Annual Meeting of the IEEE Task Force on Process Mining

Monday September 11th 2017 (16.00-17.30)
UPC Nord Campus, Vertex Building VS217,
c/ Jordi Girona, 1-3, 08034 Barcelona

http://www.win.tue.nl/ieeeTFpm/
| 16:00 – 16:05 | Welcome |
| 16:05 – 16:15 | Overview of Activities and Developments in the Process Mining Space in 2016-2017  
(Wil van der Aalst)  
This session will provide a quick overview of the goals of the task force and its activities. It also reflects on its activities and the developments in the process mining space. |
| 16:15 – 16:30 | Process Mining in Spain  
(Josep Carmona)  
This session will provide an overview of the process mining activities in Spain. Josep Carmona, also the host of this year’s BPM conference, will summarize and reflect on initiatives in Spain. |
| 16:30 – 17:00 | XES Standardization and Certification  
(Eric Verbeek)  
On November 11th, 2016, the IEEE Standards Association has officially published the XES Standard as IEEE Std 1849TM-2016: IEEE Standard for eXtensible Event Stream (XES) for Achieving Interoperability in Event Logs and Event Streams. The IEEE Task Force on Process Mining has been driving the standardization process for over six years, because the standard allows for the exchange of event data between different process mining tools. Eric Verbeek will give a short update on XES developments and then focus on XES certification. Recently, the XES WG accepted the XES Certification proposal distinguishing different levels of XES support for import and export (A1-D2). Now it is time to operationalize the certification process and the task force should play a key role in this. Eric will explain the different certification levels and discuss the organization. |
| 17:00 – 17:25 | Brainstorming Session on New Activities  
(All)  
The mission of the task force is to “promote the research, development, education and understanding of process mining”. The goal of this session is to think of new activities or ways to strengthen existing ones. Example questions include:  
• What are new success process mining stories and data sets?  
• Should there be a stand-alone process mining conference or not?  
• New workshops or special sessions (SSCI, CEC, WCCI, KDD, ICML, PAW, etc.)?  
• Best Process Mining Dissertation Award in 2018?  
• Do we need a database with tool information?  
• Books and articles aimed at practitioners?  
• New process mining MOOCs?  
• How to make process mining an integral part of Six Sigma?  
• How to better utilize the LinkedIn Process Mining Group?  
• Do we need a new Process Mining Manifesto?  
• … |
<p>| 17:25 – 17:30 | Closing |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
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- Do we need a new Process Mining Manifesto?  
- … |
| 17:25 – 17:30 | **Closing**                                                             |
Organizations Supporting our Task Force (70+)
Uptake of process mining

Documents by year

Scopus “process mining” papers 23-8-2017
Goals

**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 (BPI, ATAED, etc.)
- Industry meetings (PM Camp, etc.)
- Contests (BPIC, PDC, etc.)

**Advancing Software**
- Evaluation

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Virtual Communities

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advancing software
- sharing data
- virtual communities
- creating awareness
LinkedIn Group on PM
(managed by George Varvaressos)

Now 6248 members

Approx. 1000 joined in the last year

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

• LinkedIn
  – Keep triggering discussions and sharing news
  – More case studies or war stories from users
  – Consider more non-commercial self-promotion

• @processmining page at facebook
  – 500 followers (students, younger researchers)
  – Some focus on teaching activities
  – Contact Joos Buijs / Dirk Fahland if you want to contribute as a administrator

• Other communities we could use/create?
Scientific Meetings

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BPI Workshop

Running well since 2005!

BPI 2018 in Sydney?

Discussion on conference?
The workshop Algorithms & Theories for the Analysis of Event Data (ATAED 2017) is a satellite event of both the 36th International Conference on Application and Theory of Petri Nets and Concurrency and the 17th International Conference on Application of Concurrency to System Design (PN 2017 and ACSD 2017). The workshop aims to attract papers related to process mining, region theory and other synthesis techniques. These techniques have in common that "lower level" behavioral descriptions (event logs, sets of partial orders, transition systems, etc.) are used to create "higher level" process models (e.g., various classes of Petri nets, BPMN, or UML activity diagrams).

ATAED 2017 solicits papers related to process mining and region theory. However, the scope is not limited to this. The program committee invites submission of full papers (up to 15 pages) and of short papers (up to 5 pages). Papers should be submitted as pdf-files using the Springer LNCS-format. Papers need to be submitted via EasyChair.

