

Detecting Citation Anomalies in Hyperbolic Space with the Poincaré Ball Model



User manual

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1.Introduction

This user manual provides instructions for utilizing the **ADIHS system** (*Detecting Citation Anomalies in Hyperbolic Space with the Poincaré Ball Model*), a model designed to enhance the integrity and reliability of scientific communication by detecting citation anomalies through hyperbolic geometry, specifically leveraging the Poincaré ball model.

This manual will guide you through the application's functionalities and how to use them effectively.

2. Getting Started

To set up the environment, follow the next steps:

1. Open a terminal or command prompt.
2. Clone the repository from GitHub using the following command line:

```
$ git clone https://github.com/YotamG12/1.-Analyzing-Dynamic-neural-network-graph-within-Hyperbolic-Space.git
```

3. Navigate to the project directory and install the required packages (python 3.10 is required):

```
$ cd src
```

```
$ pip install torch
```

```
$ pip install -r requirements.txt
```

4. Open the UI:

```
$ python UI.py
```

Final-Project

DataFrame

Time Slices: ?

Graph Type: ?

Plots moving window histograms and delta traces for top nodes.

Hyperparameters

Number of Walks: ?

Number of Workers: ?

Number of Epochs: ?

validation

Number of iteration: ?

Console Output

3. Operating the System

3.1 Loading the Dataset:

To load the dataset, click the Generate Data button (highlighted in red in the UI). The system will process and load the data based on the selected time slice

Final-Project

DataFrame

Time Slices: 61 ?

Generate Data

Graph Type: moving_window_histograms

Plots moving window histograms and delta traces for top nodes.

Hyperparameters

Number of Walks: 200 ?

Number of Workers: 2 ?

Number of Epochs: 100 ?

Run Main

validation

Number of iteration: 30 ?

Console Output

Once the data is fully loaded, a confirmation message will be displayed:

Console Output

☒ Data generation completed.

3.2 Graph Selection-

The UI provides a Graph Type Selection panel where users can choose from a variety of statistically analyzed plots. Each graph includes additional descriptive information to assist in interpretation:

The screenshot shows the 'Final-Project' application window. It features several sections: 'DataFrame' with a 'Time Slices' input set to 61 and a 'Generate Data' button; 'Graph Type' with a dropdown menu currently showing 'moving_window_histograms' (highlighted with a red box) and a descriptive text 'Plots moving window histograms and delta traces for top nodes.'; 'Hyperparameters' with inputs for 'Number of Walks' (200), 'Number of Workers' (2), and 'Number of Epochs' (100), along with a 'Run Main' button; 'validation' with a 'Number of iteration' input set to 30; and 'Console Output' showing a checked checkbox and the text 'Data generation completed.'

Users can choose a specific graph or opt to display all available visualizations:

This screenshot is similar to the previous one, but the 'Graph Type' dropdown menu is open, displaying a list of options: 'temporal_anomaly_distribution', 'temporal_sharp_changes', 'as_std_histogram', 'moving_window_histograms', and 'All Graphs'. The 'moving_window_histograms' option is currently selected in the background dropdown.

3.3. Hyperparameters Selection-

The Hyperparameters section allows users to configure model settings before training. Users may either:

- Manually adjust each hyperparameter
- Use the default global settings

Clicking the question mark (?) icon next to a parameter displays a tooltip with additional explanations.

The screenshot shows a software interface titled "Final-Project". It contains several sections: "DataFrame" with a "Time Slices" input (61) and a "Generate Data" button; "Graph Type" with a dropdown menu set to "moving_window_histograms" and a tooltip that reads "Plots moving window histograms and delta traces for top nodes."; "Hyperparameters" (highlighted with a red box) with three rows: "Number of Walks" (200), "Number of Workers" (2), and "Number of Epochs" (100), each with a question mark icon; a "Run Main" button; "validation" with "Number of iteration" (30) and a question mark icon; and "Console Output" with a checked checkbox and the text "Data generation completed."

