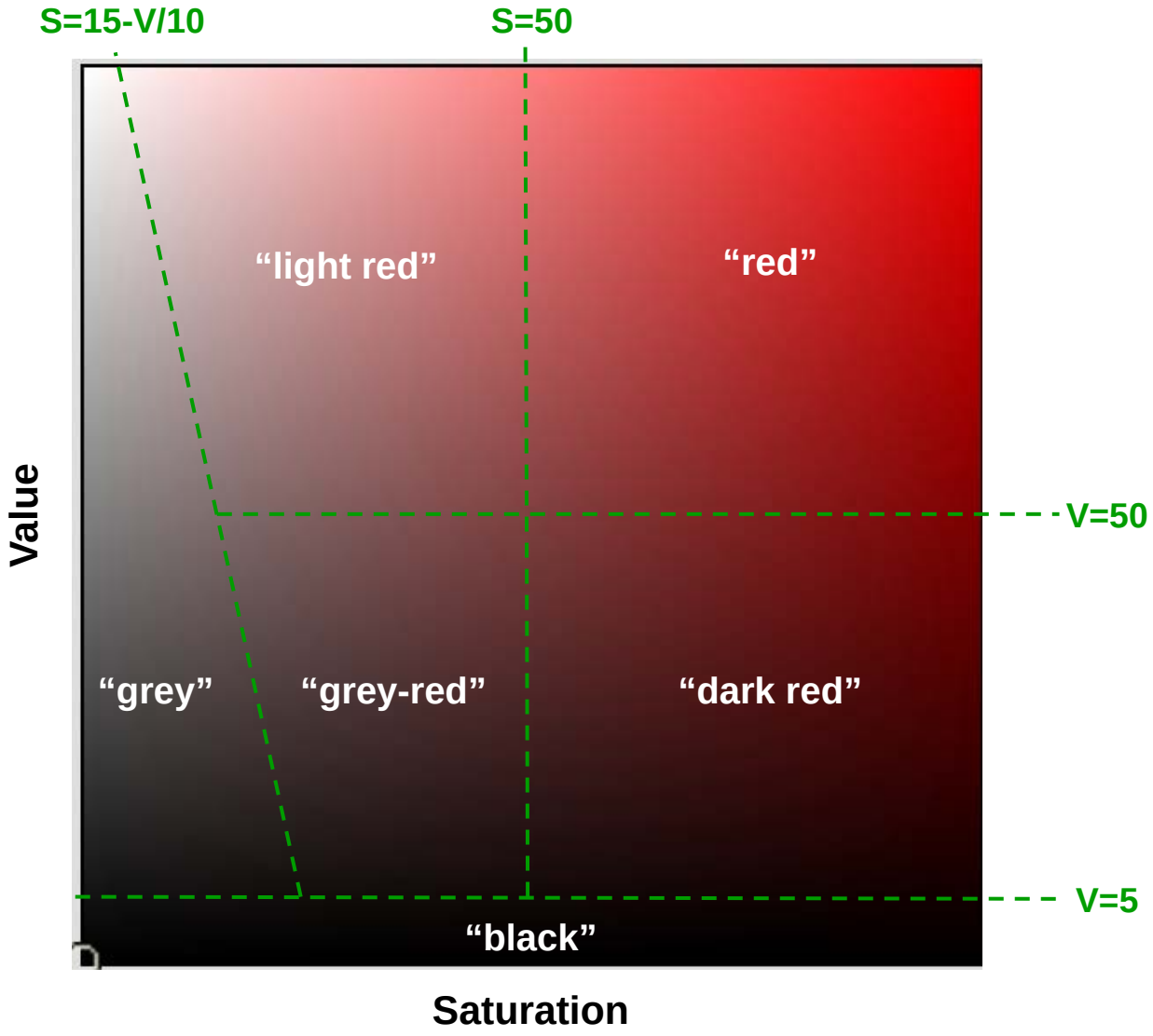
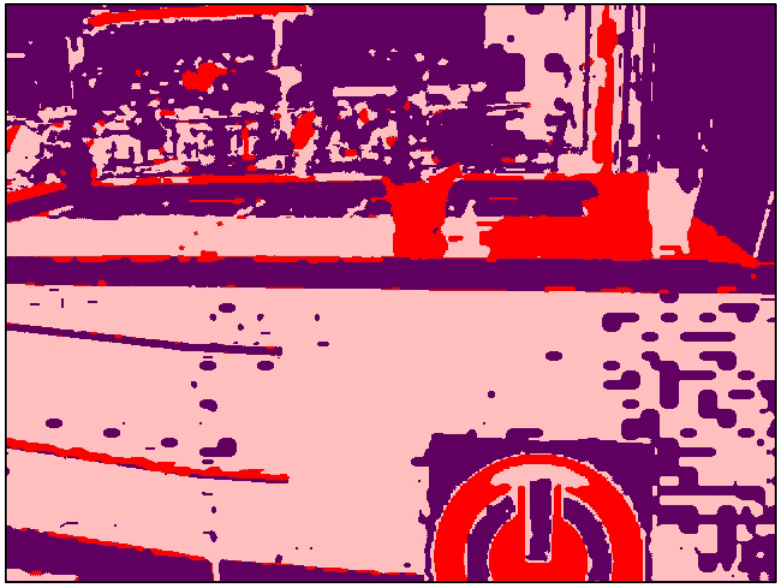

