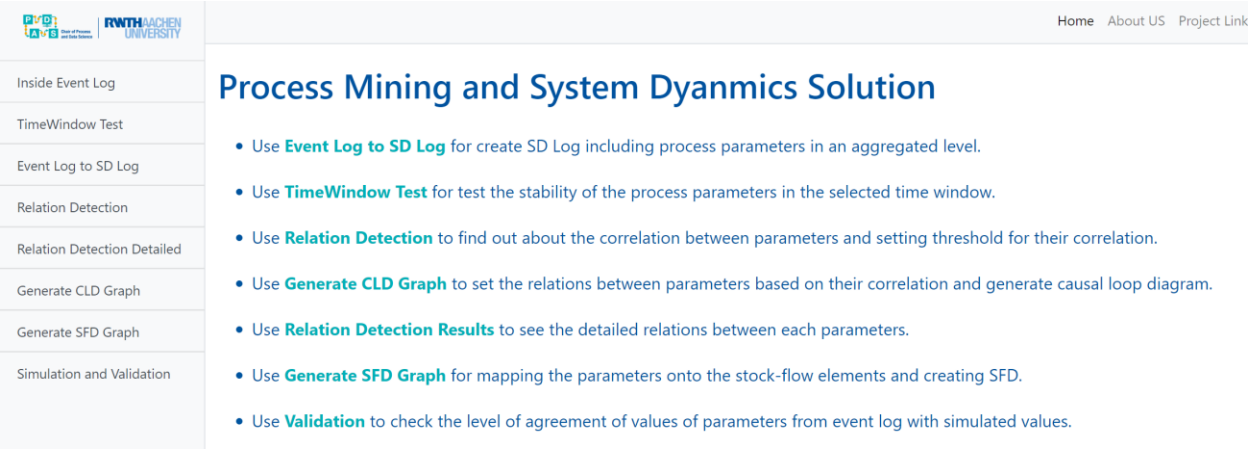
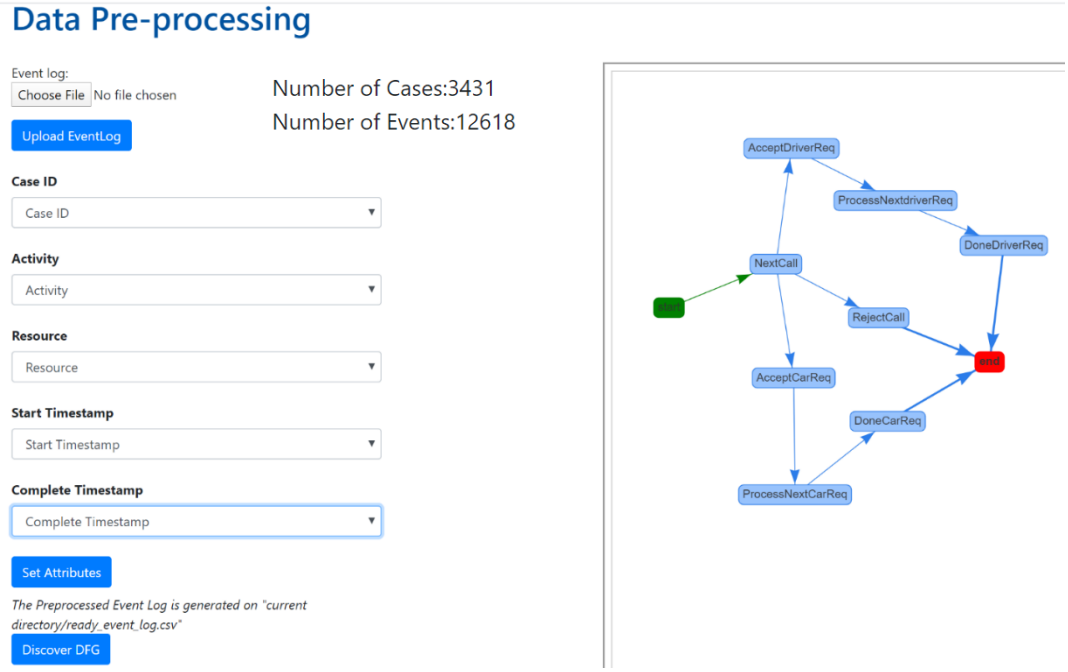
Contents

To access the main page of the web application, after installing the "Requirement.txt" file, download the project, open in one of the python IDE, run "app.py" and then use the provided URL *"127.0.0.1:5000"* in the browser:



1 Inside Event Log



In this section, by uploading the event log we can map and choose the required/basic attributes of the event log.