Process mining makes it possible to analyze event data, thereby focusing on behavior rather than correlations and simplistic performance indicators. For example, event logs can be used to automatically learn end-to-end process models based on recorded event data. Next to the automated discovery of the real underlying process, there are process mining techniques to analyze bottlenecks, to uncover hidden inefficiencies, to check compliance, to explain deviations, to predict performance, and to guide users towards "better" processes.

Region theory makes it possible to synthesize a process model from a behavioral description. Applying the behavioral description and the language equivalent. In recent years, various (rule-based and state-based variants) have been developed. Here, there is only example to be improved. Hence, there are many practical relevance.
Other events

- SIMPDA: INTERNATIONAL SYMPOSIUM ON DATA-DRIVEN PROCESS DISCOVERY AND ANALYSIS
- DeHMiMoP: International Workshop on Declarative/Decision/Hybrid Mining and Modelling for Business Processes
- iERP - INTELLIGENT ERP SYSTEMS
- Conference on Traffic Mining Applied to Police Activities
- International Conference on ICT and Knowledge Engineering
- Workshop on Security and Privacy-enhanced Business Process Management
- AusDM: Australasian Data Mining Conference
- IEEE International Conference on BUSINESS INFORMATICS (CBI’17)
- 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
- Etc. Etc.
Industry Meetings

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Advancing Software
- Evaluation
e.g. Process Mining Camp
Contests

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Contests

• Business Process Intelligence Challenge (BPIC) (every year, since 2011)

• Process Discovery Contest (2016, 2017)

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

  – How to continue?
  – Positioning wrt to BPM Thesis award

Public Data Sets

creating awareness
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Data sets

http://data.4tu.nl/repository/collection:event_logs
New Data Sets

- BPI Challenge 2017 - loan application process of a Dutch financial institute
- BPI Challenge 2016 - from UWV (Employee Insurance Agency)
- Hospital Billing financial modules of the ERP system of a regional hospital
- JUnit 4.12 Software Event Log
- NASA Crew Exploration Vehicle (CEV) Software Event Log
- Sepsis Cases sepsis cases from a hospital
- Validation of Precision Measures - Event Logs and Process Models
- Data-driven Process Discovery
- Etc.

All on http://data.4tu.nl/repository/collection:event_logs
Standardization

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**Standardization**
Extensible Event Stream

Eric: approval, recent activities, certification
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Advancing software evaluation
Development

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Advancing software:
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Advancing research:
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## Some tools (not complete)

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Evaluation

From indexing to scoring.

What role should the task force have?
Articles, books, ...

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**Advancing Software**
PM Manifesto

Available in 16 Languages

Opgoing discussion topic: Update of manifesto? Volunteers?

Too little activity: Send more case studies!
Innovation is the cornerstone of Siemens' success, not only today, but throughout its 170-year-old history.

In the age of digitization and Industry 4.0, Siemens embraces new trends and cultures, embracing innovation in all areas of the company. Siemens audit department initially engaged with Celonis in the year the startup was first established. The aim: to find a solution capable of making processes transparent within the company as well as, like an x-ray image, revealing potential inefficiencies and bottlenecks.
(Online) Courses

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Process Mining: Data science in Action

Available in on-demand mode

https://www.coursera.org/learn/process-mining
Future Learn MOOC
Process Mining in Healthcare

ONLINE COURSE

Process Mining in Healthcare

Learn how process mining can be used to turn healthcare data into valuable insights to improve patient care while reducing costs.

https://www.futurelearn.com/courses/process-mining-healthcare
Movies

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- Standardization (XES)

Advancing knowledge
- Research
- Scientific publications

Advancing software
- Development
- Evaluation

Community building
- Virtual communities (LinkedIn, Facebook, etc.)
- Scientific meetings (BPI, ATAED, etc.)
- Industry meetings (PM Camp, etc.)
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Movies
Various PM Movies

IEEE CIS Task Force on Process Mining

Process Mining Movies
- Introduction to Process Mining: Turning (Big) Data into Real Value
- Process Mining In A Nutshell (Fluxicon)
- Perceptive Process Mining
- Automated Business Process Discovery - QPR ProcessAnalyzer
- Overview of the Business Process Insight (BPI) platform of IBM (IBM)
- Fuzzy model animation
- Process Mining animations using BPMOne
- First-time Automated Process Discovery demo
- Nomination of Process Mining Research at TU/e for ICT Regio Award
- Presentations on http://fluxicon.com/c
- Prototyping Process Mining for SAP On
- Process mining 20sec
- Process mining
- Introduction to Process Mining
- ProcessMining - Improve Revenue, Rev
- Process Variants - Process Mining TV
- Process mining (Dutch, English subtitle
- Perceptive Software & Alliander: Price
- 15-min Video recording bpmNEXT pres

Help to promote it: put it on your website!