Parameter	Value	Help Icon
Time Slices	61	?
Number of Walks	200	?
Number of Workers	2	?
Number of Epochs	100	?

3.4 Validation Iteration-

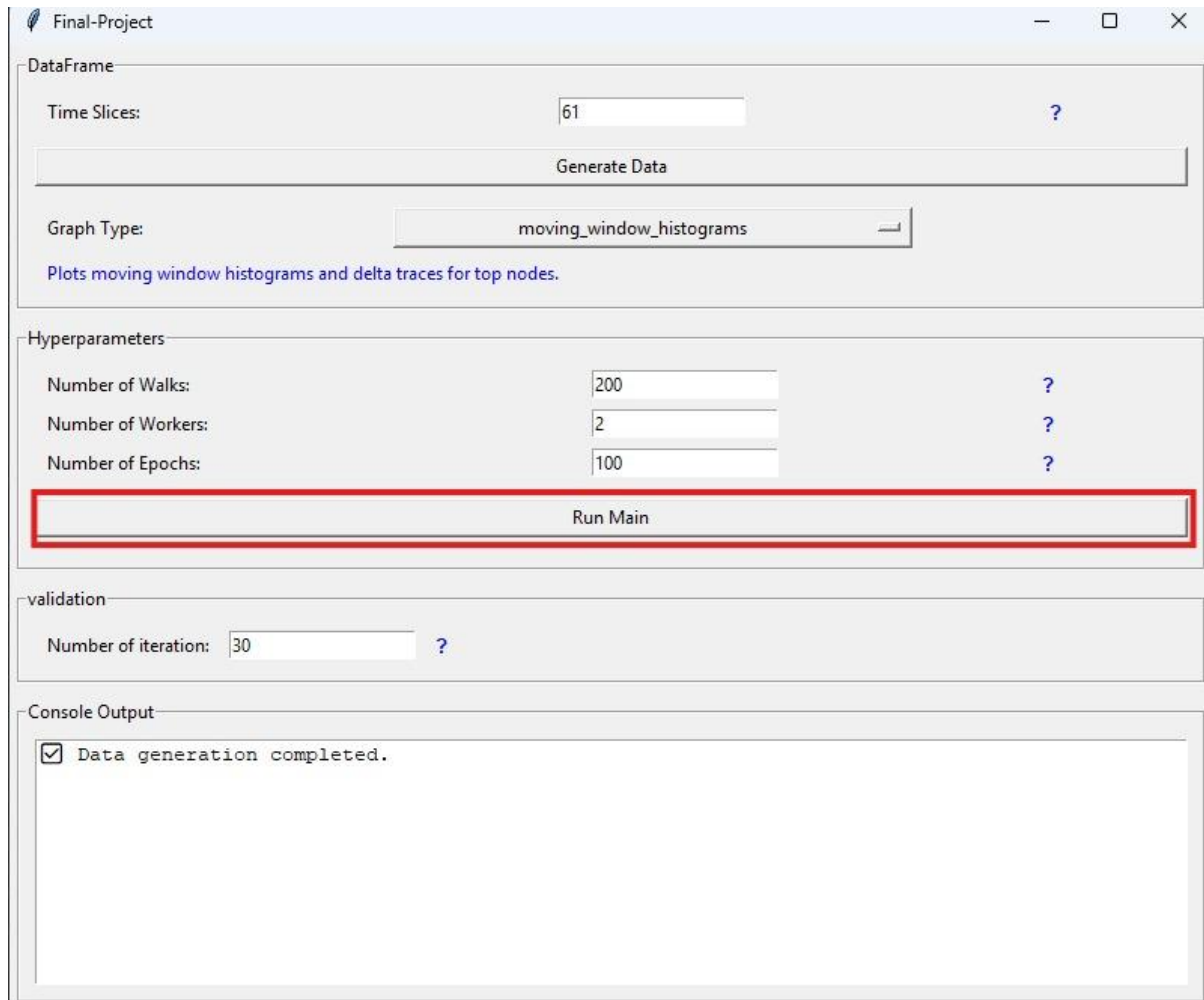
Users can specify the number of iterations to be used during the validation process. This setting determines how many times the system will repeat the validation phase to ensure consistent and robust evaluation results.