1. Upload the event log in .csv or .xes format
2. Set the required attributes of the event log
3. Submit the event log and the attributes
4. Use discover DFG Button

1.1 Output

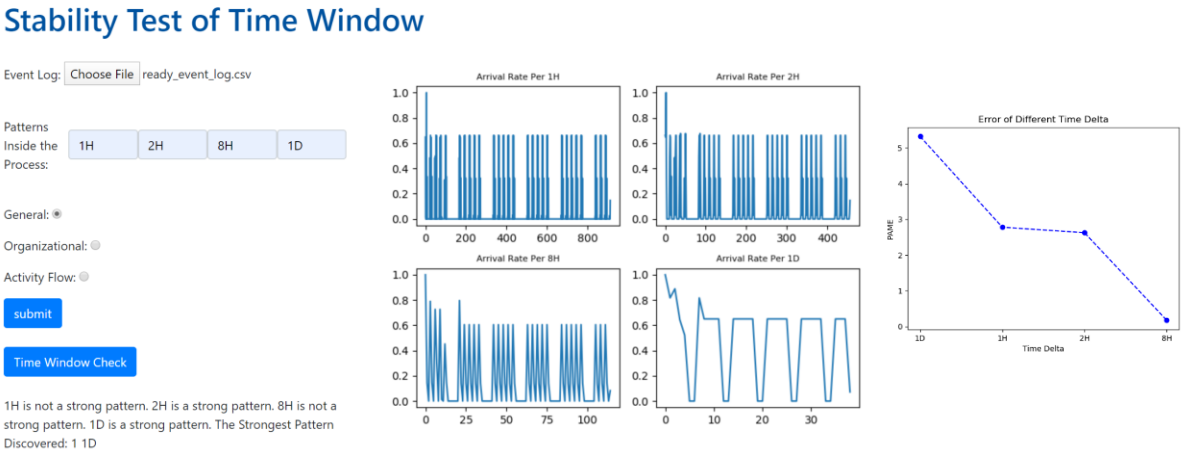
1.1.1 Visualized

Directly follows graph of the event log

1.1.2 Exported

A .csv file of the event log with the assigned attribute with the name of “ready_event_log.csv” in the system.

2 Time Window Selection



1. Uploading an event log with the required attributes (ready_event_log.csv)
2. Inserting different time windows in the format of a digit + H/D/W/M
    a. Example: 1H, 8H, 1D, 5D, 3W,
3. Submit the event log and the time windows
4. Show the result and errors

2.1 Output

2.1.1 Visualized

The patterns of the selected time windows for all of them as plots.

The errors of the trained model for all the time windows in one plot for comparison.

2.1.2 Exported

Two SD-log (.csv) for all the selected time windows:

1. One including all the time steps with the name “General_timewindow_sd_log.csv”, e.g., General_8H_sd_log.csv.
2. One only for the active steps, in which the inactive steps are the process are removed with the name “Active_timewindow_sd_log.csv”, e.g., “Active_8H_sd_log.csv”.

3 Event log to SD-log

If you are going to use one of the selected time windows for the simulation and model generation, this step can be skipped.

1. Upload the ready event log (.csv)
2. Select the aspect for generating SD-logs: General, organizational, activity
3. Select the time window
4. If only looking for active steps, check the remove inactive steps
5. Submit the information
6. After showing the generated SD-log in the selection pane, if there is more than one (for organizational and activity aspects), select one and use the show result button.