S=15-V/10
S=50
"light red"
"red"
V=50
"grey"
"grey-red"
"dark red"
V=5
"black"
Value
Saturation

Figure 4

a

b

Figure 5



a

b

Figure 6

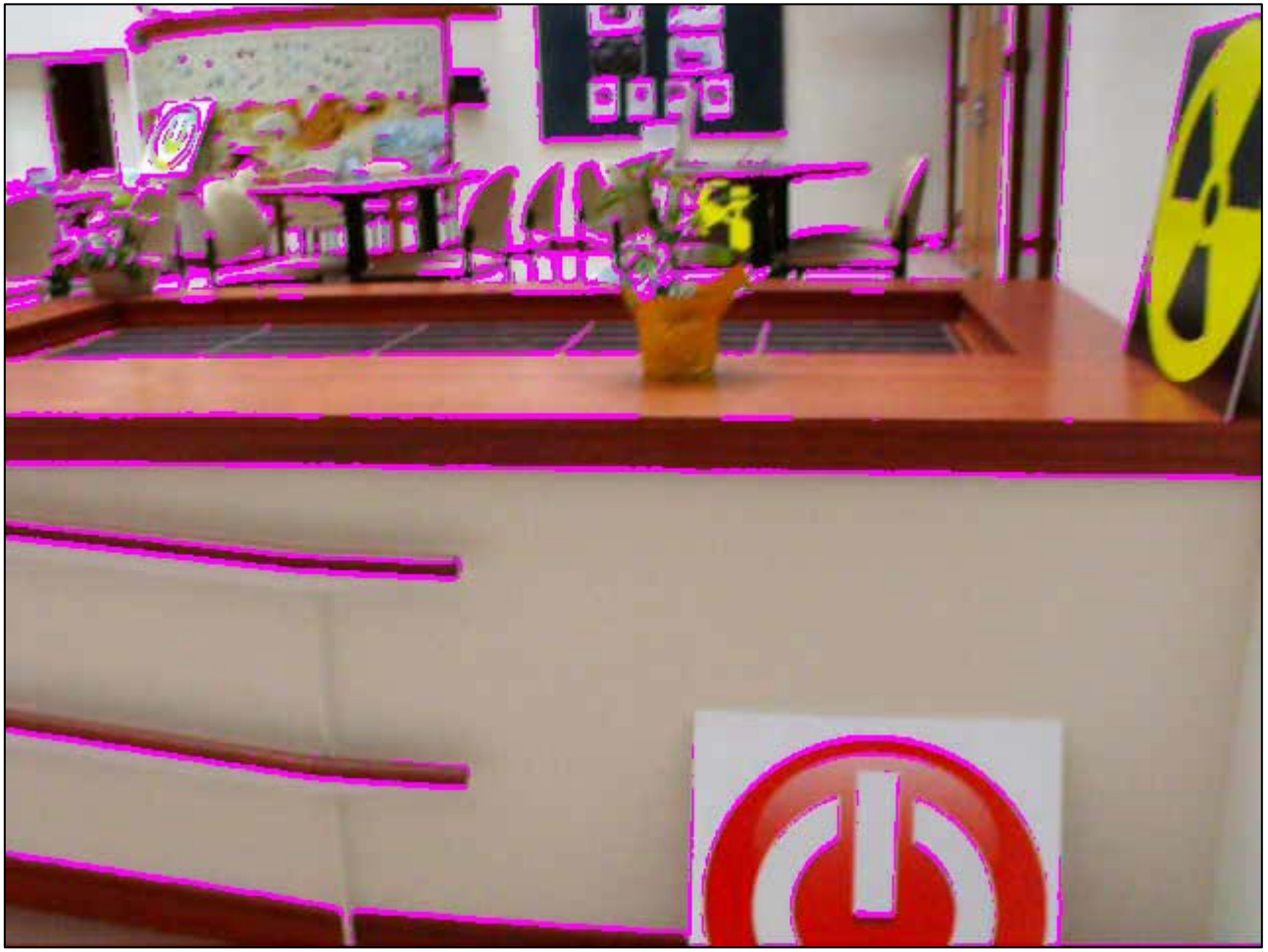


Figure 7

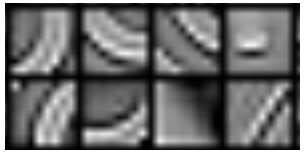
Figure 8

Training:

Test examples

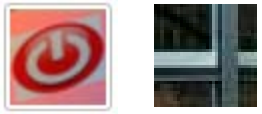
→ Unsupervised learning algorithm →

Learned features



Encoding:

New examples



→ Encoder →

Feature vectors

$$\varphi_{stop}, \varphi_{non-stop} \in R^K$$

Classifying:

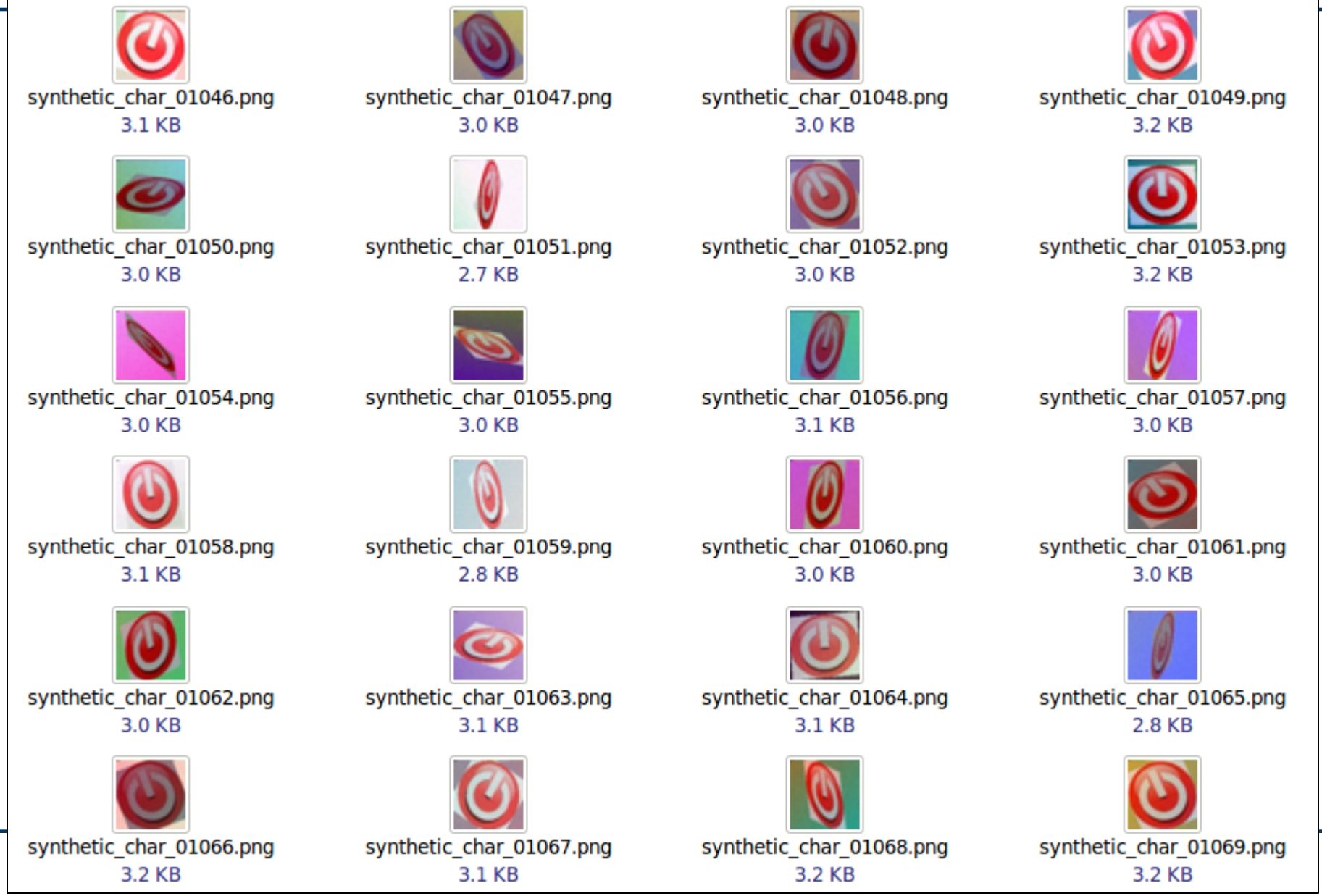
Feature vectors

$$\varphi_{stop}, \varphi_{non-stop} \rightarrow$$

Support Vector Machine →

Stop sign, non-stop sign decisions

Figure 9


synthetic_char_01046.png
3.1 KB
synthetic_char_01047.png
3.0 KB
synthetic_char_01048.png
3.0 KB
synthetic_char_01049.png
3.2 KB
synthetic_char_01050.png
3.0 KB
synthetic_char_01051.png
2.7 KB
synthetic_char_01052.png
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synthetic_char_01062.png
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3.2 KB
synthetic_char_01069.png
3.2 KB

