

The Importance of Process Mining in Enhancing Process Performance in Organisations

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Abstract

The development of business intelligence allows organisations to manage and enhance the decision-making process by providing methods and tools for analysing data. Process mining in organisation is needed to develop connection between data mining as business intelligence method and Business Process Management. The main purpose of process mining is to discover process model based on existing event log data that can be used for different objectives. This research will examine the essential concepts of process mining and its tools in order to analyse data and deliver proposal to enhance process performance in organisation. This research conducts focus group discussion as a qualitative method to discuss the advantages of process mining and to compare the process mining tools. The analysis highlights that the process mining has important role in organisation in determining: basic performance metrics; process model; and organisational model, and analysing social network and performance characteristics. Interestingly, both of process mining tools ProM and DISCO have different features and capabilities to discover the business process in organisation. This allows organisation to assess the data of business process transaction and provide some improvement approaches based on the result in process mining. By using the process-mining algorithm and tools, organisation can manage how to improve their process of business more effectively and efficiently in order to achieve their objectives.

Keywords: process mining, BPM, business intelligence, DISCO, PROM, data mining
Introduction

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Introduction

Dealing with business today, there are many data log and processes that perform an important role in assisting organisations to gain their business strategies by managing and analysing data log toward the achievement of desired business objectives. This experience requires a Business Process Analytics (BPA). BPA delivers business analyst, management, and stakeholders with understanding how to optimize business process in organisations. This concept consists a consideration either performance or compliance. In performance aspect, process analytics will help decision maker to shorten the time consuming in organisational process. On the other hand, in compliance aspect, process analytics will ensure that the process execution is align with rules and procedures (Muehlen & Shapiro, 2009).

The important purpose of this research is to examine essential concepts of process mining and its tools in order to analyse data and deliver proposal to enhance process performance in organisations. This includes gathering experience on using process mining tools, discussing the advantages of process mining and comparing the process mining tools.

Research Approach

Qualitative research is used to conduct this research in order to collect data. Saldana (2009) states that primary data in qualitative research can be collected and analysed at least from interview, focus group discussion, documents, or website. This highlights that primary data can be gathered by using various techniques both direct and indirect. In addition, this method supports researchers to understand the phenomenon of research more clearly (Indulska, Hovorka, & Recker, 2010) This is important because this method allow the author to understand real condition or experience of using process mining concepts in order to explain how process mining can be used to improve business process in organisations.

This research conducts Focus Group Discussion (FGD) as a qualitative method to discuss the advantages of process mining and to compare the process mining tools. There are five groups involved in this research. Each group consist three to four students who were undertaking the Business Process Analytics Unit at QUT. The discussion is based on their experience on using process mining tools in the case study. Students worked with two different process mining tools: ProM and DISCO.

Process Mining Tools

Process Mining is an approach to provide revolutionary concept to analyse and monitor the real life processes. Process Mining is focused on the extraction of knowledge about a (business) process from its process accomplishment logs (Prom, 2014). Basic requirement for process mining are:

- a. Determine basic performance metrics, this element consist of two perspectives: process/control-flow and resources perspective.
- b. Determine process model to discover a process model without knowing the business process.
- c. Determine organizational model such as role and responsibilities and workload without knowing the organizational structure of organization.

- d. Analyze social network based on handover of work, subcontracting, working together, reassignments, doing similar tasks
- e. Analyze performance characteristics based on resources, performance metrics of case and machine learning techniques (van der Aalst, 2003)

This research will examine two process mining tools which is Prom and Disco. Both tools represent an extremely powerful data analysis tool that is capable of process discovery, process mining, and checking process conformance. Based on logs that are generated from a system, Prom or Disco is able to do multitudes of analysis. Both tools are extremely useful in performing resource and control-flow analysis that can be used for business process improvement initiatives, resource allocation, improved performance measures, relationship patterns and many more.

Based on the FGD, how to clean and filter the process log become major challenges. Business analyst should decide whether filtering out noisy data is necessary or not, because it would affect the process model. Moreover, filtered data have to be sufficient to provide justification and analysis to tackle the improvement process. The explanation of process mining tools is elaborated in following section:

ProM

Process Mining Framework (ProM) is an Open Source tools for process mining algorithm. It provides the framework that can be used and developed easily by users and developers. ProM is an extensible structure that provides a huge variety of process mining techniques in the method of plug-ins. This is an independent tool as it is implemented in Java, and can be downloaded for free.