3.1 Output

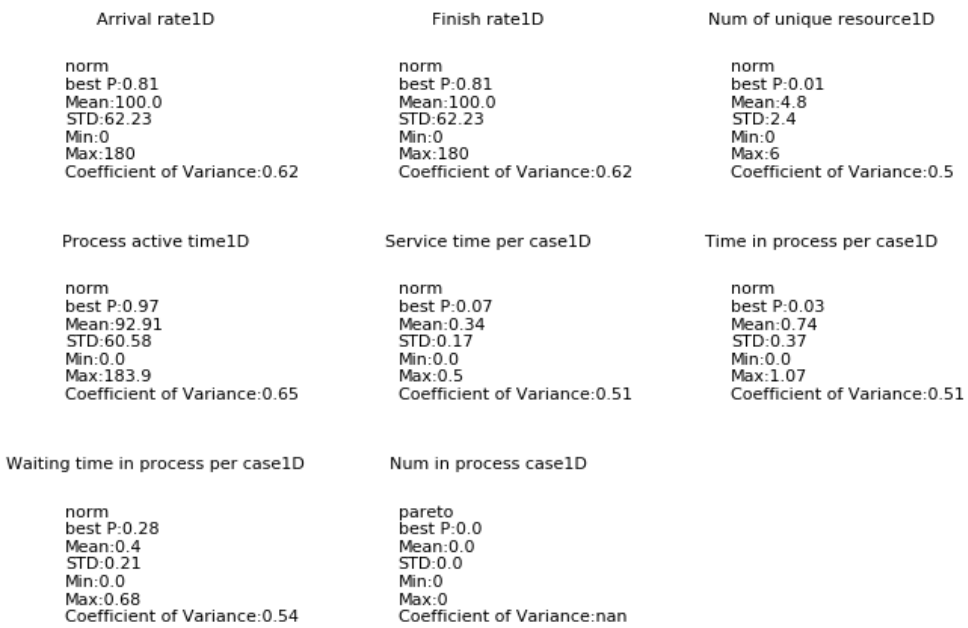
3.1.1 Visualized

The statistical information for the selected SD-log including the closest distribution for each of the attributes in the SD-log.

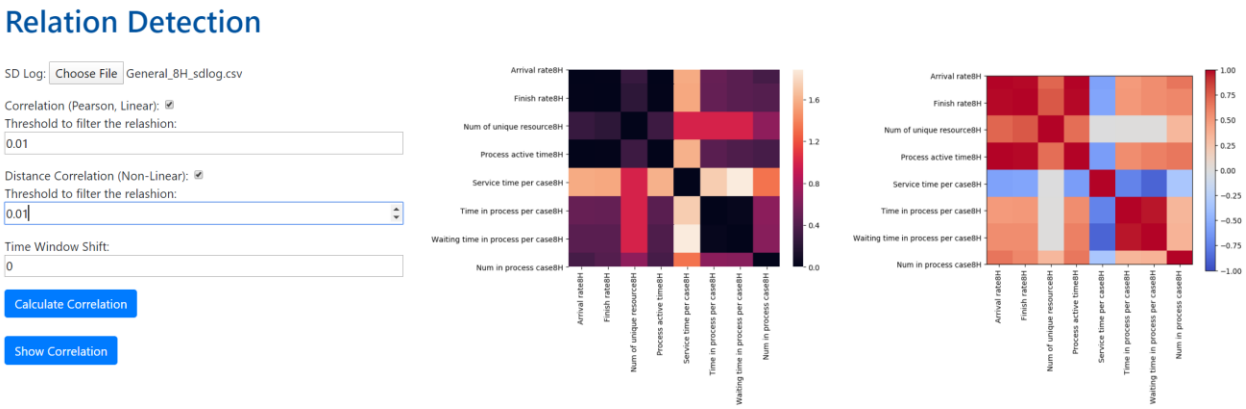
3.1.2 Exported

Based on the selected aspects one or more (for activity (number of unique activities) and organizational (number of organizations)) are generated (.csv) in the system which can be only active or inactive steps as a result of checking the remove inactivity.

