

## NeatSankey: Sankey Diagrams with Improved Readability Based on Node Positioning and Edge Bundling

– Supplementary Material –

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This supplementary material provides additional information and results about the evaluation for our paper titled NeatSankey: Sankey Diagrams with Improved Readability Based on Node Positioning and Edge Bundling.

Firstly, we add more results about the quantitative evaluation (Section 4.1 in the paper). Secondly, we offer more details for the user study (Section 4.2 in the paper).

While we only show statistic results about the quantitative evaluation in the paper, this supplementary material illustrates different layouts of Sankey diagrams to provide more details. The comparison is conducted on 10 real-world datasets and 15 randomly generated datasets.

For the user study, we provide the screenshots of our website and the system usability scale questionnaire and photos of interviewee. We also present the five real-world datasets used in the user study.

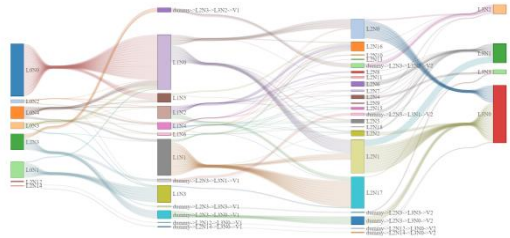
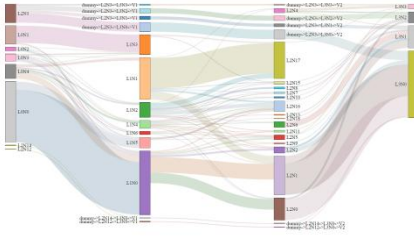
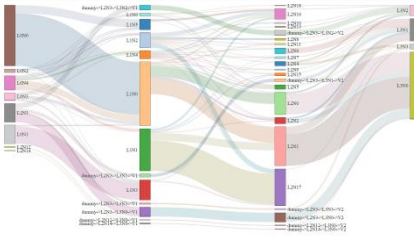
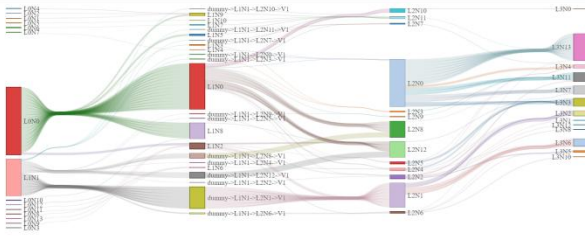
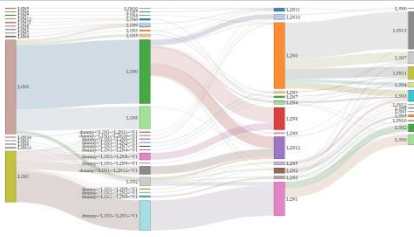
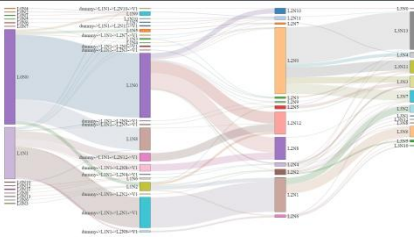
Cross Number(CN) is an aesthetic metric of diagram proposed by Gansner et al. for measuring the number of edge crossings in a generated layout. Whether the two edges cross is judged between the coordinate of the endpoint of the edge and count the number of all the crossed edges. The smaller the value of CN is, the fewer edges intersect in the whole layout. To some extent, it reflects the clutter.

Swing Amplitude(SA). Gansner et al. proposed the metric of the shortest edge (SE). Swing amplitude further extends SE. The swing of the edge is shown by calculating the slope.

Layout Coverage(LC). Barth et al. proposed this metric in order to measure the total proportion of blank space in the generated layout. The generated images are converted without text into grayscale images and obtained LC by calculating the number of pixels in the images. Therefore, smaller LC often means clearer visuals.