Two versions of ProM were using in order to solve the improvement process in case study that is ProM 5.2 and ProM 6. The study of assessing the performance of process mining tools shows different experiences of using ProM 5.2 and ProM 6.3

The difference between both type of ProM as shown in the table below:

ProM 5.2	ProM 6.3
ProM 5.2 is the preferred tool when doing specific analyses and conformance checks	ProM 6 has better interface as compared to ProM 5.2, although it is not as user-friendly
It has extensive analysis tools – resource bottlenecks, relationships, data perspective, organizational perspective, performance analysis and many more	Like ProM 5.2 it also contains an extensive list of analysis tools
It conveys more data as compared to ProM 6 and is more user-friendly	Multiple formulas can be applied in LTL checker simultaneously, although the results cannot be verified using Disco and ProM 5.2
	Social network model can be grouped
Suitable for analysts, but not for high-level management	Suitable for analysts, but not for high-level management
Process model has to be mined manually	Process model has to be mined manually
The tool is not compatible with Mac OS	The tool is not compatible with Mac OS

Based on the findings this study highlight some aspects such as:

- a. Serious user interface improvements are required in order to streamline and simplify the process of process mining with ProM.
- b. The documentation for ProM and the Plug-ins are not good at all, there are so many broken links and half-finished documentation for the products.
- c. ProM 5.2 is more efficient than ProM 6.3 as it lacks a wide range of plug-ins that the team could not find it capable to provide decent answers to each given task.
- d. LTL Checker plug-in suffers from small issues that are slowing the steps of getting the results. One of the identified issues are, the user need to copy the needed term or resource from the system, which means typing it will not give a appropriate results, instead it will gives a results of 0.
- e. Some of the LTL Checker formulas do not offer a clear description to its capabilities, which required the team to perform different inputs to understand its proficiency.

DISCO

DISCO is designed to make makes process mining easy and fast. Fuzzy miner is a basic miner in DISCO event tough it has been further developed in many approaches. The Fuzzy Miner was the initial mining algorithm to present the “map metaphor” to process mining, including advanced features like seamless process simplification and highlighting of frequent activities and paths (Gunther & Rozinat, 2010).

The study of assessing the case study using process miner, shows that there are some findings as explained below:

- a. Charts and process models are automatically generated, but is limited to an EPC-like model
- b. Animation of process model means that this is extremely useful for high-level management – easy to understand as animation shows process complexity, bottleneck, and reworks
- c. Due to Disco simple use as well as answer can be found easily comparing to ProM, all group used Disco to compare and make sure about most of the tasks results.
- d. Complex scenarios made simple using the filter, as compared to LTL checker
- e. Using Disco to explore and identifying the solutions is easier than using ProM software, as the team found it difficult. It is because of its wide range of plug-ins that need first to be understood before applying to answer the task.

DISCO is powerful tool, because it shows several different visual data straightaway so business analyst can quickly have a look the duration or performance of processes. In addition, the process model of DISCO is automatically created that can give clear idea of process. Process animation helps business analyst to find out the potential bottleneck that can be reduced.

Conclusion

The analysis highlights that the process mining has important role in organisation in determining: basic performance metrics; process model; and organisational model, and analysing social network and performance characteristics. Interestingly, both of process mining tools ProM and DISCO have different features and capabilities to discover the

business process in organisation. This allows organisation to assess the data of business process transaction and provide some improvement approaches based on the result in process mining. By using the process-mining algorithm and tools, organisation can manage how to improve their process of business more effectively and efficiently in order to achieve their objectives.

References

- [1] Gunther, C., W & Rozinat, A. (2010). Disco: Discover Your Process. Retrieved from: <http://ceur-ws.org/Vol-940/paper8.pdf>
- [2] Indulska, M., Hovorka, D., Recker, J. (2012). Quantitative Approaches to Content Analysis: Identifying Conceptual Drift Across Publication Outlets. *European Journal of Information Systems*, 21 (1), pp. 49-69.
- [3] ProM. (2014). ProM Tools. Retrieved from <http://www.promtools.org/doku.php>
- [4] Saldana, J. (2009). The coding manual for qualitative researchers. Los Angeles, CA: SAGE.
- [5] van der Aalst, W. (2003). Process Mining: The next step in Business Process Management. Retrieved from https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CD8QFjAA&url=http%3A%2F%2Fwww.processmining.org%2F_media%2Fpresentations%2Fmining_au_process_days.ppt&ei=m2ajVIzrEM7UuQSEjIGQCg&usg=AFQjCNH6GO6ufBqPpSB7a10M_UkE8xcOig&bvm=bv.82001339,d.c2E