

(Experimental material designed using LimeSurvey platform)

For example, the following screenshot images are the experiment materials designed for Participant 6, 12, 18 (P1, P12, P18).

Evaluation of Visualization approaches for visualizing the vertical context of Geographic locations-V6

Welcome to our survey! We appreciate your participation in this experiment.

We would like to compare visualization techniques that help find information about a geographic location. You will have questions for which you will use the application and answer in the survey. After that, short interview will be conducted about your experience. Your feedback is essential in helping us validate our hypothesis and improve the effectiveness of visualization approaches. Please take a few moments to share your answers and ratings on the visualization approaches.

Thank you for being a part of our study..! Let's get started with the survey...

Please Note:

This survey is conducted in the English language. It is crucial to answer all the mandatory questions on each page. Before beginning the survey, kindly take the following points into consideration.

- Before starting the survey, you should fill out the **consent form** and send it to **prasad.dream13@gmail.com**.
- For the optimal survey experience, we recommend to use laptop or desktop computer.
- Screen size of the computer should be range between 13 inches to 27 inches and you should use only one screen.
- Please ensure your computer has a stable internet connection.

There are 43 questions in this survey.

Introduction and Instructions

Next

User Experience questionnaire

*Full Name

*Gender

☐ Female ☐ Male

*Age

Choose one of the following answers

☐ Less than 20 years

☐ 21-30 years

☐ 31-40 years

☐ 41-50 years

☐ 51-60 years

☐ Greater than 60 years

Background questionnaire

*Highest education level

Choose one of the following answers

☐ Bachelor

☐ Masters

☐ Phd

☐ Other

*How would you rate your proficiency in English?

Choose one of the following answers

☐ Beginner

☐ Intermediate

☐ Advanced

*How would you rate your Computer literacy?

Choose one of the following answers

☐ Beginner

☐ Intermediate

☐ Advanced

Background questionnaire

*What is your professional background?

Choose one of the following answers

- ☐ GIS Data Analyst
- ☐ Front End Developer
- ☐ Back End Developer
- ☐ Full Stack Developer
- ☐ Cartographer
- ☐ Other

*How would you rate your familiarity with web maps?

Choose one of the following answers

- ☐ Very Familiar
- ☐ Somewhat Familiar
- ☐ Not Familiar

Background questionnaire

*How would you rate your familiarity with web maps?

Choose one of the following answers

- ☐ Very Familiar
- ☐ Somewhat Familiar
- ☐ Not Familiar

*How would you rate your familiarity with leaflet.js markers and leaflet.js marker patterns?

Choose one of the following answers

- ☐ Very Familiar
- ☐ Somewhat Familiar
- ☐ Not Familiar

*How would you rate your familiarity with the D3.js Zoomable circle packing Visualization?

Choose one of the following answers

- ☐ Very Familiar
- ☐ Somewhat Familiar
- ☐ Not Familiar

Background questionnaire

Task1 - Visualization Approach 3

Link to "VerticalGeoVis" Web application: <https://prasadmahusanka.github.io/VerticalGeoVis/>

TASK 1 :

Please select the variables as follows.

Dataset: Use top navigation bar, Select **UmweltBundesamt**

Visualization Approach: Use top navigation bar, Select **Visualization Approach 3**

Geographic Location: Click on the marker related to **Munich**

*Use **Visualization Approach 3** and answer the next five questions related to Task1

☐ I acknowledge and agree to proceed.

Task 1

Next

Question 1: What is the monthly maximum ($\mu\text{g}/\text{m}^3$) of "Ozone (O3)" recorded in the "Munich/Johanneskirchen" station for April?

Task 1 – Question 1

Next

Question 2: What is the monthly maximum ($\mu\text{g}/\text{m}^3$) of "Nitrogen dioxide (NO2)" recorded in the "Munich/Lothstrasse" station for October?

Task 1 – Question 2

Next

Question 3: What is the monthly average ($\mu\text{g}/\text{m}^3$) of "Fine dust (PM10)" recorded in the "Munich/Stachus" station for December?

Task 1 – Question 3

Next

Question 4: How many data records (vertical attributes) are available for the air pollutant "Fine dust (PM10)"?

Task 1 – Question 4

Next

Question 5: What are the categories of air pollutants that exist in Munich city?

Task 1 – Question 5

Next

Enjoyment + USE questionnaire- Visualization Approach 3

Questionnaire designed to measure the enjoyment, Usefulness, Ease of Use, Satisfaction of [Visualization Approach 3](#).

