Organizational Mining

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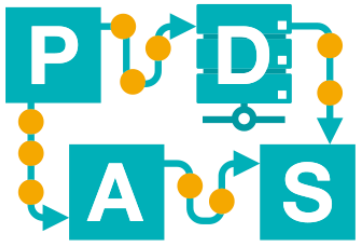
BPI-I12



Chair of Process and Data Science

RWTH AACHEN UNIVERSITY

Exercise 1

Create the resource-activity matrix for the following event log.

$$L = [\langle a^{John}, b^{Mike}, c^{John}, d^{Pete}\rangle,$$
$$\langle a^{John}, c^{Mike}, b^{John}, d^{Pete}\rangle,$$
$$\langle a^{Sue}, b^{Carol}, c^{Sue}, d^{Pete}\rangle,$$
$$\langle a^{Sue}, c^{Carol}, b^{Sue}, d^{Pete}\rangle,$$
$$\langle a^{Sue}, e^{Clare}, d^{Clare}\rangle]$$

Exercise 2

Based on the following event log, create the handover of work matrix where you consider multiple transfers within the same case. Create the corresponding social network and annotate each arc with its corresponding weight*.

$$
\begin{aligned}
L = [&\langle a^{Sara}, b^{John}, e^{Felix}, d^{Alex}, a^{John}, b^{Felix}\rangle,\\
&\langle a^{Sara}, c^{Rene}, d^{Felix}, b^{Alex}, d^{Felix}, c^{John}\rangle,\\
&\langle a^{Sara}, b^{Rene}, e^{John}, d^{Alex}, a^{John}, b^{Felix}\rangle,\\
&\langle a^{Sara}, b^{Rene}, c^{Sara}, d^{Rene}, a^{John}, b^{Felix}, d^{John}\rangle,\\
&\langle a^{Sara}, b^{Rene}, d^{John}, b^{Alex}, c^{John}, c^{John}\rangle]
\end{aligned}
$$

*: Mean number of times a resource passes over work to another resource per case.

Exercise 3

Based on the following event log, create the handover of work matrix where you ignore multiple transfers within the same case. Create the corresponding social network by drawing only the arcs whose corresponding weight is ≥ 0.4.

$$L = [\langle a^{R1}, b^{R2}, a^{R2}, c^{R3}, e^{R4}\rangle,$$
$$\langle a^{R2}, c^{R2}, c^{R3}, c^{R4}, d^{R1}\rangle,$$
$$\langle a^{R4}, b^{R4}, c^{R2}, b^{R2}, d^{R4}, e^{R4}\rangle,$$
$$\langle a^{R1}, b^{R2}, b^{R4}, d^{R2}, e^{R3}\rangle,$$
$$\langle b^{R2}, b^{R2}, b^{R3}, c^{R4}, d^{R4}\rangle]$$

Exercise 4

Given the following event log, create the real handover of work matrix by considering multiple transfers within the same case. Use dependency measure threshold ≥ 0.5 to derive causal relations between activity pairs. Create the corresponding social network and display only the arcs and their weights where the weight ≥ 0.4.

$$
\begin{aligned}
L = [&\langle a^{R1}, b^{R2}, a^{R2}, c^{R3}, e^{R4}\rangle,\\
&\langle a^{R2}, c^{R2}, c^{R3}, c^{R4}, d^{R1}\rangle,\\
&\langle a^{R4}, b^{R4}, c^{R2}, b^{R2}, d^{R4}, e^{R4}\rangle,\\
&\langle a^{R1}, b^{R2}, b^{R4}, d^{R2}, e^{R3}\rangle,\\
&\langle b^{R2}, b^{R2}, b^{R3}, c^{R4}, d^{R4}\rangle]
\end{aligned}
$$

Performance analysis with Celonis
Data Integration (same as always)

- Upload the files “activity_table.csv” and “case_table.csv” into Celonis. Create a corresponding data model using the CASE ID to connect the activity table (“activity_table.csv”) and the case table (“case_table.csv”).
- Make sure you assign the case table as the “Case Table” of your “Activity Table”.
- Optional: Set aliases (e.g. “cases” for the case table and “events” for the activity table).
- Don’t forget to load the data model before you start your Analysis.
- Create a new analysis using the newly created data model.

PQL documentation: https://docs.celonis.com/en/pql-function-library.html

Task 1: Exploration

a) Using a Pie Chart, show which activities are executed how often.
b) Using a Column Chart component, show for each resource (x-axis), the total number of activities handled by that resource in the process (y-axis).
c) Using a Pie Chart component, visualize how often one specific resource (of your choice) executes different activities.
d) Using a Pie Chart component, visualize how the executions of one specific activity (of your choice) are split among the corresponding resources.

Task 2: Resource-activity matrix

We want to compute the resource-activity matrix. For this we want to create a resource-based situation table, where each row corresponds to a resource and each column corresponds to an activity. The value of each entry must reflect the average number of times per case that the resource executes the corresponding activity.

a) **Add a Pivot component to your analysis. The table must have two dimensions: one for resources, and one for activities. The KPI must reflect the average number of times per case that each resource executes the corresponding activity.**
b) **Export the table and import it to RapidMiner. Use the k-means Algorithm with k=3 to split the resources into 3 clusters. What are the clusters?**

Task 3: Simple work handover

We want to compute the simple handover of work matrix. For this we want to create a resource-based situation table, where each row corresponds to a resource and each column also corresponds to a resource. The value of each entry must reflect the average number of times per case that the (row) resource hands over work to the (column) resource.

a) **Add a Pivot component to your analysis. The table must have two dimensions: one for the (source) resource, and one for the (target) resource. The KPI must reflect the handover of work value.**
b) **Export the table and import it to RapidMiner. Use the Transition Graph to discover a Social Network. Show only the arcs whose weight is at least 1.05.**

Task 4: Resource DFG

Using the Process Explorer component, create a DFG where the nodes correspond to resources (instead of activities).

Task 5: Cluster DFG

Using the Process Explorer component, create a DFG where the nodes correspond to the resource clusters you discovered in Task 2 b). Adjust the Custom dimension accordingly.