

Gravity++: An Alternative Graph-based Approach for Creating Interactive Visualisation Narratives

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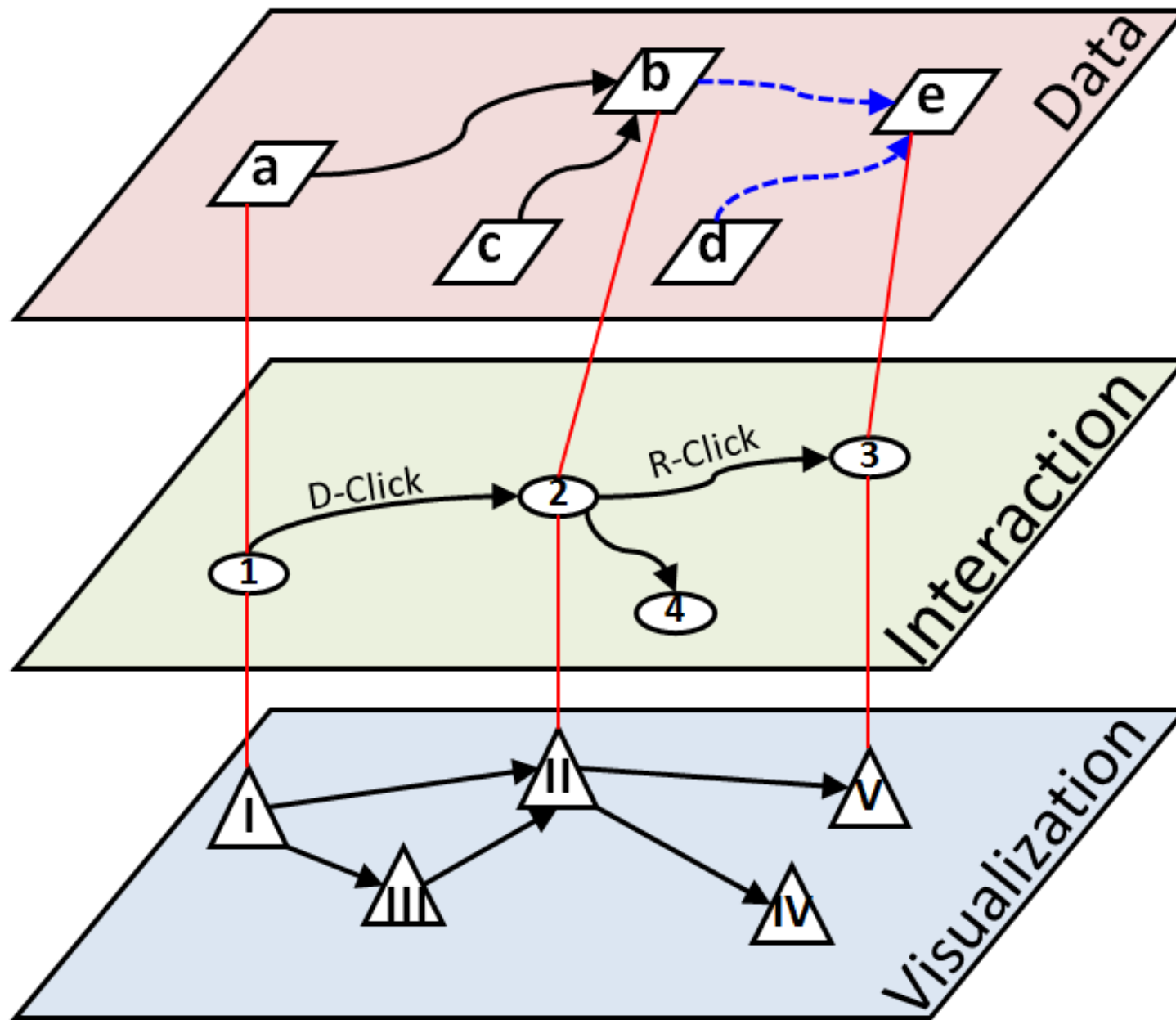
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Stepped Area Chart



Alternative Graph-based Architecture



Data Domain and Interface

The screenshot displays the gravity++ data management interface. On the left, a dark sidebar contains navigation options: 'Upload new dataset' (A), 'Current datasets', 'Add new Node' (B), and 'TOOLBOX'. The main area is titled 'GRAPH VIEW' (C) and shows a data flow diagram. The root node is 'ASEAN_Covid_per_day' (highlighted in red), which is filtered by 'country == zIGqe_girA'. It branches into 'governmentStringency' and 'total_covid_cases_per_country'. 'total_covid_cases_per_country' is derived from a 'sum on new_cases' operation. Both 'governmentStringency' and 'total_covid_cases_per_country' are joined to form 'Total_Cases_And_Strictness'. 'total_covid_cases_per_country' is also joined with 'HealthStatsData' to form 'Total_Covid_and_cation'. A table on the right (D) displays the output data for 'ASEAN_Covid_per_day'.