Send links to your videos!

https://www.youtube.com/watch?v=7oat7MatU_U
Examples of PM Movies

Celonis
https://www.youtube.com/watch?v=eUOutoXp75U

QPR
https://www.youtube.com/watch?v=D0jaUMOU31I

Perceptive
https://www.youtube.com/watch?v=nKy2Sx2WYRE

Fluxicon
https://www.youtube.com/watch?v=KCpY90T3rQk
Outreach 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
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Other Outreach Activities
Scientific Research Community

Process Mining

Mieke Jans
Scientific Research Community (SRC)

International network of researchers that encourage national (Belgian) and international cooperation at postdoctoral level.
Partners of SRC on Process Mining

Business Informatics @ Hasselt University - Koen Vanhoof, Mieke Jans, Benoît Depaire, Niels Martin
UGent MIS - Frederik Gailly, Jan Claes
LIRIS, KULeuven – Jan Vanthienen, Jochen De Weerdt, Bart Baessens, Monique Snoeck, Seppe vanden Broucke, Estefania Serral Asensio
Vrije Universiteit Amsterdam - Hajo Reijers, Henrik Leopold, Dennis Schunselaar
Free University of Bozen-Bolzano - Enrico Franconi, Diego Calvanese, Marco Montali
Universitat Politecnica de Catalunya - Josep Camona
Technical University of Denmark - Barbara Weber, Ekkart Kindler
Fondazione Bruno Kessler - Chiara Ghidini, Chiara Di Francescomarino, Riccardo De Masellis, Mauro Dragoni
Data61-CSIRO - Nick van Beest
Queensland University of Technology - Arthur ter Hofstede, Marcello La Rosa, Moe Wynn, Chun Ouyang, Michael Adams, Artem Polyvyanyy
Rutgers Accounting Research Center - Miklos Vasarhelyi, Alex Kogan, Michael Alles
University of Tartu - Marlon Dumas, Luciano García-Bañuelos, Dietmar Pfahl, Raimundas Matulevicius, Fabrizio Maria Maggi
Technical University of Eindhoven - Wil van der Aalst, Massimiliano de Leoni
Technical University of Eindhoven - Paul Grefen, Remco Dijkman, Irene Vanderfeesten, Rik Eshuis
Wirtschaftsuniversität Wien - Jan Mendling, Claudio Di Ciccio, Cristina Cabanillas, Andreas Rogge-Solti, Monika Malinova
Support of Flanders (Belgium)

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
<table>
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<tr>
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Process Mining in Spain

Pedro Alvarez (UZ), Josep Carmona (UPC), Luis Carrasco (Nodotic),
Carlos Fernandez-Llatas (UPV), Helena Fernandez (Gradiant),
Maria Teresa Gómez (US), Manuel Lama (USC),
Marc Solé (CA), Antonio Ruiz (US), Antonio Valle (G2)

UNIVERSITY R & D COMPANY
Geographical distribution of organizations

- Universidad de Santiago de Compostela (USC)
- Gradiant
- Universidad de Sevilla (US) (two groups)
- Universidad de Zaragoza (UZ)
- Universitat Politècnica de Catalunya (UPC)
- Nodotic
- CA Technologies (CA)
- Universidad Politècnica de Valencia (UPV)
Companies: CA Technologies, G2, Nodotic
CA Technologies, one of the world’s leading providers of information technology (IT) management software and solutions, is committed to advance technology research in areas of strategic importance to our company and to our customers.

Strategic Research, the research brand of CA Technologies, partners with internal and external organizations to further innovation in enterprise IT management.

By engaging with academia, professional associations, industry standards bodies, customers and partners, Strategic Research explores novel products and emerging technologies.

