1 OVERVIEW

The following algorithm documents the rule-based system which is the foundation of our guiding wizard. The source code of the v-plot designer and guiding wizard are available at osf.io/jk8rp. The underlying rules can be customized and tailored towards one's needs. To do so, the following files contain the main properties that can be adjusted:

- **plot.js** – contains the implemented rules; also for the automatic chart recommendation engine.
- **propertyservice.js** – contains the default properties (color, transparency, etc) of the v-plots.
2 IMPLEMENTED RULES

Data: List with tasks L1, ..., L5, A1, ..., A10, G1, ..., G5 and indication whether they are notRelevant, relevant, or highlighted.
Initialization:
- Remove all layers and elements from the v-plot;
- Set default color and opacity for all layers and visual elements;

/* Initializing Layers */

if relevant(any local task) OR highlighted (any local task) then
  add layer (i) with mirrored bar charts;
end

if relevant(any global task) OR highlighted (any global task) then
  add layer (ii) with density distribution;
end

if relevant(any aggregated task) OR highlighted (any aggregated task) then
  add layer (iv) with statistic measures;
end

if relevant(any of L4, L5, G3, G4, G5) OR highlighted (any of L4, L5, G3, G4, G5) then
  add layer (iii) with difference encoding:
    if notRelevant(L4 and L5) then
      use difference-shape;
    else
      use difference-histogram;
    end
end

/* Local Analysis Tasks */

if highlight(any of L1, L2, L3) then
  darken (i) mirrored bar chart by increasing its opacity;
end

if relevant(L1) then
  add grid with labels of relative frequencies to the plot (layer v);
end

if highlight(L1) then
  add grid with labels of relative frequencies to the plot (layer v);
  add labels with the relative frequency to each bin of the mirrored bar chart (layer v);
end

if highlight(any of L4, L5) then
  darken (iii) difference encoding by increasing its opacity;
end

/* Global Analysis Tasks */

if highlight(any of G1, G2) then
  darken (ii) density distribution by increasing its opacity
end

if highlight(any of G3, G4, G5) then
  darken (iii) difference encoding by increasing its opacity;
end

/* Aggregated Analysis Tasks */

if highlight(any aggregated task) then
  put layer (iv) with statistic measures at the top layer;
end

if relevant(any of A6, A7) then
  connect central tendency measure (mean, median) by a straight line;
end

if highlight(any of A6, A7) then
  connect central tendency measure (mean, median) by a straight line;
  darken connection of central tendency by increasing its opacity;
end

if relevant(any of A8, A9, A10) then
  connect variance measure (quartiles, standard deviation, or standard error) by a straight line;
end

if highlight(any of A8, A9, A10) then
  connect variance measure (quartiles, standard deviation, or standard error) by a straight line;
  use background color for area between quartiles, standard deviation, or standard error;
end

Algorithm 1: Implemented rules of the guiding wizard. All rules can be adjusted in the source code.