date	total_cases	new_cases	country
2021-01-21	507717	1778	Philippines
2021-01-22	509887	2170	Philippines
2021-01-23	511679	1792	Philippines
2021-01-24	513619	1940	Philippines
2021-01-25	514996	1377	Philippines
2021-01-26	516166	1170	Philippines
2021-01-27	518407	2241	Philippines
2021-01-28	519575	1168	Philippines
2021-01-29	521413	1838	Philippines
2020-01-23	1	1	Singapore

Rows per page: 10

Visualisation Domain and Interface

The screenshot displays the gravity++ interface, which is divided into several sections:

- Header:** Includes the logo "gravity++", a menu icon, and navigation tabs for "seven", "Home", "Data", "Visualisation", "Interaction", and "User Study". On the right, there are "Save" and "Watch your story" options.
- Left Panel (VISUALISATION NODES):** Contains a "Add new Node" button (A), a "GRAPHSCAPE GENERATE" button (E), a "Path Number" input field set to "1", and a "Sequence Cost" display showing "32.96" (F).
- GRAPH VIEW (B):** A central workspace with a grid background. It contains three nodes: "New Zealand By Day", "India By Day", and "Relationship between Diabetes and Total Cases in Asia". The nodes are connected by a green dashed line. A toolbar with icons for zooming and panning is located at the bottom left of this view.
- RELATIONSHIP BETWEEN DIABETES AND TOTAL CASES IN ASIA (C):** A scatter plot showing the relationship between "total_cases_max_total_cases" (x-axis, 0 to 10,000,000) and "country_stats_diabetes_prevalence" (y-axis, 4 to 18). The plot includes a legend for "country_stats_location" with various countries and their corresponding symbols. The legend lists: Afghanistan, Armenia, Azerbaijan, Bahrain, Bangladesh, Bhutan, Brunei, Cambodia, China, Georgia, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Laos, Lebanon, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Oman, Pakistan, and "...15 entries".
- SPEC VIEW (D):** A panel at the bottom right showing a JSON schema for the visualization. It includes a "Reset" and "Save" button. The JSON snippet is:

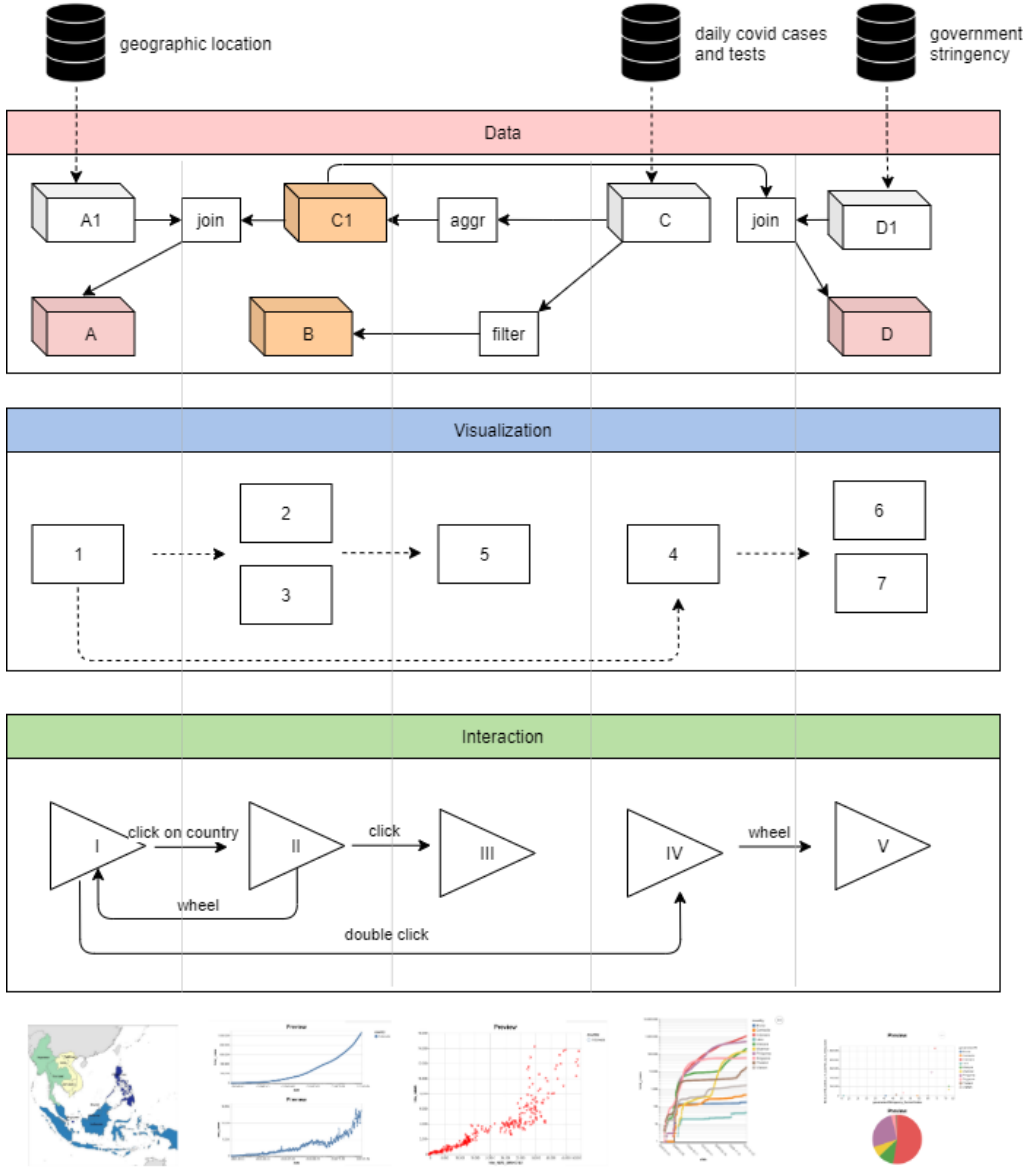
```
"root": { 6 items
  "$schema": string "https://vega.github.io/schema/vega-lite/v4.json"
  "width": string "container"
```