- Currently 30+ research projects investigating emerging technologies
- Goal is to enhance, extend CA Technologies products and solutions
- Collaboration with universities and research bodies around the world
- Protecting IP through patents
- Research results have been published in major academic and business conference proceedings and journals
MAJOR HYPOTHESIS

Process Mining can be used to generate the profile of a user in a digital platform?

Under the validation of the hypothesis that Process Mining can be used for profiling of users, CA Strategic Research has shown interest in the following research topics:

— **Process Mining can be used for** summarizing the activities performed by a user and, in particular, **detecting identity theft**. Process models are precise enough to highlight the peculiarities of user’s behavior.

— Exists a **distance between process models** that approximates the similarity of the respective users’ functional roles (i.e. similar positions or responsibilities). Anomalous behavior is also filtered out by such distance.

— When a group of individuals is considered, **Process Mining can be used for explaining the common behavior of a group**.

— If an organization or institution has divided their users in a set of groups, **multiple models can be generated with the objective of classifying new users according to such models**.
• Seminar/Dissemination
  • Manage the LinkedIn Group “Mineria de Procesos”: 107 members
  • Organize seminars and workshops for practitioners
  • Practical course on theory/practice
• Industrial projects using process mining:
  • KAO: *Process improvement for bill management*
  • Telefónica Spain: *Improvement for process support*
  • Catalan Institute of Oncology: *Identification of Targets in Recurrent Cancer*
• Comercial activities around the Disco tool
• More on [www.gedos.es](http://www.gedos.es)
Nodotic is a young consulting company based in Barcelona. Our focus is centered in improving the business of our clients by a better organization, reengineering of the processes and a smart use of technology.

Our values are Independence from third parties, Flexibility to fit the needs and circumstances of our clients, commitment with our projects and experience of our team.

Our team is composed exclusively of Senior Business Consultants with more than 20 years of experience in a broad range of business domains (Finance, Supply Chain, IT, Sales, etc.) developed in management positions in multinational companies.

Nodotic has a proven track of successful projects in Process Reengineering and recently Nodotic has incorporated to his portfolio of services the practice of Process Mining as an excellent way to enhance the value proposition of our projects.

<table>
<thead>
<tr>
<th>#</th>
<th>Organization</th>
<th>Process</th>
<th>Value Proposition</th>
<th>Status</th>
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</table>
| 1 | Administrative Unit of one of the top 3 Financial Services Company in Spain | Customer Claims through regulatory organisms (CNMV, Bank of Spain and CECA) | ▪ Identify improvements opportunities (as usual): bottlenecks, reworks, lead times, SLA’s, etc.  
▪ Identify the first points of the process to improve to maximize the impact of a RPA (Robotic Process Automation) initiative. | In progress |
| 2 | Administrative Unit of one of the top 3 Financial Services Company in Spain | Money laundry prevention in international transfers | ▪ Identify improvements opportunities (as usual): bottlenecks, reworks, lead times, SLA’s, etc.  
▪ Identify the first points of the process to improve to maximize the impact of a RPA (Robotic Process Automation) initiative. | In progress |
| 3 | Dental Clinic Chain with 10 millions customers and more than 5000 centers | Customer Assistance, from reservation to closing of service. | ▪ Identify improvements opportunities (as usual): bottlenecks, reworks, lead times, SLA’s, etc.  
▪ Use the knowledge on the process as a commercial tool to demonstrate Quality and Control as a differentiation from the competitors. | Pilot |

More info in [www.nodotic.com](http://www.nodotic.com) and [www.processmining.pro](http://www.processmining.pro)
Institutions: Gradiant
Gradiant, 3º ICT technology centre in Spain

A non-profit private research and development centre focused on technological development and knowledge transfer to industry.

- ~100 People
- 5M€ Revenue in 2015
- 65% Contracted companies
- 35% Competitive public funding
- 12 European projects
Gradiant’s model: Transfer chain

FOCUS ON INDUSTRY NEEDS:
SAME LANGUAGE, FLEXIBILITY, COMPETITIVENESS, PROFITABILITY
Activity based on process mining

An ICT tool to facilitate the understanding and simulation of complex processes is under development. Presently, focused on health care processes.

