

Process Discovery Technology: A Comment on Paul Harmon's June 10 Advisor

Wil van der Aalst

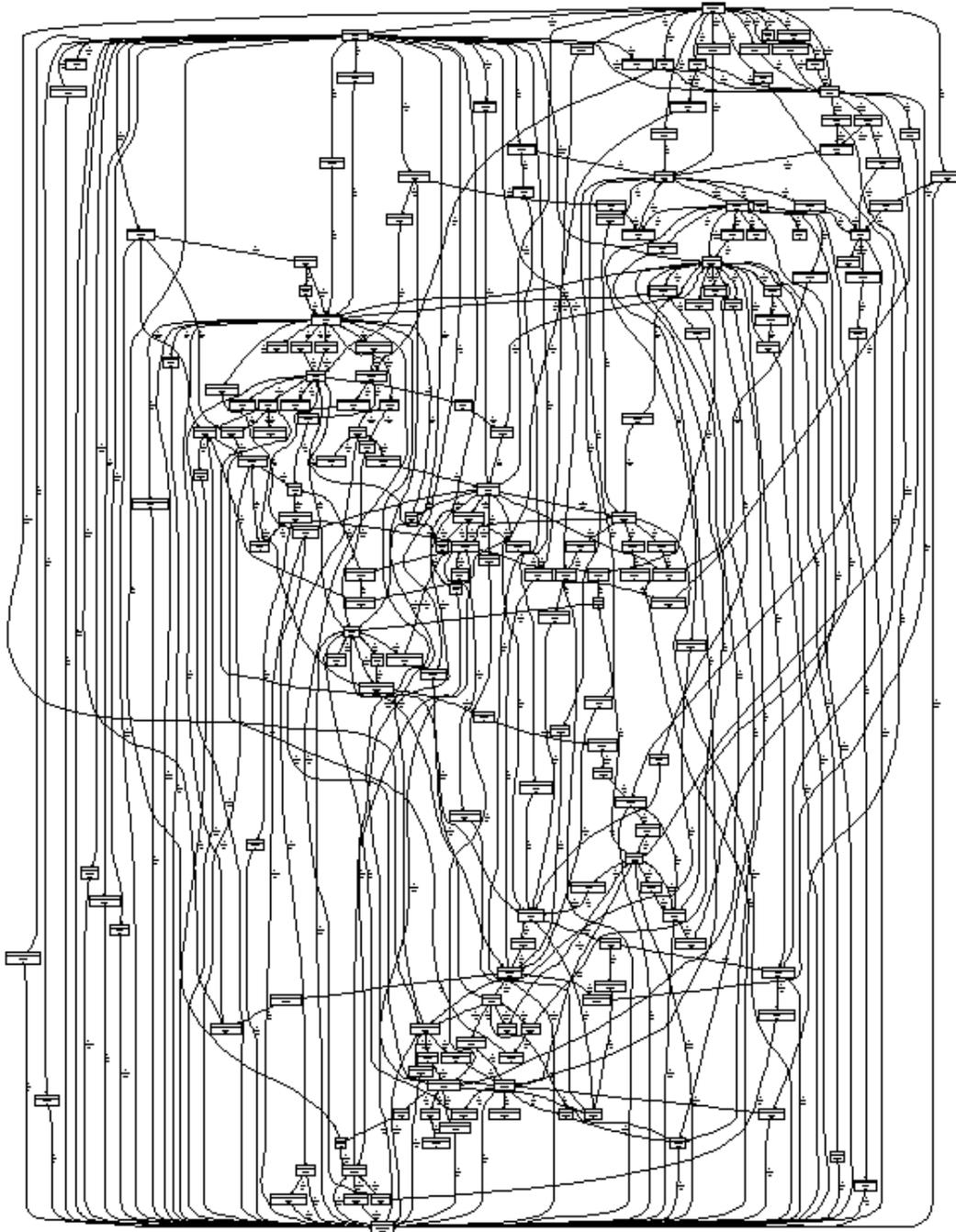
In his Email Advisor of June 10th, Paul Harmon presents Fujitsu's Process Discovery Technology (BPTrends 6(11)). He argues that process discovery is an interesting and refreshing way of looking at business processes. I completely agree with this and predict that such functionality will lead to more intelligent BPM solutions that have a better alignment and lead to process improvements. However, Paul's advisor is also a bit misleading. It is presented as if Fujitsu's Process Discovery Technology is the first offering in this space. In the academic world such tools have been around of many years. At the Technical University of Eindhoven, we have been building process mining tools such as MiMo, EMIT, and ProM for almost 10 years. These tools allow for process discovery and have been applied in many real-life case studies. Moreover, the open-source process mining tool ProM (www.processmining.org) offers a much broader range of analysis techniques than Fujitsu's offering as will be shown below.

It is encouraging to see that companies like Fujitsu are currently developing tools for process discovery. However, besides ProM, there are also several other software tools offering process mining functionality. Pallas Athena is offering process mining based on genetic algorithms. This is fully integrated in their BPM suite, making its very easy to use. Futura Technology is a new Dutch company focusing completely on the development of process mining software. Also other vendors such as IDS Scheer try to provide process mining functionality in their systems. (However, tools like the ARIS PPM require the analyst to model fragments of the process at design-time and hence only partially support process discovery.) Given the availability of various process mining tools, Fujitsu's claim to offer the first process discovery tool is unjustified.

