Intent-Driven Synthesis - Tasks - Two Conditions

Survey Flow

Standard: Consent (2 Questions)

Branch: New Branch

If

If I disagree Is Selected

EndSurvey: Advanced

EmbeddedData

PROLIFIC\_PIDValue will be set from Panel or URL.

BlockRandomizer: 1 - Evenly Present Elements

Group: Condition A

EmbeddedData

condition = A

BlockRandomizer: 1 - Evenly Present Elements

EmbeddedData

method = random

EmbeddedData

method = blue

EmbeddedData

method = outlier

EmbeddedData

method = vas

EmbeddedData

method = maxmin

Group: Condition B

EmbeddedData

condition = B

BlockRandomizer: 1 - Evenly Present Elements

EmbeddedData

method = random

EmbeddedData

method = blue

EmbeddedData

method = outlier

EmbeddedData

method = vas

EmbeddedData

method = maxmin

Group: Condition C

EmbeddedData

condition = C

method = na

BlockRandomizer: 10 -

Standard: Find Correlation (HIDDEN CORRELATION DATASET) (1 Question)

Standard: Find Extremum (FRAUD DATASET) (1 Question)

Standard: Find Clusters (MNIST DATASET) (1 Question)

Standard: Characterize Distribution (APPS AND GAMES DATASET) (1 Question)

Standard: Filter (APPS AND GAMES DATASET) (1 Question)

Standard: Find Anomalies (FRAUD DATASET) (1 Question)

Standard: Compute Derived Value (POLLUTION DATASET) (1 Question)

Standard: Determine Range (MNIST DATASET) (1 Question)

Standard: Retrieve Value (APPS AND GAMES DATASET) (1 Question)

Standard: Order (POLLUTION DATASET) (1 Question)

Standard: Mini VLAT (5 Questions)

Standard: Demographics (5 Questions)

Standard: Ending (3 Questions)

EndSurvey:

|  |  |
| --- | --- |
| Page Break |  |

Start of Block: Consent

Q1   
   
 **Informed Consent**   
 You are being invited to participate in a research study titled “Intent-driven approximations for fast visual analytics”. This study is being done by researchers from the DREAM lab and the HCI-VIS lab at the University of Massachusetts Amherst, in collaboration with Adobe Research.    
 **Why are we doing this research study?**  
 The purpose of our study is to investigate people’s effectiveness in performing various visual analytic tasks based on the visualizations they see. These visualizations are generated over a dataset or subsets of the dataset using various sampling techniques. We want to learn if (and how) people's ability to carry out specific analytical tasks is affected by the data underlying these visualizations.    
 **Who can participate in this research study?**  
 Any person who is at least 18 years of age may participate in this research study.   
 **What will I be asked to do and how much time will it take?**  
 You will be presented with multiple visualizations and accompanying texts that describe those visualizations, and will be asked to answer quantitative questions involving basic statistical concepts. You will also be asked to provide the following demographic information: age, gender, level of education, email, number of relevant undergraduate/graduate/professional experience involving statistics. All of the demographic questions are optional and you may choose not to answer them. Lastly, you will be asked questions regarding your familiarity with data visualizations. We expect this research study to last between 15 and 20 minutes.    
 **Will being in this research study help me in any way?**  
 You are not likely to have any direct benefit from being in this research study. The potential benefits to you from participation may include learning about how visualization research is conducted, and current issues of interest in the visualization community. Further, we hope that your participation in the study may help researchers build better tools to facilitate fast and accurate visual analytics over real-world datasets.    
 **What are my risks of being in this research study?**  
 Your participation in this study does not involve any risks other than what you would encounter in daily life such as fatigue and boredom. The effects of participating should be comparable to those you would experience from viewing a computer monitor and using a keyboard.   
 **How will my personal information be protected?**  
 To the best of our ability, your answers in this study will remain confidential. We will minimize any risks by assigning you a random 13 digit ID that will not be connected to your personal information. The survey is hosted by Qualtrics, and your responses will be stored electronically on a secure and password-protected database. Only the research team will have access to the data.  
 De-identified data from this study will be shared with the research community at large to advance visualization research and data analytics. We will remove or code any personal information that could identify you before files are shared with other researchers to ensure that, by current scientific standards and known methods, no one will be able to identify you from the information we share. Despite these measures, we cannot guarantee anonymity of your personal data.   
 **Will I be given any money or other compensation for being in this research study?**  
 No.   
 **What happens if I say yes, but I change my mind later?**  
 You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time by closing your browser.  There are no penalties of any kind.   
 **Who can I talk to if I have questions?**  
 If you have questions about this project or if you have a research-related problem, you may contact the Principal Investigator, Dr. Alexandra Meliou, at ameli@cs.umass.edu. If you have any questions concerning your rights as a research subject, you may contact the University of Massachusetts Amherst Human Research Protection Office (HRPO) at (413) 545-3428 or humansubjects@ora.umass.edu.   By clicking “I agree to participate” below you are indicating that you are at least 18 years old, have read this consent form, and agree to participate in this research study. Please print a copy of this page for your records.