3.2 Sample result



4 Relation Detection



Based on the scenario and aspects, you can upload one of the generated SD-logs in the previous sections (sections 2, 3), selecting threshold the relations between variables inside the SD-log are checked.

1. Select an SD-log
2. Check linear or nonlinear relations or both
3. Selecting the threshold of showing relations on the scale of 0 to 1.
4. The time window shift input: if 0: the relations between two pair of values at the same step is calculated. If above 0, the relation between two pairs of values in the shifted step is calculated.
5. Submit the inputs.
6. Using the show relations button, the plots are shown.

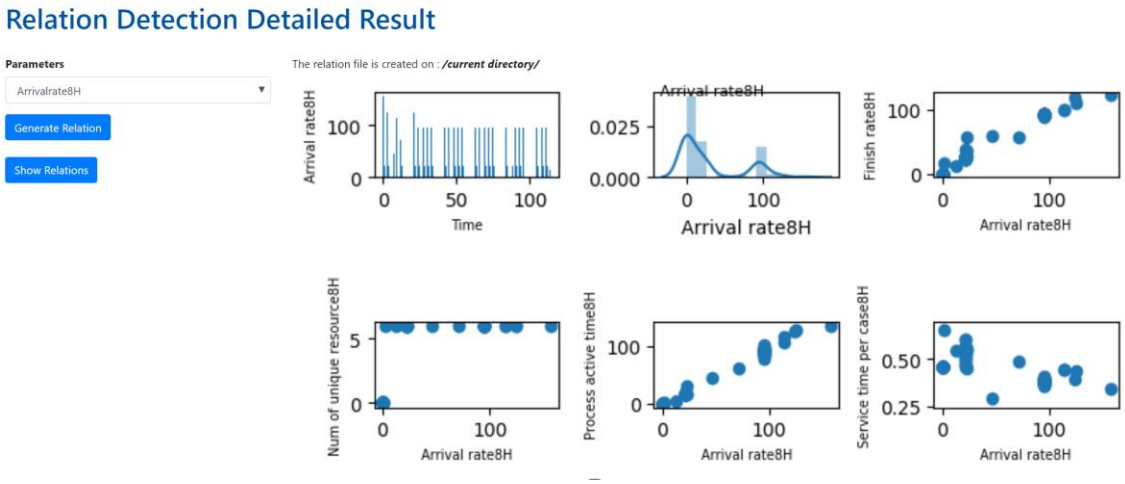
4.1 Output

4.1.1 Visualized

Two heat maps for the linear and nonlinear relations between the variables inside the SD-logs are shown.

4.2 Sample result

5 Detailed Relation



By the provided information in the backend from the previous step, the relations can be seen visually between every two variables inside the SD-log.