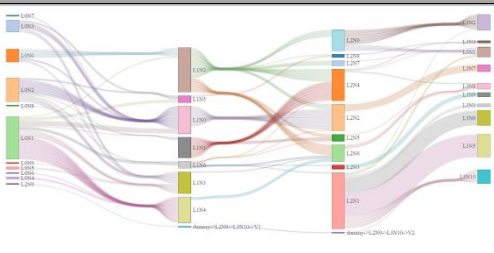
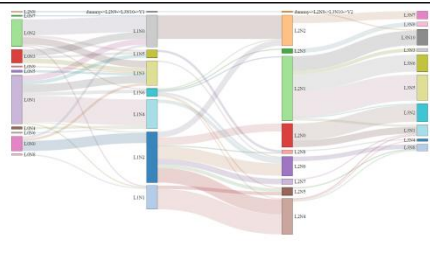
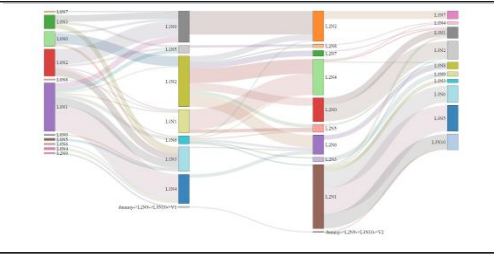
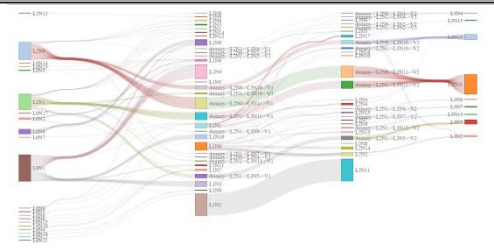
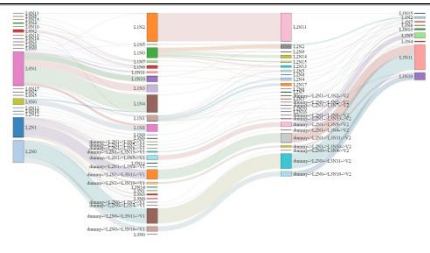
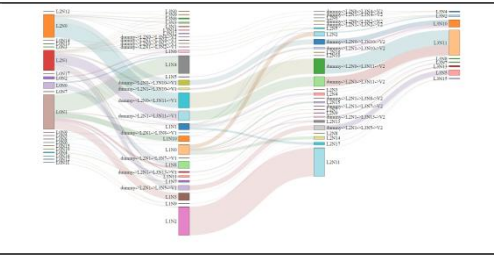
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|                      | Sugiyama |        |
|                      |          |        |
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|                      | Sugiyama |        |
|                      |          |        |

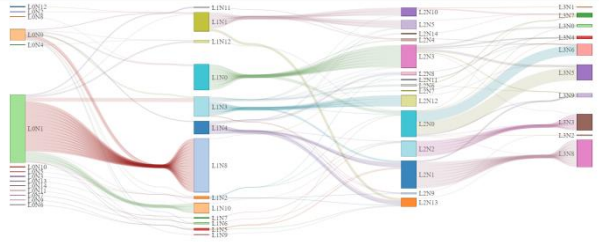
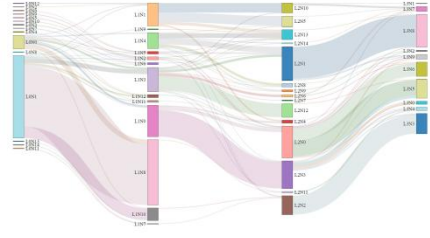
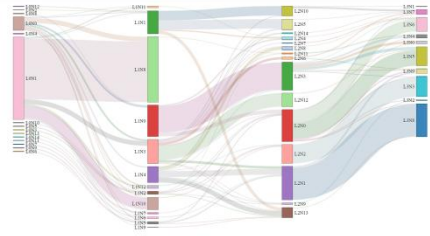
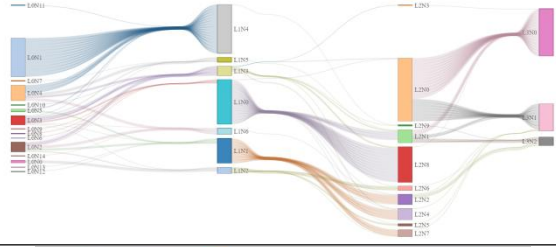
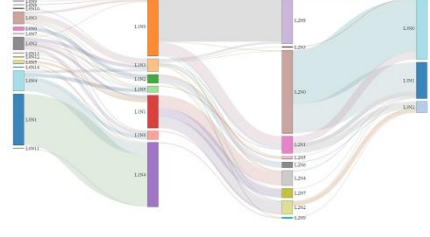
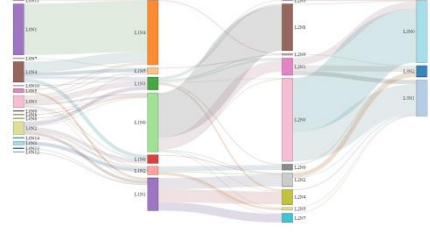
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|                      |          |  |
| auto_generated_data5 | Ours     |  |
|                      | ILP      |  |
|                      | Sugiyama |  |
|                      |          |  |