Process mining is a technique that can be applied easily in almost any organization. Unlike typical BPM software it has a small footprint, i.e., it can be installed easily and does not require changes to the technical infrastructure. The only requirement is that it is possible to extract event logs. More and more organization have such logs and it is clear that in a few years such event logs will be omnipresent.

Interestingly, practical applications of process mining reveal that reality is often quite different from the idealized models, also referred to as "PowerPoint reality". Future "process-aware information systems" will need to provide full support of the entire life-cycle of business processes. Recent results in business process mining show that this is indeed possible, e.g., the possibilities offered by process mining tools such as ProM are breathtaking both from a scientific and practical perspective.

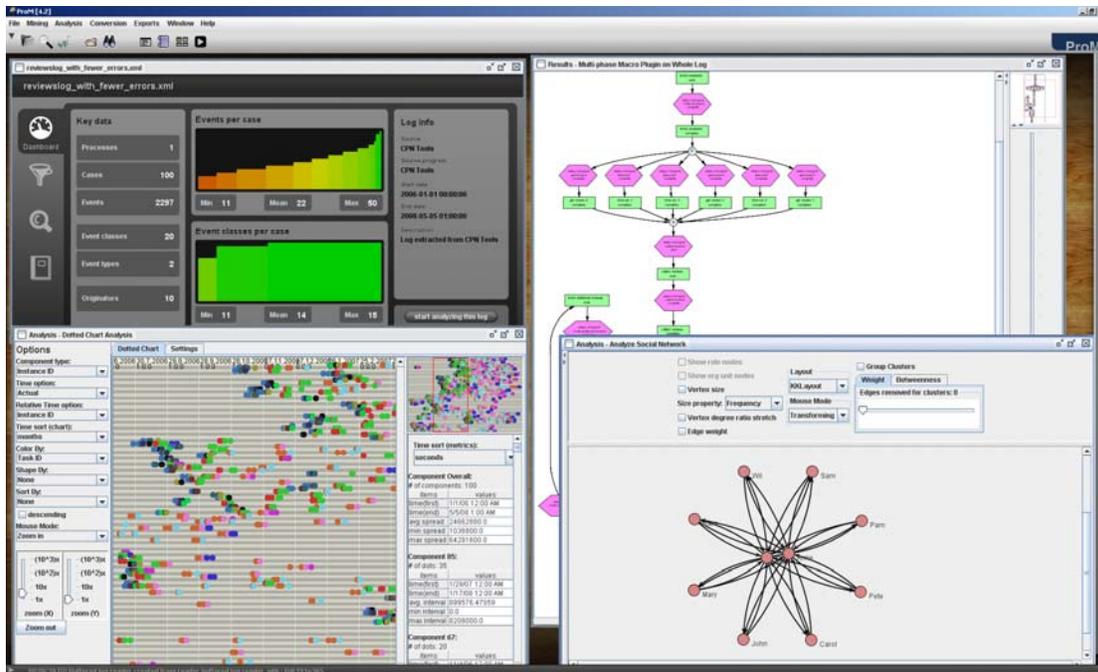
Note that, unlike classical data mining, the focus of process mining is on concurrent processes and not on static or mainly sequential structures. Also note that commercial "Business Intelligence" (BI) tools are not doing any process mining. They typically look at aggregate data seen from an external perspective (frequencies, averages, utilization, service levels, etc.). Unlike BI tools, process mining looks "inside the process" (What are the causal dependencies?, Where is the bottleneck?, etc.) and at a very refined level. For example, in the context of a hospital, BI tools focus on performance indicators such as the number of knee operations, the length of waiting lists, and the success rate of surgery. Process mining is more concerned with the paths followed by individual patients and whether certain procedures are followed or not.



To illustrate the functionality of ProM consider the diagram above. This is the process discovered after analyzing events that were recorded by the information system of a Dutch hospital for a group of 874 patients. This was a relatively homogeneous group of patients: each patient had a heart surgery. There are 181 different events, i.e., event types corresponding to possible activities in the context of heart surgery. As can be seen, the model is "spaghetti-like". One may think that this suggests a poor performance of the particular process mining technique applied. However, this is not the case, the diagram reflects reality and reality is often "spaghetti-like" and not as structured as people want to believe. In ProM there are many ways to simplify the above structure. It is like looking at a map, i.e., one can choose to show only the "highways" of a

process, but one can also show more infrequent paths. In both cases, valuable insights are gained.

The above diagram was created using only one of the more than 250 plug-ins of ProM (i.e., 0.4%). This illustrates that the functionality of ProM is much broader than the functionality of tools like Fujitsu's Automated Business Process Discovery & Visualization service. ProM also allows for the extraction of social networks, bottleneck analysis, conformance checking in the context of SOX, case prediction, pattern analysis, etc.



The above diagram shows a screenshot of ProM showing a discovered process (in EPC format), a discovered social network, and a detailed performance analysis. This is a small illustration of the wide range of analysis techniques supported. It is our hope that ProM will trigger organizations such as Fujitsu to extend and improve their process mining capabilities.

For more information about process mining visit www.processmining.org (for process mining) or prom.sf.net (for the open source tool ProM).

prof.dr. Wil van der Aalst
Eindhoven University of Technology