Figure 10

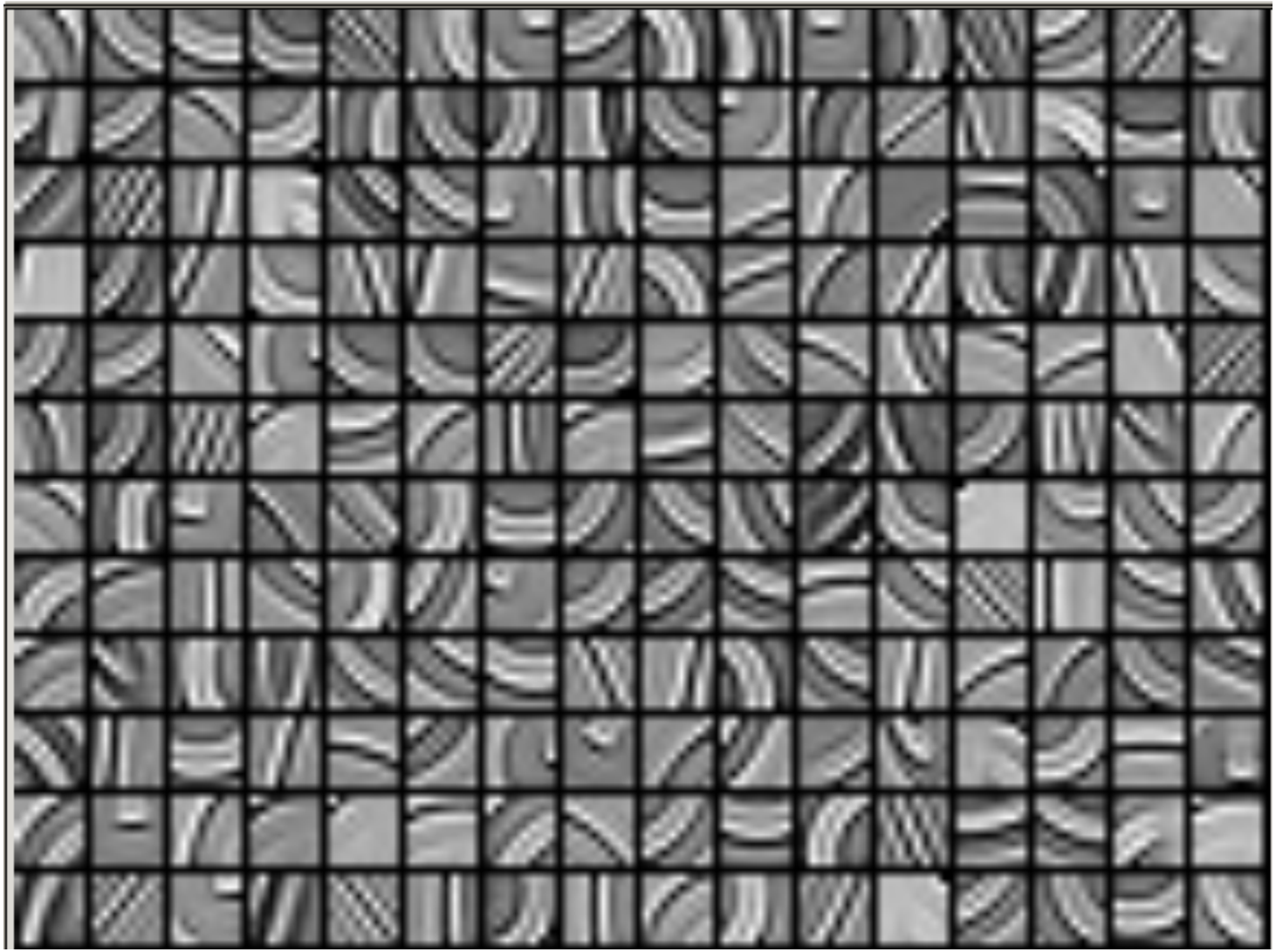