*Question 1: The clarity of visual elements (e.g., labels, legends), colors, and interactions in Visualization Approach 3 positively impacted my enjoyment.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 2: Visualization approach 3 makes the things I want to accomplish easier to get done.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 3: I don't notice any inconsistencies as I use the Visualization approach 3.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 4: I am satisfied with Visualization approach 3.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 1 – USE questionnaire

Next

Task - Visualization Approach 1

Link to "VerticalGeoVis" Web application: <https://prasadmahusanka.github.io/VerticalGeoVis/>

TASK 2 :

Please select the variables as follows.

Dataset: Use top navigation bar, Select [UmweltBundesamt](#)

Visualization Approach: Use top navigation bar, Select [Visualization Approach 1](#)

Geographic Location: Click on the marker related to [Hamburg](#)

*Use [Visualization Approach 1](#) and answer the next five questions related to Task 2

☐ I acknowledge and agree to proceed.

Task 2

Next

Question 1: What is the monthly maximum ($\mu\text{g}/\text{m}^3$) of "Ozone (O3)" recorded in the "Hamburg Sternschanze" station for April?

Task 2 – Question 1

Next

Question 2: What is the monthly maximum ($\mu\text{g}/\text{m}^3$) of "Nitrogen dioxide (NO2)" recorded in the "Hamburg Max-Brauer-Allee II (Straße)" station for October?

Task 2 – Question 2

Next

Question 3: What is the monthly average ($\mu\text{g}/\text{m}^3$) of "Fine dust (PM10)" recorded in the "Hamburg Habichtstrasse" station for December?

Task 2 – Question 3

Next

Question 4: How many data records (vertical attributes) are available for the air pollutant "Fine dust (PM10)"?

Task 2 – Question 4

Next

Question 5: What are the categories of air pollutants that exist in Hamburg city?

Task 2 – Question 5

Next

Enjoyment + USE questionnaire- Visualization Approach 1

Questionnaire designed to measure the enjoyment, Usefulness, Ease of Use, Satisfaction of [Visualization Approach 1](#).

*Question 1: The clarity of visual elements (e.g., labels, legends), colors, and interactions in Visualization Approach 1 positively impacted my enjoyment.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 2: Visualization approach 1 makes the things I want to accomplish easier to get done.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 3: I don't notice any inconsistencies as I use the Visualization approach 1.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 4: I am satisfied with Visualization approach 1.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 2 – USE questionnaire

Next

Task - Visualization Approach 2

Link to "VerticalGeoVis" Web application: <https://prasadmahusanka.github.io/VerticalGeoVis/>

TASK 3 :

Please select the variables as follows.

Dataset:

Use top navigation bar, Select UmweltBundesamt

Visualization Approach:

Use top navigation bar, Select Visualization Approach 2

Geographic Location:

Click on the marker related to Berlin

*Use Visualization Approach 2 and answer the next five questions related to Task 3.

☐ I acknowledge and agree to proceed.

TASK 3:

Please select the variables as follows.

Visualization Approach: Use top navigation bar, Select Visualization Approach 2

Geographic Location: Click on the marker related to **Berlin**

☐ I acknowledge and agree to proceed.

Next

Next

Next

Next

Next

Next

[illegible]

* Question 1: The clarity of visual elements (e.g., labels, legends), colors, and interactions in Visualization Approach 2 positively impacted my enjoyment.

[illegible]

*Question 2: Visualization approach 2 makes the things I want to accomplish easier to get done.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 3: I don't notice any inconsistencies as I use the Visualization approach 2.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Question 4: I am satisfied with Visualization approach 2.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 3 – USE questionnaire

Next

Participants's Interview

*Question 1: Considering the three visualization approaches you've interacted with, could you please rank them in order of preference based on which one you found most effective in helping your answer the questions?.

📌 Double-click or drag-and-drop items in the left list to move them to the right - your highest ranking item should be on the top right, moving through to your lowest ranking item. Please select at most 3 answers

Available items

- Visualization Approach 3
- Visualization Approach 1
- Visualization Approach 2

Your ranking

*Question 2: Could you please provide reasons for ranking them.

Participants Interview questions

Question 3: Do you have any suggestions regarding this Web Application for further improvements?.

Participants Interview questions

Submit

Your information was successfully submitted.

Thank You

Thank you!

Turn your own questions into answers and start building your own survey today.

Get started now

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