Chapter 4
Proposed Algorithms and Formalizations

ABSTRACT

In this chapter, the work presents and describes the different algorithms that it proposes for ample implementation of the SPMaAF framework. The procedures outlined in the Algorithms 1, 2, and 3 illustrates the method that the work applies for developing the semantic-based process mining approach described in this book. Technically, the outlined procedures (i.e., Algorithms 1, 2, and 3) are aligned with the entire speculation of the work in this book, which are grounded on the three different phases or components of the SPMaAF Framework.

SEMANTICALLY MOTIVATED PROCESS MINING ALGORITHMS

Essentially, the following sets of algorithms are provided for the purpose of the work done in this book by considering the different phases that constitutes practical implementation of the SPMaAF framework.

Algorithm 1

The work describes in this section the proposed *Algorithm 1* and how it makes use of the method to perform the process mining and model discovery (Phase 1). Perhaps, the algorithm (Algorithm 1) is developed to show how to

effectively discover useful process models from the readily available events (data) logs. In principle, the process proves useful towards generation and mapping of the individual traces that makes up each of the process executions. For example, we illustrate in Chapters 5 and 7 how the proposed *algorithm 1* is implemented using process mining tools such as Disco that is based on Fuzzy Miner framework (Rozinat & Gunther, 2012) to generate and map the process models from the readily available event logs. In addition to the process models discovery, the process is also carried out for conformance checking and analysis of the individual cases (i.e. classified traces) and visualization of the several sequence(s) of activities executions.

   Practically, the following *Algorithm 1* describes how the work discovers and generates the process models and individual traces from any given events data log as follows:

Algorithm 1: Discovering Fitting Process Models through Fuzzy Mining Approach

```
1: For all Recorded Events Data Log, L
2: Input:    PM – Process mining tool used to extract model, M
                  L – Input Data for process Mapping/
Visualization
                  e – Classifier for the event logs, L and
traces, T
3: Assign:  case_id(e)  i.e. the Case associated to event, e
within the events log, L
                  act_name(e)  i.e. Activities associated to
event, e within L
                  other_attributes e.g. Event ID, Timestamp,
Resources, Roles etc. related to event, e within L
4: Output: Process maps (fuzzy model), M & individuals traces,
T classifications for the events log, L
                  Model or TraceFitness, TF discovery through
semantic fuzzy mining
5: Procedure: Discover Fuzzy Models, M from L for cross-
validation to determine how well M reflects the performed
activities in reality, i.e TraceFitness, TF and for further
analysis
6: Begin
7:     For all Event Data Log L
8:       Extract Process Maps, M, & Traces, T ← from Event Log
L
9:       while no more process element is left do
10:       Analyze Fuzzy Model, M and Traces, T to determine
tracesFitness, TF
```

12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/proposed-algorithms-and-formalizations/253007

Related Content

Semantic Technology for Improved Email Collaboration
Simon Scerri (2012). *Collaboration and the Semantic Web: Social Networks, Knowledge Networks, and Knowledge Resources (pp. 121-133).*
www.irma-international.org/chapter/semantic-technology-improved-email-collaboration/65690

PatchR: A Framework for Linked Data Change Requests
Magnus Knuthand Harald Sack (2015). *International Journal on Semantic Web and Information Systems (pp. 30-45).*
www.irma-international.org/article/patchr/135561

An Architecture for Managing Knowledge and System Dynamism in the Worldwide Sensor Web
Deshendran Moodley, Ingo Simonisand Jules Raymond Tapamo (2012). *International Journal on Semantic Web and Information Systems (pp. 64-88).*
www.irma-international.org/article/architecture-managing-knowledge-system-dynamism/70587

An Ontology-Based, Cross-Application Context Modeling and Management Service
Annett Mitschick, Stefan Pietschmannand Klaus Meißner (2012). *Semantic-Enabled Advancements on the Web: Applications Across Industries (pp. 55-71).*
www.irma-international.org/chapter/ontology-based-cross-application-context/64017

LinkedVis an Information Visualisation Toolkit for RDF Data
Antonio Garroteand María N. Moreno García (2013). *International Journal on Semantic Web and Information Systems (pp. 1-16).*
www.irma-international.org/article/linkedvis-an-information-visualisation-toolkit-for-rdf-data/102705