1. Select one variable
2. Submit the variable
3. Press the show relation button.

5.1 Output

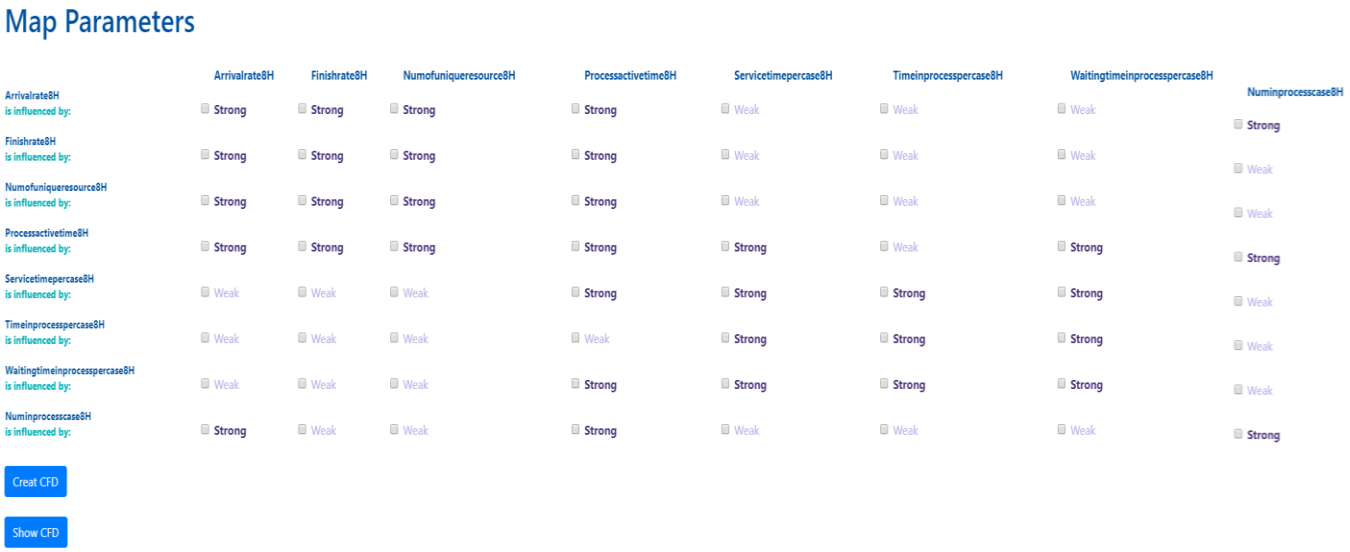
5.1.1 Visualized

Plots of the relation between the selected variables and all the other variables in the SD-log. Two first plots are the general plots of the selected variable and its distribution.

5.1.2 Exported

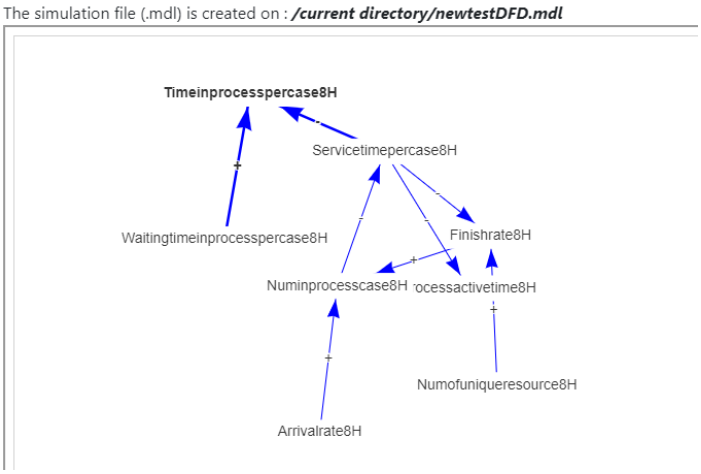
The plots are exported as .png format and can be used for the detailed view.

6 Generate CLD



All the needed information is ready in the backend here the all the variables are shown as a table and the strangeness or weakness of relations between each are shown. By selecting the relations, the causal loop diagram is generated.

1. For each row, select the variables that are influencing the variable in the row. (It is recommended to check the box with label “strong” however all can be selected based on the domain knowledge).
2. Submit the complete checked table.



6.1 Output

6.1.1 Visualized

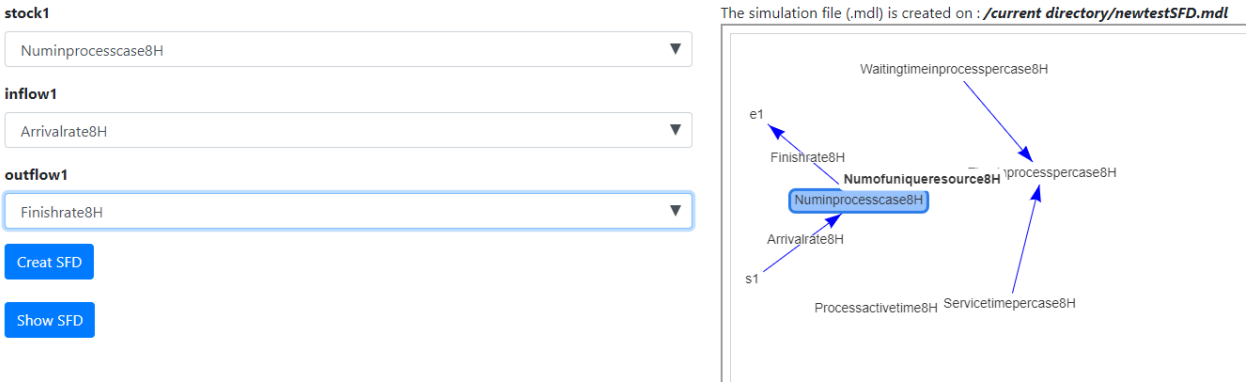
The causal loop diagram is shown on the button of the page. It includes the relations between variables and the sign of the relations either variable x affect y in a negative way or positive.