| Data                 |          | Layout |
|----------------------|----------|--------|
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|                      | ILP      |        |
|                      | Sugiyama |        |
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|                      | Sugiyama |        |
|                      |          |        |

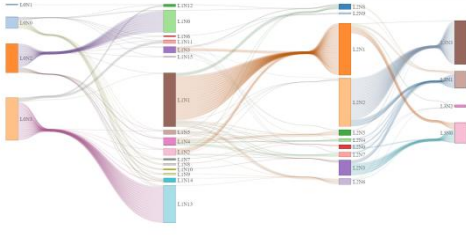
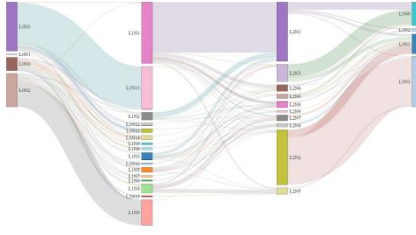
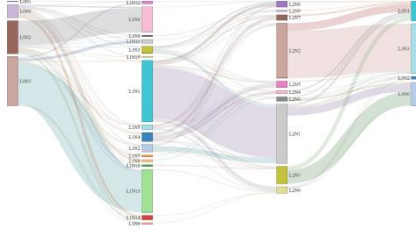
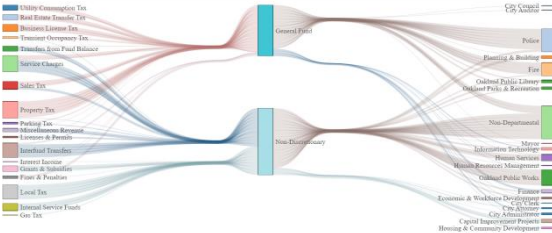
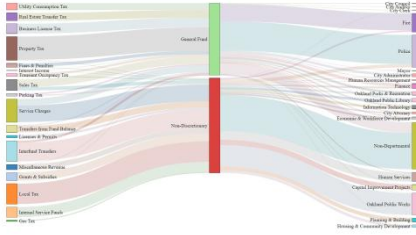
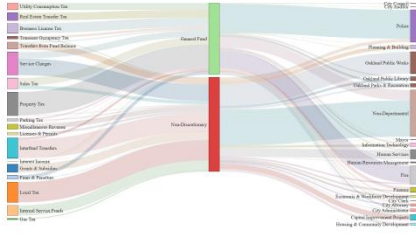


