Supplementary material

TilinGNN: Learning to Tile with Self-Supervised Graph Neural Network

SIGGRAPH 2020

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This supplementary material includes the following parts.

Part A - More Tiling Results

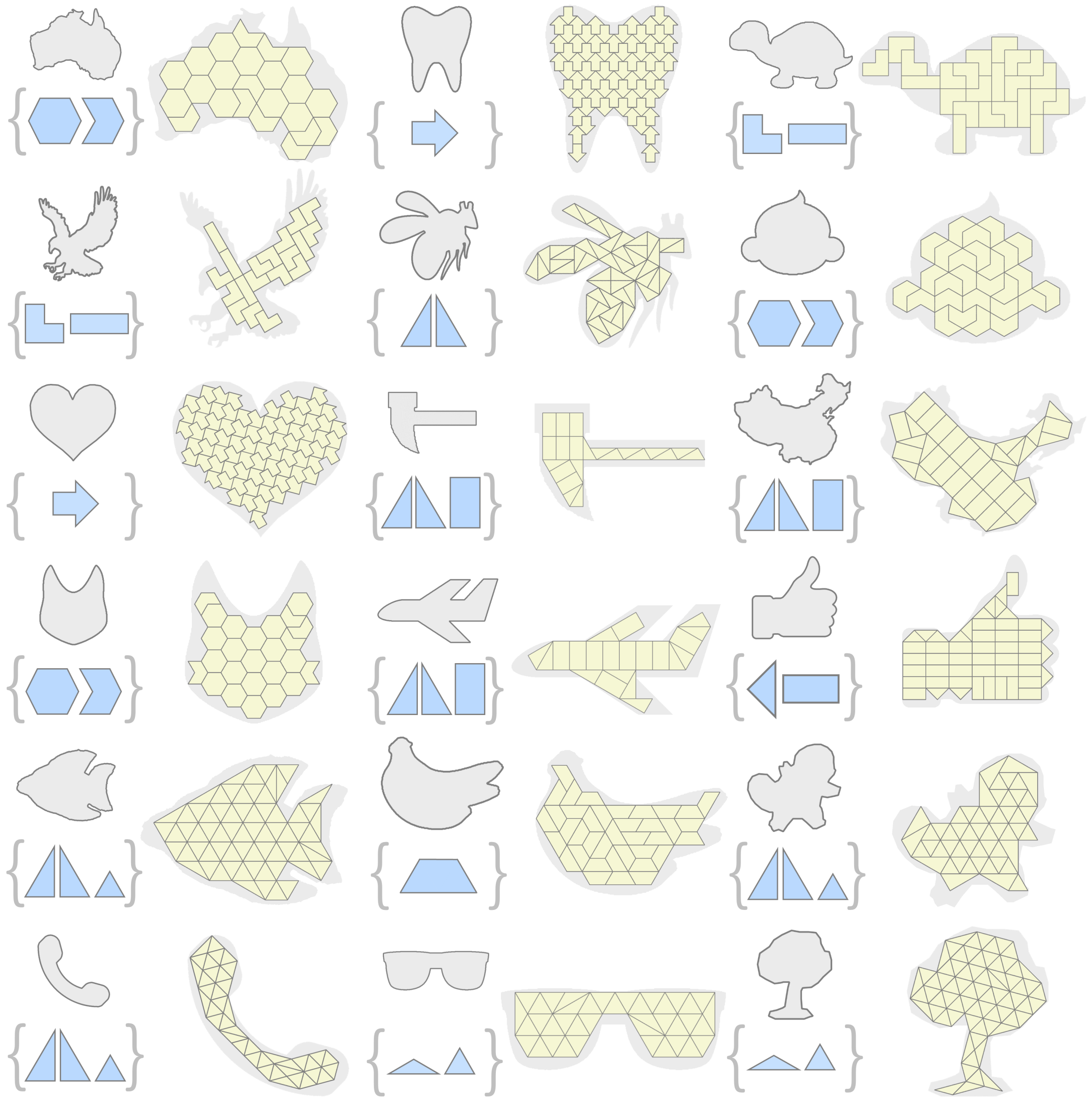

Figure 1. More tiling results produced by our method.

