

Appendix A: Tiling selection code

In order to track the highest scoring tiling along with its score, let us associate a set of tiles and a score in an ordered pair $s = (a, \mathcal{T})$. Here, a is the score and \mathcal{T} is a (possibly partial) tiling, meaning that it is a set of non-overlapping tiles. When the tiling is partial, the tiles do not tile the entire space. The notation s_{score} and s_{tiling} will be used to refer to the elements of the ordered pair. The notation $T(x, R_L, R_H, C_L, C_H)$ will be used to represent a tile with outbreak state x (0 or 1) and boundaries R_L, R_H, C_L, C_H . \emptyset denotes the empty set.

Tiling selection algorithm:

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1  For a grid of size  $R \times C$ 
2  Track best hypotheses:  $bestR, bestC$ 
3  Keep caches  $rCache, cCache$ 
4  Init:
5       $rCache[0] \leftarrow (1, \emptyset)$ 
6       $cCache[0] \leftarrow (1, \emptyset)$ 
7  for  $R_H$  from 1 to  $R$ 
8       $bestR \leftarrow (0, \emptyset)$ 
9      for  $R_L$  from 1 to  $R_H$ 
10         for  $C_H$  from 1 to  $C$ 
11              $bestC \leftarrow (0, \emptyset)$ 
12             for  $C_L$  from 1 to  $C_H$ 
13                  $x \leftarrow \operatorname{argmax}_{x \in \{0,1\}} \operatorname{score}(x, R_L, R_H, C_L, C_H)$ 
14                  $s \leftarrow (\operatorname{score}(x, R_L, R_H, C_L, C_H), \{T(x, R_L, R_H, C_L, C_H)\})$ 
15                 if  $bestC_{score} < cCache[C_L - 1]_{score} \cdot s_{score}$  then
16                      $bestC \leftarrow (cCache[C_L - 1]_{score} \cdot s_{score}, cCache[C_L - 1]_{tiling} \cup s_{tiling})$ 
17                 end if
18             end for
19              $cCache[C_H] \leftarrow bestC$ 
20         end for
21         if  $bestR_{score} < rCache[R_L - 1]_{score} \cdot bestC_{score}$  then
22              $bestR \leftarrow (rCache[R_L - 1]_{score} \cdot bestC_{score}, rCache[R_L - 1]_{tiling} \cup bestC_{tiling})$ 
23         end if
24     end for
25      $rCache[R_H] \leftarrow bestR$ 
26 end for
27 return  $bestR$ 

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