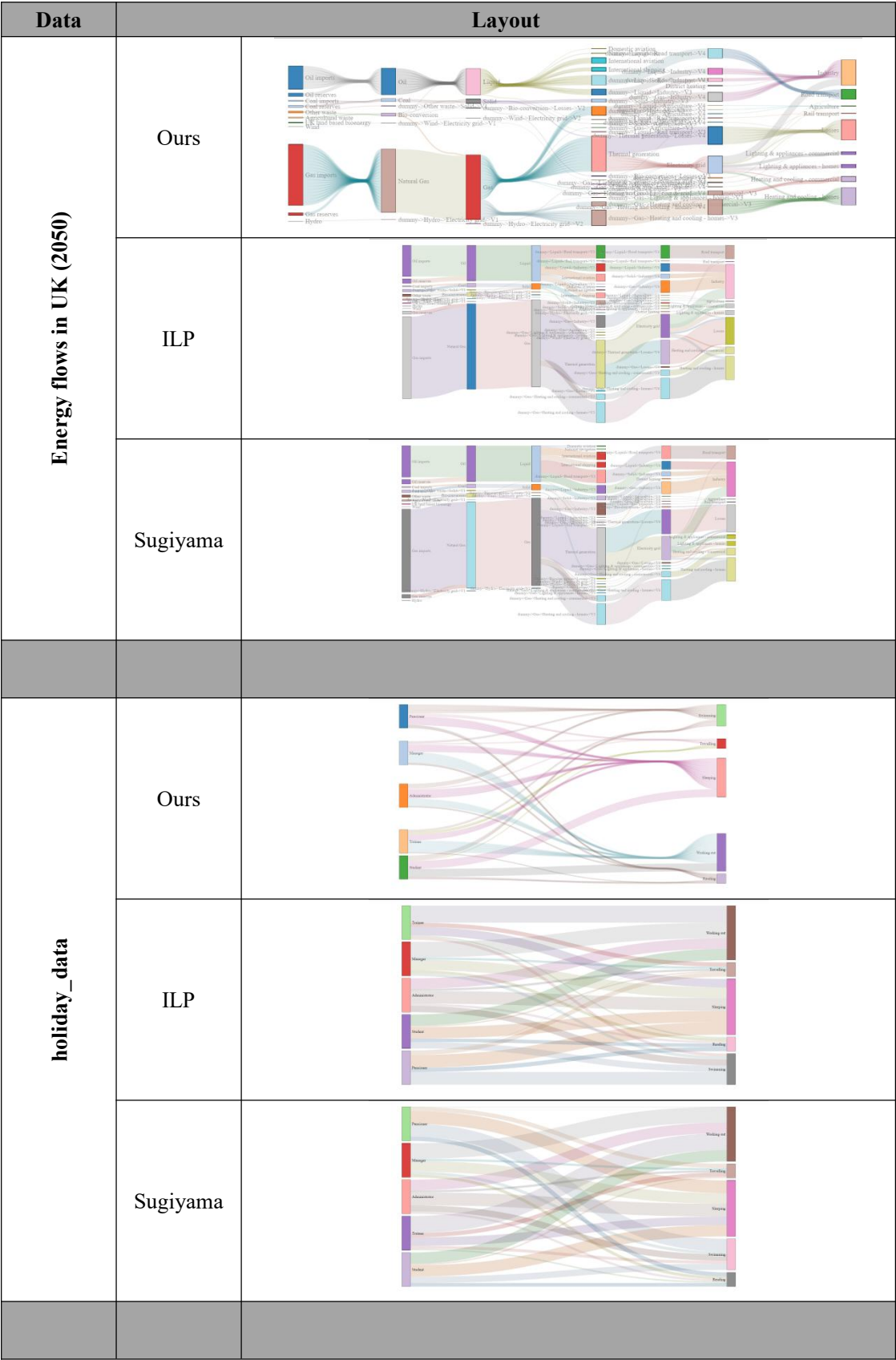


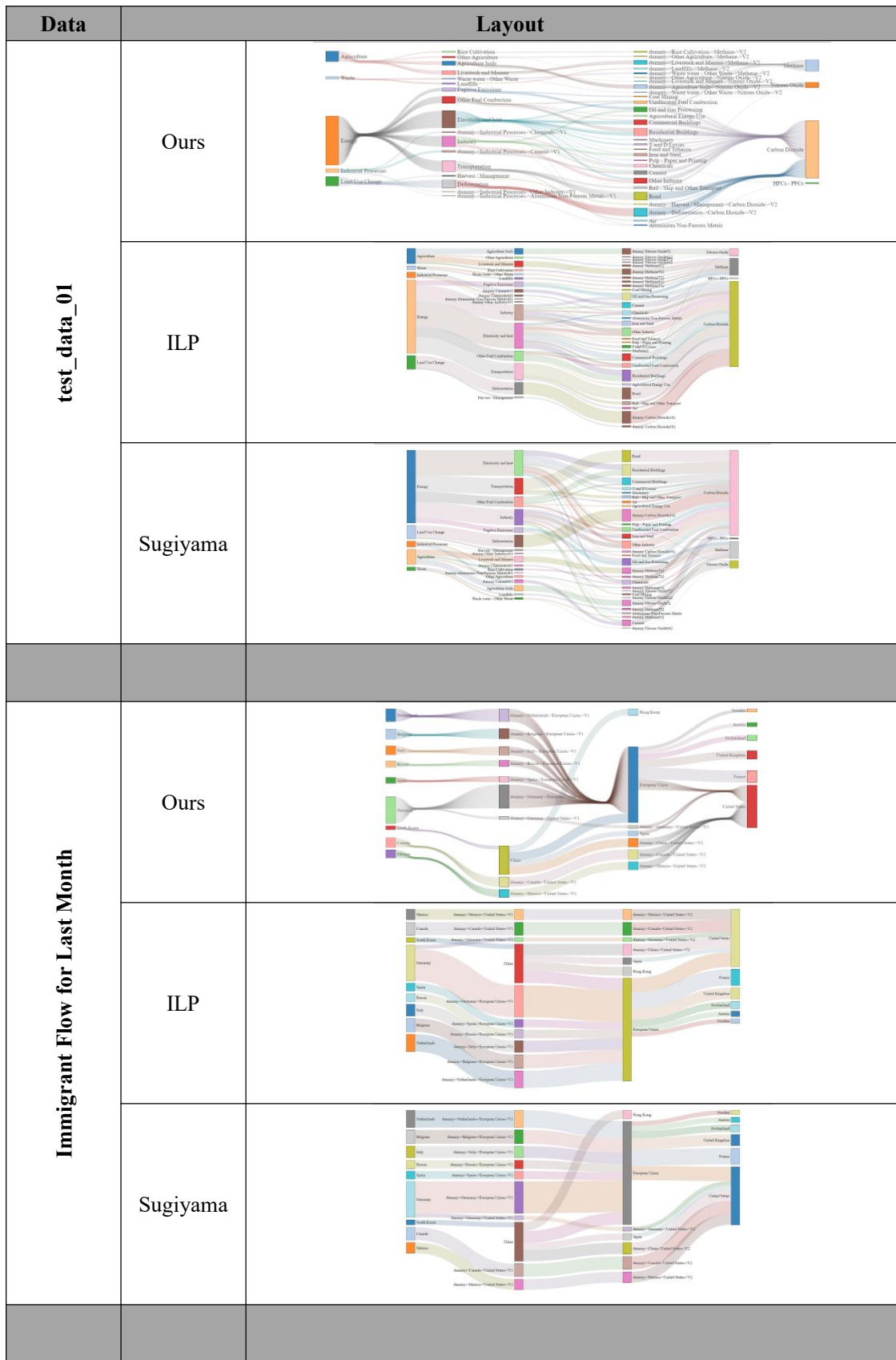
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|                       |          |  |
| auto_generated_data11 | Ours     |  |
|                       | ILP      |  |
|                       | Sugiyama |  |
|                       |          |  |