Figure 11

Figure 12

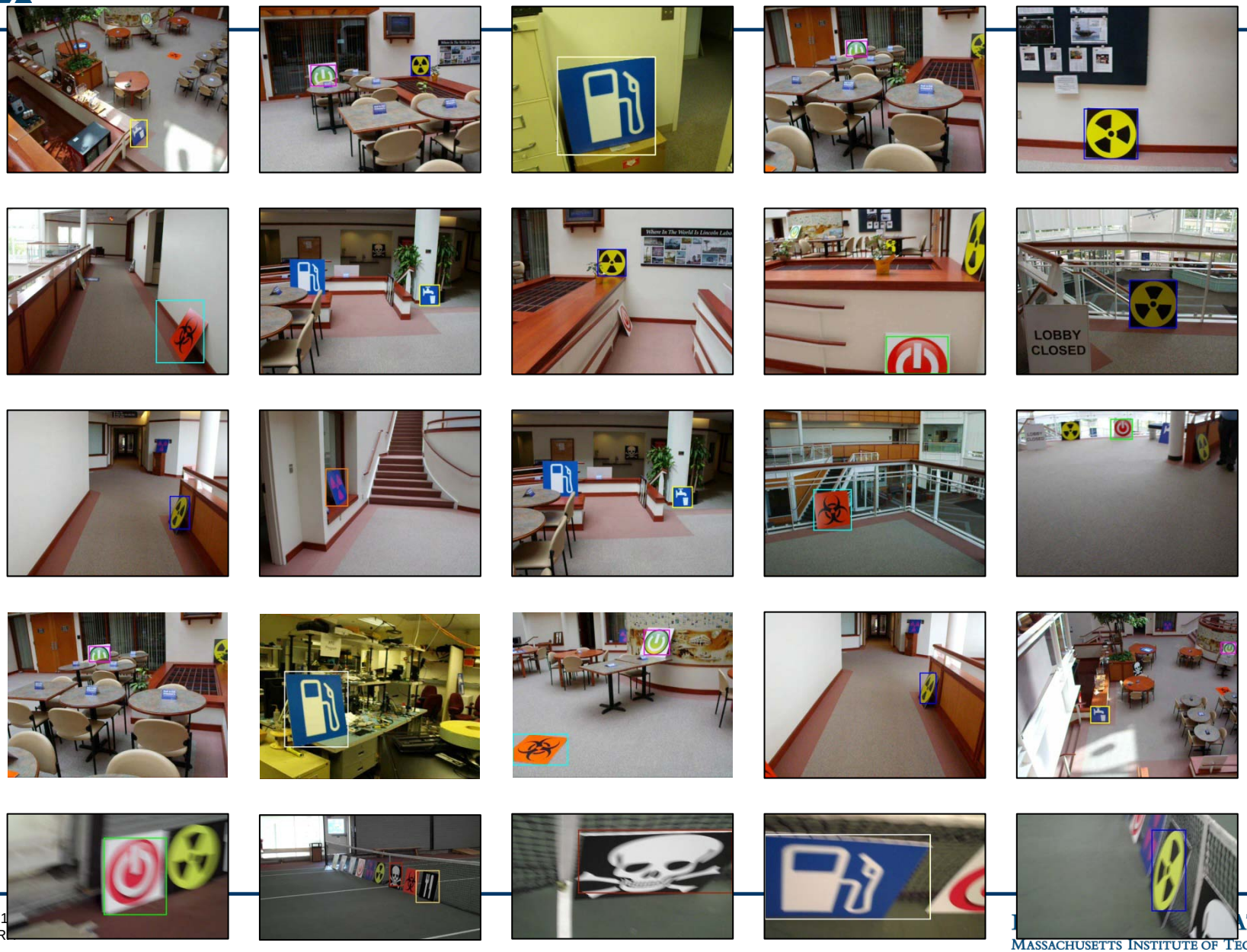