6.1.2 Exported

A system dynamic model format .mdl file is also generated in the system with the name newtestcld.mdl, which can be used for simulation in the system dynamics simulation software such as Venism.

7 Generate SFD

Map Parameters into SFD Elements



Here based on the number of variables in the SD-log, stock, inflow, and outflow inputs are generated. The variables can be assigned to these. Other variables will be assigned automatically using sections 5 and 6 results.

1. Select one variable as stock (or if there is more can be assigned different stocks)
2. Select one variable from the suggested one as inflow and outflow.
3. Submit the inputs
4. Use Show SFD button

7.1 Output

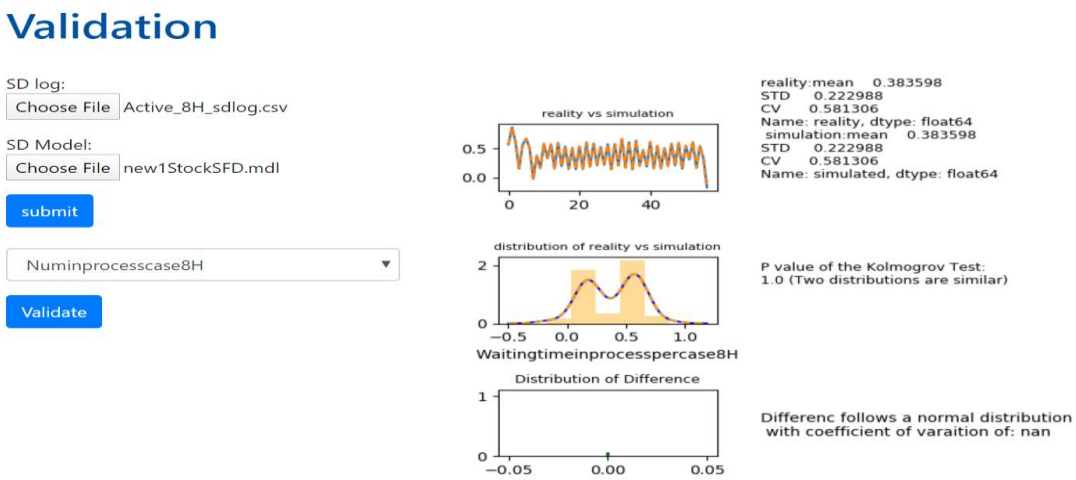
7.1.1 Visualized

A stock-flow diagram at the bottom of the page.

7.1.2 Exported

The corresponding stock-flow diagram is generated automatically in the format of .mdl. It can be used for defining the underlying equations and refining the model if needed by adding external variables and values for them.

8 Simulation and Validation



One of the SD-log and the corresponding generated SFD model in the form of .mdl are uploaded and after submitting the automatic simulation and validation for the variables inside both SD-log and the SFD model are performed.

1. Upload the SD-log (.csv)
2. Upload the system dynamic model, SFD (.mdl)
3. Submit
4. Select one of the shown variables in the choice input
5. Use button show validation

8.1 Output

8.1.1 Visualized

Validation result of the simulation including the statistical comparison and the plots of the simulation values and real values, the distribution of the two sets of values and the plot of the distributions of the difference values