| Data                  | Layout   |  |
|-----------------------|----------|--|
| auto_generated_data12 | Ours     |    |
|                       | ILP      |    |
|                       | Sugiyama |    |
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| auto_generated_data13 | Ours     |  |
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|                       | Sugiyama |  |
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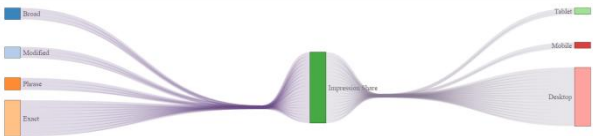
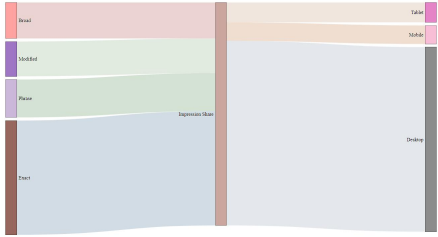
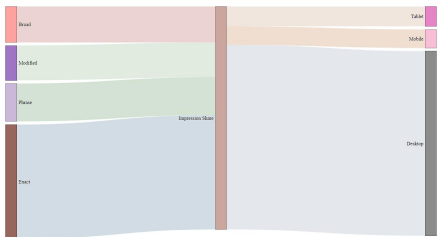
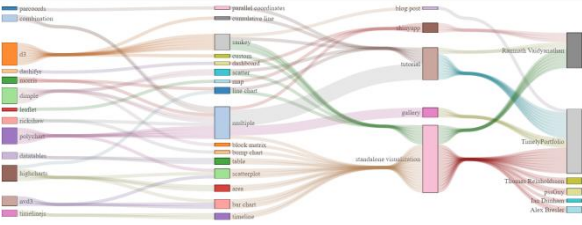
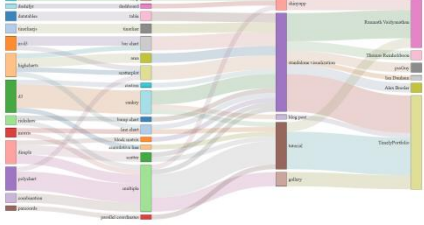
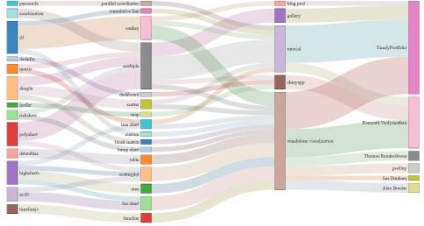


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|   | Sugiyama |    |
|   |          |  |
| City of Oakland Budget Sankey Particles | Ours     |  |
|   | ILP      |  |
|   | Sugiyama |  |
|   |          |  |

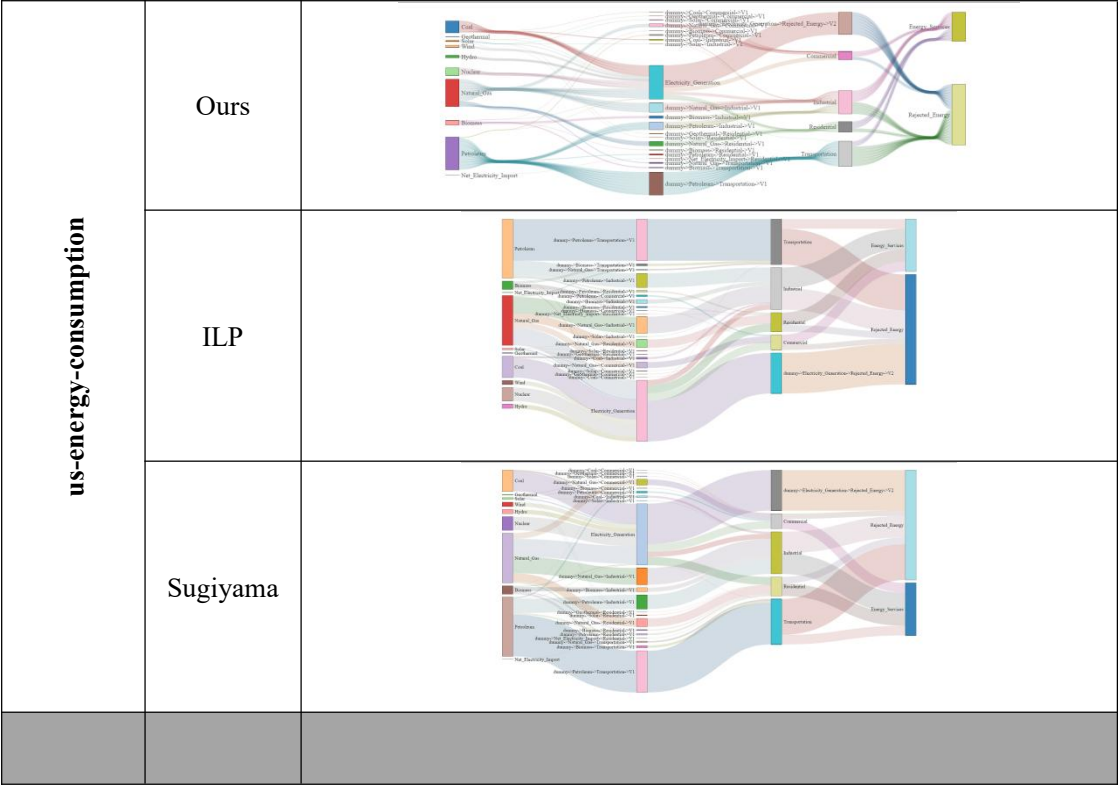




| Data    | Layout   |  |
|---------|----------|--|
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|         | ILP      |  |
|         | Sugiyama |  |
|         |          |  |
| nottest | Ours     |  |
|         | ILP      |  |
|         | Sugiyama |  |
|         |          |  |