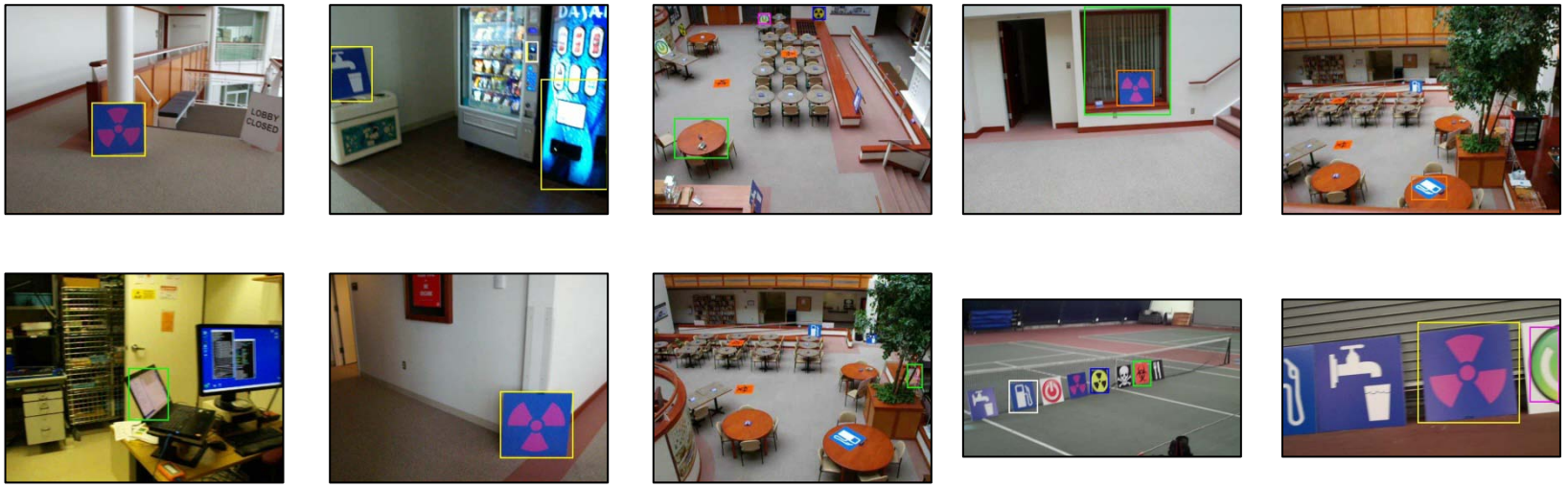
Figure 13