**EXAMPLES AND QUESTIONNAIRE MODULE**

**Project title**: Visualizing Uncertainty with Chromatic Aberration

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**Questionnaire Setup and Arrangement:**

The existing approach of uncertainty representation named VSUP uses grid-chart method using colors whereas we are using both grid-chart and bubble-chart with Chromatic Aberration (CA). So, the questionnaire arrangement is made with the following sections:

* A: CA + Bubble
* B: CA + Grid
* C: VSUP + Bubble
* D: VSUP + Grid

To make the comparison fair, we have grouped our uncertainties to 4 levels since VSUP uses four levels of uncertainties. In our case, we have quantized our CA data and made four equidistant values of [33, 52, 71, 90] to draw the aberration in both circles and rectangles. In addition, to fill the circles and rectangles of CA, we have used top eight VSUP colors to make the evaluation more logical.

We have also implemented counter balancing in questionnaire presentation in both section level as well as question level. That means every four users will see the questionnaire by the following orders:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| B | C | D | A |
| C | D | A | B |
| D | A | B | C |

Every section consists of eight questions, but the order of the questions is randomly chosen by the system. So, the number of questions and the content of the questions will remain the same but in different order for different participants.

So, at the first place when participant will navigate to the given url of our online application, they will see the following screen to provide their email address:

**Graphical user interface, application

Description automatically generated**

After providing the email address, user will see one of the four sections. The layout of the questionnaire design will be something like the following:

**Graphical user interface, application, PowerPoint

Description automatically generated**

At the beginning of every section, bottom-right part the of the UI will show the Session description option. That means researcher will describe the features (chart, legend and how question will be asked and what does that mean, etc.) After completion of explanation, the participant is asked to hit ‘Start’ button as the following screen:

**Graphical user interface, text, application

Description automatically generated**

Once s/he presses ‘Start’ button, questionnaire will be started immediately and one question at a time. For example:

**Text

Description automatically generated with low confidence**

Now user need to select a cell (bubble or rectangle) from the chart based on the provided Value and Uncertainty/CA. On select an anticipated cell, next question will appear at the same place until it reaches to eighth question of the section.

Since bubble chart and grid chart are core component of evaluation criteria, we have presented the subsequent portions of the examples and questionnaires in the following sequences:

1. Examples of CA in Bubble Charts
2. Questionnaire Section-1: CA + Bubble
3. Questionnaire Section-2: VSUP + Bubble
4. Example of Grid Chart
5. Questionnaire Section-3: CA + Grid
6. Questionnaire Section-4: VSUP + Grid

**Examples of CA in Bubble Charts:**

**Rest of content will continue…**