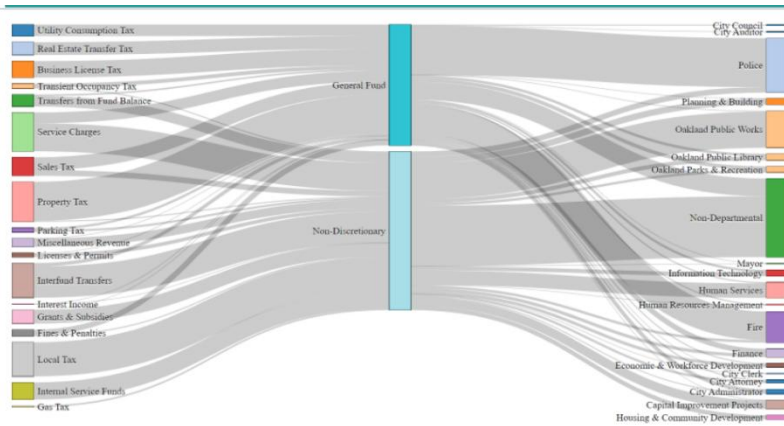
| Data                              | Layout   |  |
|-----------------------------------|----------|--|
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|                                   | ILP      |    |
|                                   | Sugiyama |    |
| rCharts Examples Sankey Particles | Ours     |   |
|                                   | ILP      |  |
|                                   | Sugiyama |  |

| Data | Layout |
|------|--------|
|------|--------|





### Test 1: Tflow evaluation ( 1 / 15 )

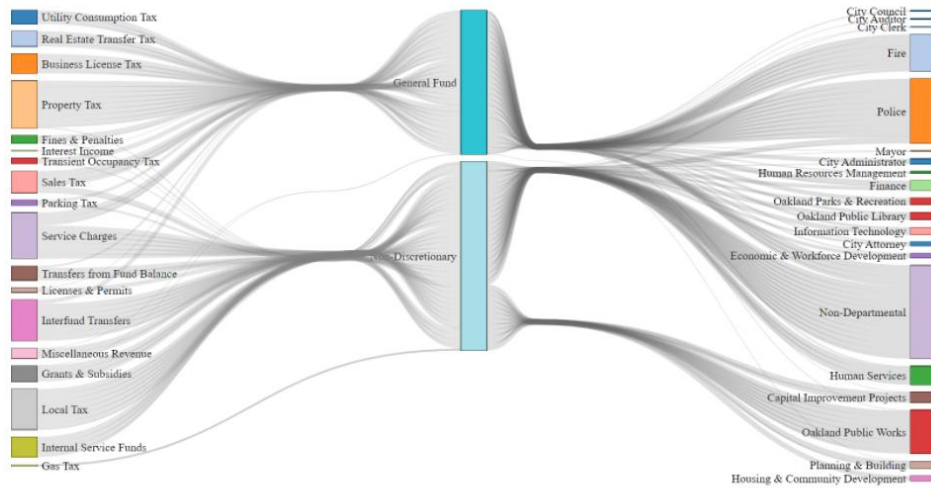


Test 1: Among the edge-series below, which one is actually existing in the map?