Interaction Domain and Interface

The screenshot displays the gravity++ interface, which is used for creating interactive stories. The interface is divided into several sections:

- Header:** Includes the logo "gravity++", a navigation menu with "Home", "Data", "Visualisation", "Interaction", and "User Study", and utility buttons for "Save" and "Watch your story".
- Interaction Nodes Panel (Left):** Contains two options: "Add new Node" (marked with a green circle 'A') and "Add new Edge" (marked with a green circle 'B').
- Graph View (Center):** Labeled "GRAPH VIEW" (marked with a green circle 'C'), it shows a flowchart of interaction nodes. The nodes are: "Overview: Total covid cases in each SE country" (top), "Cumulative Cases and New Cases in each country" (middle-left), "Compare covid case trajectories" (middle-right), "More tests more cases?" (bottom-left), and "Government stringency and total covid cases" (bottom-right, highlighted in green). Edges between nodes are labeled with interaction types: "line-wheel", "area-dblclick", "line-click", and "line-wheel".
- Preview View (Right):** Labeled "PREVIEW" (marked with a green circle 'D'), it shows a visual representation of the story. It includes a scatter plot titled "Preview" showing "total_covid_cases_per_country_sum_new_cases" on the y-axis (0 to 1,000,000) and "governmentStringency_Current Index" on the x-axis (15 to 80). A legend for "governmentStringency" lists countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Below the scatter plot is a pie chart also titled "Preview", showing the distribution of data points across categories.
- Presentation Note Panel (Bottom Right):** Labeled "PRESENTATION NOTE" (marked with a green circle 'E'), it contains a text area for notes, a "Reset" button, and a "Save" button. The text area includes a rich text editor with options for "Normal", "B", "I", "U", and "Quote", and a placeholder text "Enter some notes here".

An Example Supergraph



Advantages of a Graph-based Architecture

- Metamodel of other data models
- Recommendation of visualisation sequences
- Custom interaction modes for storytelling
- Support for non-linear narrative visualisation structure
- Data query prediction and traversal



Preliminary Evaluation of Prototype



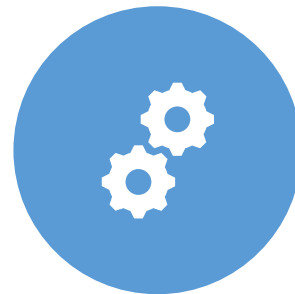
+ Intuitive approach to constructing narrative visualisations



+ Creation of complex processing graphs



- UI needs improvement and other basic features



- Lacks integration with other tools & workflows

Thank You!

Questions?