Part B - Minizinc Source Code

```
%%%%%%%%%%%%%%%%%%%% Inputs
int : nums_node; % num of tile placement
int : nums_edge_overlap; % num of overlap edges
int : nums_edge_adjacent; % num of adjacent edges

set of int: NODE = 1..nums_node;
set of int: EDGE_OVERLAP = 1..nums_edge_overlap;
set of int: EDGE_ADJ = 1..nums_edge_adjacent;

array[NODE] of float : node_area; % area of each possible tile placement
array[EDGE_OVERLAP] of NODE : from_overlap; % first node index of the overlap edges
array[EDGE_OVERLAP] of NODE : to_overlap;  % second node index of the overlap edges
array[EDGE_ADJ] of NODE : from_adjacent; % first node index of the adjacent edges
array[EDGE_ADJ] of NODE : to_adjacent; % second node index of the adjacent edges
array[EDGE_ADJ] of float : align_length; % normalized length of each alignment

%%%%%%%%%%%%%%%%%%%% Decision Variable
array[NODE] of var 0..1 : node; % whether a node in solution or not

%%%%%%%%%%%%%%%%%%%% constraints
% constraint no overlaying
% forbid both end of overlap edges in the soluion
constraint
forall(e in EDGE_OVERLAP) (
node[from_overlap[e]] + node[to_overlap[e]] <= 1
);

%%%%%%%%%%%%%%%%%%%% objectives

% calculate alignment length
var float : alignment_length_sum = sum(e in EDGE_ADJ)(
node[from_adjacent[e]] * node[to_adjacent[e]] * align_length[e]
);

% calculate total node area
var float : node_area_obj = sum(n in NODE) (node[n] * node_area[n]) / sum(node_area);

% divide total align length
var float : alignment_obj = alignment_length_sum / sum(align_length) ;


% objective
var float : obj;
obj = node_area_obj
+ 0.001 * alignment_obj;

% solve maximztion of objective
solve maximize obj;
```

Part C - Test Shapes employed in Evaluations

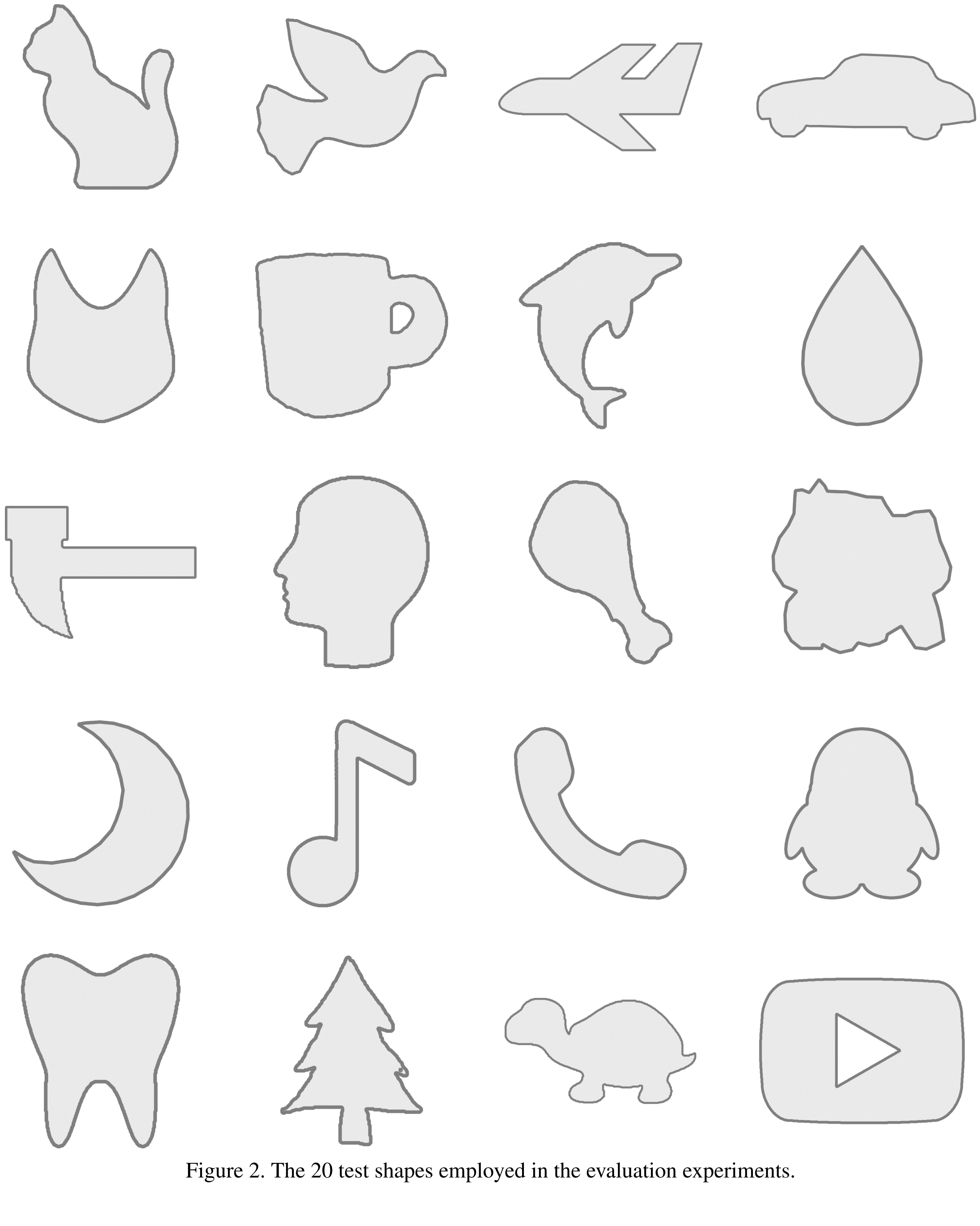

Figure 2. The 20 test shapes employed in the evaluation experiments.

The End