- ☐ A: Local Tax -> General Fund -> Police
- ☐ B: Internal Service Funds -> General Fund -> Non-Departmental
- ☐ C: Interfund Transfers -> Non-Discretionary -> City Council
- ☐ D: Property Tax -> Non-Discretionary -> City Auditor

Submit

### Task 2: Trel evaluation( 3 / 15 )

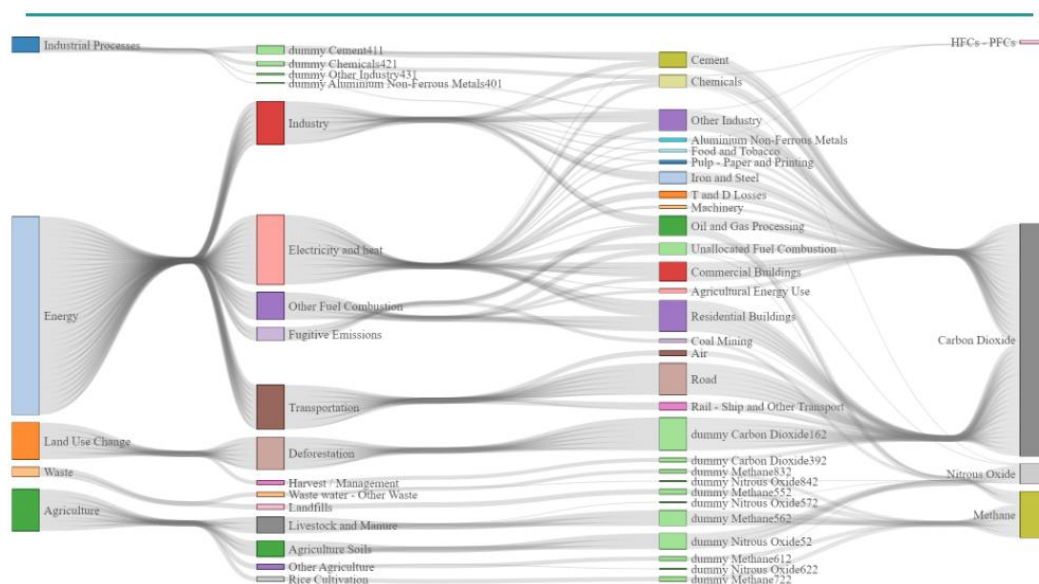


Test 3: As For the node 'General Fund' in the graph, which one among the nodes below does it not flow to?

- ☐ A: Finance
- ☐ B: None
- ☐ C: Housing & Community Development
- ☐ D: Oakland Public Library

Submit

### Task 3: Tdata evaluation



Test 15: For the nodes in third layer, which one has the largest value?

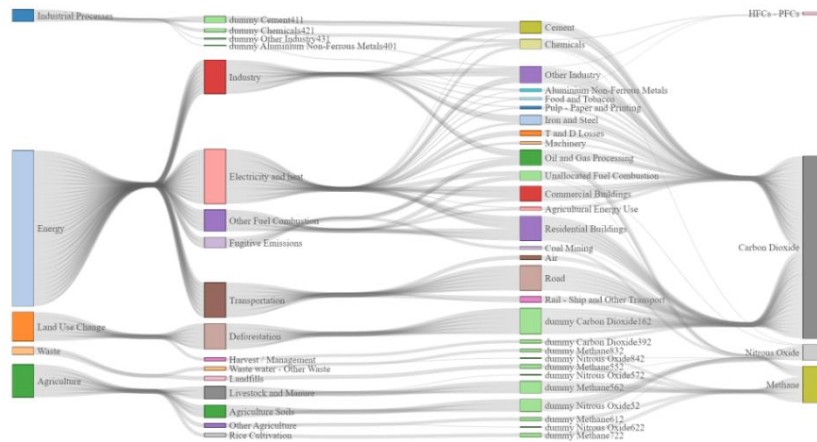
- ☐ A: Road
- ☐ B: Residential Buildings
- ☐ C: Oil and Gas Processing
- ☐ D: Other Industry

Submit

## Questionnaire: SUS Investigation for Graph Evaluation

### Question 1: ( 1 / 10 )

Please rate the Graph we post below



- I think that I would like to use this system frequently.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

### More Questions ( 2 – 10 )

- I found the system unnecessarily complex.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I thought the system was easy to use.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I think that I would need the support of a technical person to be able to use this system.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I found the various functions in this system were well integrated.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I thought there was too much inconsistency in this system.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I would imagine that most people would learn to use this system very quickly.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I found the system very cumbersome to use.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I felt very confident using the system.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

- I needed to learn a lot of things before I could get going with this system.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Complete