The screenshot shows a software interface titled "Final-Project" with several configuration sections:

- DataFrame**: Contains a "Time Slices" input field with the value "61" and a blue question mark icon. Below it is a "Generate Data" button.
- Graph Type**: Contains a dropdown menu currently set to "moving_window_histograms" and a blue question mark icon. Below it is a text description: "Plots moving window histograms and delta traces for top nodes."
- Hyperparameters**: Contains three input fields: "Number of Walks" (200), "Number of Workers" (2), and "Number of Epochs" (100), each with a blue question mark icon. Below these is a "Run Main" button.
- validation**: This section is highlighted with a red border. It contains a "Number of iteration:" input field with the value "30" and a blue question mark icon.
- Console Output**: A text area at the bottom showing a log message: "[x] Data generation completed."

3.5 Run Main-

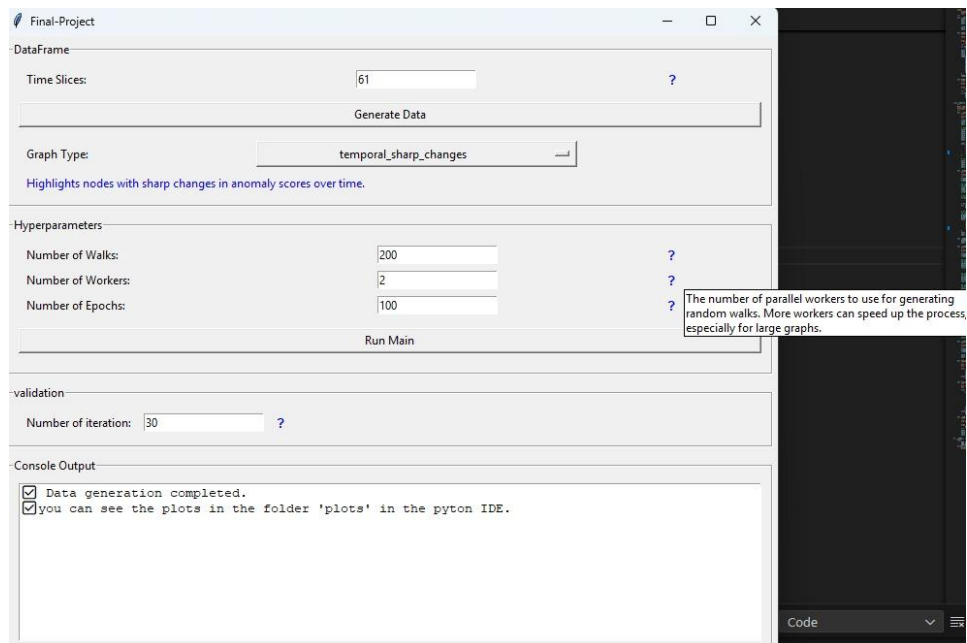
Once all configurations are set, click the “Run Main” button to execute the main algorithm using all the selected settings.



The screenshot shows the 'Final-Project' application window with the following sections:

- DataFrame**
 - Time Slices: ?
 -
 - Graph Type: ?
 - Plots moving window histograms and delta traces for top nodes.
- Hyperparameters**
 - Number of Walks: ?
 - Number of Workers: ?
 - Number of Epochs: ?
 - (highlighted with a red border)
- validation**
 - Number of iteration: ?
- Console Output**
 - ☒ Data generation completed.

After the algorithm finishes running, the generated plots will be saved to the output folder. Their location will be displayed in the console output within the UI:



You can also view the plots directly in the VS Code file explorer under the designated folder:

