Annual Meeting of the IEEE Task Force on Process Mining

Monday September 10th 2017 (17.00-18.00)
University of Technology in Sydney (UTS), Building 11, Room CB11.04.205
(Address: 83-117 Broadway, Ultimo NSW 2007)

http://www.win.tue.nl/ieeetfpm/
Agenda

(1) Activities of the IEEE Task Force
(2) XES Standard (brief)
(3) ICPM conference (main point)
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(1) Activities of the IEEE Task Force
(2) XES Standard (brief)
(3) ICPM conference (main point)
Organizations Supporting our Task Force (75+)
Goals & Activities

Creating awareness
- Articles, books (e.g., popular press)
- (Online) courses (Coursera PM course, etc.)
- Movies (YouTube, etc.)
- Outreach activities (schools, leaflets, etc.)

Sharing data
- Public data sets (4TU data center, etc.)
- Standardization (XES)

Advancing knowledge
- Research
- Scientific publications

Advancing software
- Development
- Evaluation

Community building
- Virtual communities (LinkedIn, Facebook, etc.)
- Scientific meetings (BP1, ATAED, etc.)
- Industry meetings (PM Camp, etc.)
- Contests (BPIC, PDC, etc.)

Advancing software
- Development
- Evaluation

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Virtual Communities

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LinkedIn Group on PM
(managed by George Varvaressos)

Post your research!

Possible issue:
changing LinkedIn Strategy wrt groups

https://www.linkedin.com/grp/home?gid=1915049
Other Virtual communities

• @processmining page at facebook (577 members, Joos Buijs/Dirk Fahland), rather inactive

• process-mining.blog

This blog collects process mining articles from several blogs, both academic and professional. The blog is an initiative of the IEEE CIS Task Force on Process Mining and powered by the Scientific Research Community on Process Mining.

Hosted by Hasselt University Benoît, Mieke, etc. (input to gert.janssenswillen@uhasselt.be)
Scientific Meetings

creating awareness
- articles, books (e.g., popular press)
- (online) courses (Coursera PM course, etc.)
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advancing software
- educational activities
- research
- scientific publications
- outreach activities

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Example events

- International Workshop on Business Process Intelligence (BPI) @ BPM
- International Workshop on Process-Oriented Data Science for Healthcare (PODS4H) @ BPM
- International Workshop on Artificial Intelligence for Business Process Management (AI4BPM) @ BPM
- Declarative/Decision/Hybrid Mining and Modelling for Business Processes (DeHMiMoP) @ BPM
- IFIP International Symposium on Data-Driven Process Discovery and Analysis (SIMPDA)
- International Conference on Advances in Information Mining and Management
- International Conference on ICT and Knowledge Engineering
- AusDM : Australasian Data Mining Conference
- IEEE International Conference on BUSINESS INFORMATICS
- EDOC : Enterprise Distributed Object Computing
- Conference on Advances in Databases, Knowledge, and Data Applications
- International Conference on Business Intelligence and Technology
- KDIR: International Conference on Knowledge Discovery and Information Retrieval
- Scientific Research Community (SRC) events (symposia and brainstorm workshops)
- Etc. Etc.
Scientific Research Community (SRC)

- Flemish initiative led by Mieke Jans
- Similar goals as the Task Force
- 19 partners (research institutes / universities worldwide)
- See srcprocessmining.com and slides at end.
- SRC will support ICPM 2019
SRC Events

- 1st Symposium (Barcelona, Sept 2017)
- Two day brainstorm session on Conformance Checking (February 2018)
- 2nd symposium (Tallinn, June 2018)
Industry Meetings

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advancing software
- evaluation

advancing knowledge
- research
- scientific publications
e.g. Process Mining Camp
Contests

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Contests

• Business Process Intelligence Challenge (BPIC) (every year, since 2011)
• Process Discovery Contest (skipped in 2018)
• Best PhD thesis award (on hold, see also BPM award).

• Industry awards:
  – Process Miner of the Year Award (Fluxicon)
  – Process Mining Thesis Award (Celonis)
Public Data Sets

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New public data sets

Sep. 13  Almir Diedović
• Credit Requirement Event Log

Oct. 1  Felix Mannhardt
• Hospital Billing – Event Log

March 13  Boudewijn van Dongen
• BPI Challenge 2018

Jan. 1  Karin Niemantsverdriet et al.
• Log data of interactions with three interfaces for lighting control in the Laplace office lightlab

Thanks to Eric Verbeek for collecting
Data sets

http://data.4tu.nl/repository/collection:event_logs

Keep adding your data sets!
Do not just use, also contribute!
New case studies uploaded

March 22  Celonis
  • PostFinance - Redefining the Reality of Banking Processes
  • Neste - Big Data is the New Oil
  • Eissmann - Big Data-Powered Tuning for Fast and Secure Processes
  • Boskalis - Offshore with Full Speed Ahead
  • AkzoNobel - Embracing the Future of Team Support

March 22  Fluxicon
  • PGGM Saves Time with Process Mining

Thanks to Eric Verbeek for collecting
Standardization

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XES
Extensible Event Stream
Research

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Outreach activities
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Articles and books
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**Advancing Software Development**
- Evaluation

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Process Mining Book

Living book on the practical application of process mining. Intended as a hands-on guide for the process mining practitioner.

http://processminingbook.com
Conformance Checking

Due: December 17, 2018
ISBN 978-3-319-99414-7
(Online) Courses

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advancing software

- development
- evaluation
Process Mining: Data science in Action

Go to Course

Overview
Syllabus

Process Mining: Data science in Action

About this course: Process mining is the missing link between model-based process analysis and data-oriented analysis techniques. Through concrete data sets and easy to use software the course provides data science knowledge that can be applied directly to analyze and improve processes in a variety of domains.

Who is this class for: This course is aimed at both students and professionals. A basic understanding of logic, sets, and statistics (at the undergraduate level) is assumed. Basic computer skills are required to use the software provided with the course (but no programming experience is needed). Participants are also expected to have an interest in process modelling and data mining but no specific prior knowledge is assumed as these concepts are introduced in the course.

Created by: Eindhoven University of Technology

TU/e

Taught by: Wil van der Aalst, Professor dr.ir.
Department of Mathematics & Computer Science

Language
English

How To Pass
Pass all graded assignments to complete the course.

User Ratings
Average User Rating 4.8
See what learners said

https://www.coursera.org/learn/process-mining
Other MOOCs

• Two FutureLearn MOOCs on process mining
• Celonis MOOC (under construction)
• …
Movies

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Awareness is improving

2009

Task force got established

2019

ICPM 2019
Market Guide for Process Mining

Published: 3 April 2018   ID: G00353970

Analyst(s): Marc Kerremans

Processes and interactions are basics in the execution and scaling of digital transformation, new AI capabilities and new forms of automation such as RPA. Process mining helps EA and TI leaders boost the efficiency, effectiveness and value of these initiatives to attain targeted business outcomes.

Key Findings

- Traditional discovery and modeling of your operations and related processes can be a costly and time-consuming process that is vulnerable to human interpretation, lack of business knowledge and lack of objective validation techniques.

- Formal standard operating procedures, policies, work instructions or best practices baked into enterprise applications are often "shadowed" by informal behavior, leading to governance issues and compromising the expected value of these enterprise applications.

- The business value of process automation initiatives is often unclear. The assumption is that the actual operational data is available only after the automation, leading to a business case based on estimated operational data and an initiative with limited sustainable business value.

- Task-level automation, such as RPA and the use of IoT capabilities, can deliver great success in a very short term. But implementing these initiatives without understanding the process or operational context sometimes makes these initiatives lose their relevance.
A unicorn company or unicorn startup is a private company with a valuation over $1 billion. Currently, there are about 260 unicorns around the world. Just 5 in Germany, cf. https://www.cbinsights.com/research-unicorn-companies
Agenda

(1) Activities of the IEEE Task Force
(2) XES Standard (brief)
(3) ICPM conference (main point)
Thanks to Eric Verbeek for his key role in the XES standardization process!!
Status

- Working group of 25 people
- Official IEEE Standard for almost 2 years now
- In 2018 two new extensions were introduced (software related, see slides at end)
- Too little activity on the tool certification front!
Certification Process

- ProM 6.7
  - Import A-D, X
  - Export A-D, X

- Celonis 4.2
  - Import: A1-D1
  - Export: none

- Where are the others ???
(1) Activities of the IEEE Task Force
(2) XES Standard (brief)
(3) ICPM conference (main point)
IEEE International Conference on Process Mining (ICPM)
RWTH Aachen, June 2019
Motivation

• Discussed in last task force meeting.
• Increasing number of submissions (BPM, Caise, etc.). Not always appreciated.
• Industrial uptake (see success of the 25 vendors and Gartner report).

Scopus “process mining” papers 5-9-2018
First CFP is out!

- Aachen Tivoli Football Stadium.
- Last week of June 2019, colocated with Petri nets and ACSD conferences.
- Website: http://icpmconference.org.

- General Chair: Wil van der Aalst
- PC Chairs:
  - Josep Carmona,
  - Mieke Jans, and
  - Marcello La Rosa.
Confirmed PC members

Abel Armas-Cervantes
Hyerim Bae
Andrea Burattin
Paolo Ceravolo
Thomas Chatain
Jan Claes
Raffaele Conforti
Jochen De Weerdt
Benoît Depaire
Claudio Di Cicco
Chiara Di Francescomarino
Marlon Dumas
Dirk Fahland
Diogo Ferreira
Frederik Gailly
Avigdor Gal
Luciano García-Bañuelos
Chiara Ghidini
Antonella Guzzo
Manuel Lama
Sander Leemans
Irina Lomazova
Xixi Lu
Fabrizio Maria Maggi
Felix Mannhardt
Jan Mendling
Marco Montali
Jorge Munoz-Gama
Artém Polyvyanyy
Hajo A. Reijers
Arik Senderovich
Marcos Sepúlveda
Minseok Song
Suriadi Suriadi
Arthur Ter Hofstede
Boudewijn Van Dongen
Seppe Vanden Broucke
Jan Vanthienen
Jianmin Wang
Barbara Weber
Matthias Weidlich
Lijie Wen
Moe Wynn
Massimiliano de Leoni
Sebastian van Zelst

If there is a major omission, contact the PC chairs.
Timeline

• Abstract submission: 1 February, 2019
• Full papers submission: 8 February, 2019
• Notifications: 8 March, 2019
• Camera-ready papers: 5 April, 2019
Discussion topics

• Future of BPI (proposal: keep as a “normal” BPM workshop)
• Merger of ICPM and IEEE Task Force
• Governance (steering committee and bylaws)
• Additional events
  – Workshops (also note ATAED)
  – Industry track or other ways to involve software vendors, users, etc.
  – Contests (BPIC, etc.)
• Timing in future years
Commitment needed

- “conference papers do not count”
- “the conference is not on the XYZ list”

Don’t ask what ICPM can do for you, but what you can do for ICPM :-)

Organize, submit, participate!
Ideas for new initiatives?

Use the task force!

W: www.vdaalst.com
T: @wvdaalst
E: w.m.p.v.d.aalst@tue.nl
Next meeting @ ICPM

Aachen, June 2019
Welcome Reception - The Harbour Spirit Monday, 10 September 2018, 19:00 - 22:00

The Harbour Spirit is a custom-built catamaran designed to exceptional standards with a clean, contemporary nautical interior. The vessel is fully air conditioned, spacious, custom designed for entertaining and has generous outdoor decks across two levels. The Harbour Spirit has everything you need to experience a beautiful night in Sydney harbour.
Additional slides

• SRC (Miek Jans)
• XES (Eric Verbeek)
Scientific Research Community
on Process Mining

Mieke Jans
SRC on Process Mining – what?

• A Flemish grant to support research on the following challenges:
  1. Improving usability and understandability for non-experts
  2. Understanding and reducing the representational bias in process discovery
  3. Improving the metrics to measure the quality of process discovery algorithms

• Launched in 2017
• 19 partners (research institutes / universities worldwide)
• Joint interests with IEEE Task Force on Process Mining
process-mining.blog

Initiative of SRC on Process Mining and IEEE Taskforce

Goal
Aggregator of process mining-related blogpost
*Industry, vendors & academics*

Current status
Only 4 feeds currently being imported
Vendors (not all) are reluctant to share their content
Many people want to contribute but don’t have their own blog
July 25, 2018
Conformance Analysis in Process Mining
One core benefit of process mining is the capability of identifying the gap between the desired state (to-be)... Discover →

June 20, 2018
Digital Twin of an Organization
Every organization is unique. In order to succeed in your work, you need to understand how your own organization... Discover →

May 18, 2018
Where did all the money go?
Every organization buys. Some buy raw materials for their production, others procure services, while some just need the... Discover →

April 18, 2018
7 Process Mining Market Trends for 2018
Year 2018 is regarded as the... Discover →

May 9, 2018
AI Supports Process Development – Understanding the current state and its problems
Artificial intelligence and machine... Discover →

May 9, 2018
AI supporting Process Development – part 1 – Understanding the current state... Discover →
Next steps

Increase awareness

Open platform to contributors without their own blog
(interested contributors: please contact gert.janssenswillen@uhasselt.be)

Integrate with processmining.org?

...
Activities 2017-2018

• Launch of the SRC
• Support Belgian PM Research Days (@ Ghent and @Leuven)
• Research visits between the different partners
• International joint-research proposals and projects
• 1st Symposium (Barcelona, Sept 2017)
• PM blog collector
• Introduction of ‘Brainstorm sessions’ -> 1st session February 2018 on Conformance Checking
• 2nd symposium (Tallinn, June 2018)
srcprocessmining.com

for further information & contact
XES Standard
(Eric Verbeek)
Overview

Standard for XES – eXtensible Event Stream – for achieving interoperability in event logs and event streams.

XES
Extensible Event Stream
Goal

• Facilitate export of event logs and event streams from an information system to an analysis tool
  – like, for example, a process mining tool
Scope

- To define a grammar for a language capturing event logs and event streams
  - XML Schema for event logs and event streams
  - XML Schema for extensions
  - Basic extensions
Working Group

Wil van der Aalst
Christian Günther
Eric Verbeek
Abstract:
A grammar for a tag-based language whose aim is to provide designers of information systems with a unified and extensible methodology for capturing systems behaviors by means of event logs and event streams is defined in the XES standard. An XML Schema describing the structure of an XES event log/stream and a XML Schema describing the structure of an extension of such a log/stream are included in this standard. Moreover, a basic collection of so-called XES extension prototypes that provide semantics to certain attributes as recorded in the event log/stream is included in this standard.
XES Certification

- Basic control-flow
- Lifecycles & time
- Resources
- All standard extensions
- Ad-hoc extensions
- Fixed labels
- Full classifier support
- A1
- B1
- C1
- D1
- A2
- B2
- C2
- D2
XES Certification proposal accepted by XES WG

On July 19, 2017, the XES WG has approved of the XES Certification proposal v2. As a result, we can now start checking the certification levels of the tools that support XES. Based on this certification, it will be clear whether XES files can be successfully transferred between these tools.

The figure above is the main figure in this proposal. It shows the four different levels of certification.

<table>
<thead>
<tr>
<th>Certification level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>XES Event data that only contains case identifiers and activity names. This level allows for process discovery and conformance checking.</td>
</tr>
<tr>
<td>B</td>
<td>Level A extended with event types (lifecycle:transition attribute) and timestamps (time:timestamp attribute). In addition, this level allows for performance analysis, and for the generation of basic simulation models.</td>
</tr>
<tr>
<td>C</td>
<td>Level B extended with information on resources (org:resource attribute). In addition, this level allows for social network mining, and for the generation of more advanced (resource-aware) simulation models.</td>
</tr>
</tbody>
</table>

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- ProM 6.7
  - Import A-D, X
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- Celonis 4.2
  - Import: A1-D1
  - Export: none

- Where are the others?
Certification Process

1. Report, by vendor
   - Template

2. Demo, by vendor and XES WG rep
   - Preferably live, screencast acceptable
   - In case of issues: back to Report

3. Approval, by XES WG
   - Within 2 weeks

4. Publication, by XES WG rep
   - On the TF website
Celonis 4.2 Certificate

- Received: Oct 18
- Demo: Oct 20
  - Reproduction of report by WG rep
- Round for Approvals: Oct 30
- Approved: Nov 14
XES Extensions

- Software Communication
- Software Telemetry
- Both build on the earlier approved Software Event Extension.
SW Communication Ext.

1) **sending** data from ClientA to Server

```
<event>
  <string key="concept:name" value="requestService" />
  <string key="swcomm:localHost" value="127.0.0.1" />
  <int key="swcomm:localPort" value="9000" />
  <string key="swcomm:remoteHost" value="127.0.0.1" />
  <int key="swcomm:remotePort" value="9021" />
</event>
```
SW Telemetry Extension

**Event 1**

```
<event>
  <string key="concept:name" value="readSettings" />
  <int key="swtelemetry:cpuTotalUser" value="20" />
  <int key="swtelemetry:cpuTotalKernel" value="0" />
  <int key="swtelemetry:cpuTotalIdle" value="60" />
  <float key="swtelemetry:cpuLoadUser" value="0.25" />  \[\frac{20}{20+0+60}\]
  <float key="swtelemetry:cpuLoadKernel" value="0" />  \[\frac{0}{20+0+60}\]
  <int key="swtelemetry:threadTotal" value="1" />
  <int key="swtelemetry:threadDaemon" value="0" />
  <int key="swtelemetry:memoryUsed" value="2097152" />  \[2 \text{ MB}\]
  <int key="swtelemetry:memoryTotal" value="1073741824" />  \[1 \text{ GB}\]
  <float key="swtelemetry:memoryLoad" value="0.00" />  \[\frac{20480 \text{ bytes}}{1073741824}\]
</event>
```
Action points

• XES Certification
  – Certify more existing tools

• XES Extensions
  – Artifact Lifecycle (to be proposed)

• Provide data sets via 4TU data center