Q2

* I agree to participate (1)
* I disagree (2)

End of Block: Consent

Start of Block: Find Correlation (HIDDEN CORRELATION DATASET)

|  |
| --- |
|  |

correlation   
In the chart below, each dot represents an occurrence of credit card fraud. The x-axis represents the population of the city in which the fraud occurred, and the y-axis reflects the amount of credit card fraud.   
  
   
   
  
   
Based on the chart, how weak or strong is the correlation between the city population and credit card fraud amount?

|  |  |  |
| --- | --- | --- |
|  | Not at all correlated | Strongly Correlated |

|  |  |
| --- | --- |
| () |  |

End of Block: Find Correlation (HIDDEN CORRELATION DATASET)

Start of Block: Find Extremum (FRAUD DATASET)

|  |  |
| --- | --- |
|  |  |

extremum   
When credit card fraud is detected, the database records the occurrence and associated data.   
  
   
The chart below shows the population of the city in which the fraud occurred on the x-axis, and the amount of credit card fraud value detected (in USD) on the y-axis.   
  
   
   
  
   
What is the highest **amount of credit card fraud** of any fraud occurrence?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Find Extremum (FRAUD DATASET)

Start of Block: Find Clusters (MNIST DATASET)

|  |  |
| --- | --- |
|  |  |

clusters   
In the fraud detection database, credit card fraud is detected from several cities with varying population sizes. Credit card fraud occurrences from the same fraud organization tend to have similar fraud value (in USD) and come from cities with similar population sizes.   
  
   
In the chart below, each dot represents an occurrence of credit card fraud. The y-axis reflects the credit card fraud value (in USD).   
  
   
   
  
   
Based on the chart, how many fraud organizations (clusters) are represented?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Find Clusters (MNIST DATASET)

Start of Block: Characterize Distribution (APPS AND GAMES DATASET)

|  |
| --- |
|  |

distribution   
The chart below is a histogram where the x-axis represents the number of installs of apps and games on the google play store and the y-axis denotes the average score (1-5 stars) for those apps and games.   
  
   
   
  
   
What shape of distribution does the histogram most resemble?

* (1)
* (2)
* (3)
* (4)
* (5)
* None of the above (6)

End of Block: Characterize Distribution (APPS AND GAMES DATASET)

Start of Block: Filter (APPS AND GAMES DATASET)

|  |
| --- |
|  |

filter   
In the histogram below, the x-axis represents the number of times an app or game was installed, and the y-axis represents the average review score (1-5 stars) for apps or games with that number of installs.   
  
   
   
  
   
Which "number of installs" has an average review score **greater than 4 stars?** Check all that apply.

* 0 (1)
* 1 (2)
* 5 (3)
* 10 (4)
* 50 (5)
* 100 (6)
* 500 (7)
* 1K (8)
* 5K (9)
* 10K (10)
* 50K (11)
* 100K (12)
* 500K (13)
* 1M (14)
* 5M (15)
* 10M (16)
* 50M (17)
* 100M (18)
* 500M (19)
* 1B (20)
* 5B (21)
* 10B (22)

End of Block: Filter (APPS AND GAMES DATASET)

Start of Block: Find Anomalies (FRAUD DATASET)

|  |
| --- |
|  |

anomalies   
In the chart below, each dot represents an occurrence of credit card fraud. The x-axis represents the population of the city in which the fraud occurred, and the y-axis reflects the credit card fraud value (in USD).   
  
   
We consider any city with a population above 1.6 million people to be an anomaly.   
  
   
   
  
   
Based on the chart, what **percentage** of the data do you think is anomalous?

* Less than 1% (2)
* 1-5% (3)
* 5-10% (4)
* 10-25% (5)
* More than 25% (6)

End of Block: Find Anomalies (FRAUD DATASET)

Start of Block: Compute Derived Value (POLLUTION DATASET)

|  |  |
| --- | --- |
|  |  |

derived   
The x-axis represents locations in the United States and Mexico, and the y-axis represents the average Carbon Monoxide Air Quality Index in a state from January 2000 to May 2016.   
  
   
   
  
   
Based on the visualization, what is the average Carbon Monoxide Air Quality Index in the **entire United States and Mexico** from January 2000 to May 2016? Assume the same number of measurements were taken in each location.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Compute Derived Value (POLLUTION DATASET)

Start of Block: Determine Range (MNIST DATASET)

|  |
| --- |
|  |

range   
When examining credit card fraud data, Fraud-Monitoring Agencies consider the population of the city in which fraud occurs. The city populations in this record are in the range of 0 to 3 million.   
  
   
In the chart below, each dot represents an occurrence of credit card fraud. The x-axis represents the population of the city in which the fraud occurred, and the y-axis reflects the amount of credit card fraud.   
  
   
   
  
   
For fraud occurrences in cities with a population of **less than 0.5 million**, what is the range of the amount of credit card fraud? Provide the tightest possible bound.

* Lower bound: (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Upper bound: (2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Determine Range (MNIST DATASET)

Start of Block: Retrieve Value (APPS AND GAMES DATASET)

|  |  |
| --- | --- |
|  |  |

retrieve   
The histogram below shows the number of times an app or game is installed from the Google Play store on the x-axis, and the average review score (1-5 stars) given to those apps and games on the y-axis.   
  
   
   
  
   
What is the average score for apps and games that are installed 50K times?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Retrieve Value (APPS AND GAMES DATASET)

Start of Block: Order (POLLUTION DATASET)

|  |  |  |
| --- | --- | --- |
|  |  |  |

order   
The chart below shows locations in the United States and Mexico vs. their average Carbon Monoxide Air Quality Index.   
  
   
   
  
   
Rank the following states in **descending** order of average Carbon Monoxide Air Quality Index. The location with the highest Carbon Monoxide Air Quality Index should be ranked as number 1. You can drag and drop the options.

\_\_\_\_\_\_ Arizona (2)

\_\_\_\_\_\_ Colorado (3)

\_\_\_\_\_\_ District of Columbia (1)

\_\_\_\_\_\_ North Dakota (5)

\_\_\_\_\_\_ South Dakota (4)

\_\_\_\_\_\_ Wyoming (6)

End of Block: Order (POLLUTION DATASET)

Start of Block: Mini VLAT

Q1 You will now see 4 questions that each asks you to read a chart and answer a question related to the given chart.

|  |  |
| --- | --- |
| Page Break |  |

|  |
| --- |
|  |

vlat-1   
   
  
   
What distance have customers traveled in the taxi the most?

* 60-70 km (0)
* 30-40 km (1)
* 20-30 km (0)
* 50-60 km (0)

|  |  |
| --- | --- |
| Page Break |  |

|  |
| --- |
|  |

vlat-2   
   
  
   
Which city’s metro system has the largest number of stations?

* Beijing (0)
* Shanghai (1)
* London (0)
* Seoul (0)

|  |  |
| --- | --- |
| Page Break |  |

|  |
| --- |
|  |

vlat-3   
   
  
   
What was the price of a barrel of oil in February 2020?

* $50.54 (1)
* $47.02 (0)
* $42.34 (0)
* $43.48 (0)

|  |  |
| --- | --- |
| Page Break |  |

|  |
| --- |
|  |

vlat-4   
   
  
   
What was the average price of a pound of coffee in October 2019?

* $0.71 (1)
* $0.90 (0)
* $0.80 (0)
* $0.63 (0)

End of Block: Mini VLAT

Start of Block: Demographics

Q29 Lastly, please answer the following socio-demographic questions:

|  |  |
| --- | --- |
|  |  |

gender What is your gender?

* Man (1)
* Woman (2)
* Non-binary (3)
* Prefer not to disclose (4)
* Prefer to self-describe (5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
|  |

age What is your age?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

education What is the highest level of school you have completed or the highest degree you have received?

* Maximum 12 grade no diploma (1)
* High school graduate - High school diploma or equivalent (for example: GED) (2)
* Some college but no degree (3)
* Associate degree in college - Occupational/vocational program (4)
* Associate degree in college - Academic program (5)
* Bachelor’s degree (For example: BA, AB, BS) (6)
* Master’s degree (For example: MA, MS, MEng, MEd, MSW, MBA) (7)
* Professional school Degree (For example: MD,DDS,DVM,LLB,JD) (8)
* Doctorate degree (For example: PhD, EdD) (9)
* Other (10)

experience List your relevant experience(s) with **statistics**. Enter "0" if the field does not apply.

* Number of undergraduate level course(s): (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Number of graduate level course(s): (2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Years of professional experience(s): (3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Other: (4) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End of Block: Demographics

Start of Block: Ending

Q1 The answer to this question will not affect you in any way. How much effort did you put in your response?

* Very little effort. I didn’t try at all and wrote down whatever that came to mind. (1)
* Some effort. I answered the questions but didn’t think too deeply about anything. (2)
* A lot of effort. I carefully thought about my answers before responding. (3)

Q2 Is there anything else you would like us to know, or any feedback you would like to give us on this survey?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Page Break |  |

Q3 We thank you for your time spent taking this survey.  
     
We are testing the proficiency of several sampling algorithms at capturing key patterns in data.   
    
If you are interested in knowing more, or would like to know how well your intuition matched our empirical results, please feel free to reach out to Hamza Elhamdadi at helhamdadi@umass.edu

End of Block: Ending