We are interested in collaborations with
• Research centres: efficient algorithms.
• Hospitals and other institutions that run complex processes: use cases.
• Partnerships with industry.
Universities: UPC, UPV, US, USC, UZ
SABIEN-ITACA at UPV

SABIEN (Health and Wellbeing Technologies) is the R&D&i Area Institute for Information and Communication Technologies (ITACA) at Universitat Politecnica de Valencia, dedicated to the application of Information and Communication Technologies (ICT) to the fields of public health, quality of life and social services.

- Start in 1998
- 29 Agreements with companies (2000-)
- 75 EU and national projects (2000-)
- 1.1 M€ competitive funds average every year (2000-)
- 2 Spin-offs
Recent/active Actions at SABIEN-ITACA-UPV

**Funded Projects:**
- **MOSAIC (H2020)**
  - Process Mining For Patient Flow analysis of Diabetes patients In Spain, Greece and Italy
- **LINK (H2020)**
  - 2PhD Applying Process Mining to Cardiovascular Diseases Patient Flow
- **CrowdHEALTH (H2020)**
  - Task for Analysis the patient Flow of patients with obesity
- **PALIA 4 MySphera.**
  - Web Aplication for applying Process Mining to Real Time Location Systems in Hospitals

**Exploratory Actions**
- Analysis of Behavior Modeling in IoT
  - MySphera LOCS
  - eSense Lab (Sahid Beheshti University Iran)
- Analysis of Patient Flow in Stroke Patients (Hospital General de Valencia)
- Analysis of Patient Flow in Extern Consultations at Hospital La Fe Valencia
- Analysis of Surgery Patients Flow at Hospital General de Valencia
- Following of Addictive and Mental Health patients with Fundacion san Juan de Dios
Recent/active Actions at SABIEN-ITACA-UPV

- Colaboration actions:
  - Process Mining 4 Healthcare:
    - Promoting a Initiative for enforce the application of Process Mining to Healthcare
  - PMCode
    - Process Mining Framework for .NET Platform (expected presentation at BHI’18)
  - Industrial Partners in Process Mining Initiatives
Who & Where we are

http://www.idea.us.es/
@Idea_Group_US
Research: Conformance checking Using Big Data for Parallelization

- Find misalignment parallelly using Hadoop
  - Create Constraint Satisfaction Problems that solves the misalignment [ATAED 2016]
  - Parallelize the computation of the logs using Fabiola infrastructure [ISD 2017]
Industrial application: Process discovery and Diagnosis

• Challengers in Assembly processes in Airbus
  • Different formats: store information in relational databases and logs
  • Heterogeneous information is stored
    • Operator
    • Resource
    • Design of tests
    • Sensors
  • Different frequencies of storage

• Discovery
  • Assembly: Whole process & each station
  • Life-cycle of Incidences
  • Is the information enough? Is it correctly recovered?

• Diagnosis
  • Several things can fail in an assembly process: Persons, hardware, software?
  • Is it the obtained models correct according to the company guidelines?
Process Mining in Spain
(University of Seville)

IEEE Task Force on Process Mining

Alfonso E. Márquez-Chamorro, Manuel Resinas y Antonio Ruiz-Cortés

Grupo ISA
Escuela Técnica Superior de Ingeniería Informática
Universidad de Sevilla

September 2017
Research results

• An evolutionary method for the generation of decision rules for the run-time prediction of process indicators, and a full software stack consisting of a tool to support the training phase and a framework that enables the integration of run-time predictions with BPMS:

Research results

• A method for the application of statistical techniques for the determination of thresholds of process performance indicators (PPIs):
  
Technology transfer

- **PROSAS project** was carried out with the Andalusian Service of Health (SAS) and Accenture, and consisted in the development of a system for the automatic management of performance indicators and SLAs for the IT Department of SAS.

Teaching

- Process mining is being taught as topic in two different subjects in the University of Seville.
  - **Process and Services management** (Bachelor degree).
  - **Enterprise Architecture** (Master degree).
Process Mining Activities

Research and Teaching

Manuel Lama Penín
(manuel.lama@usc.es)

Information Technology Research Center (CiTIUS)
UNIVERSITY OF SANTIAGO DE COMPOSTELA
Research

Team and topics

- **4 senior researchers**
  (Alberto Bugarín, Manuel Lama, Manuel Mucientes, Juan C. Vidal)

- **5 PhD students**

- **Research topics**
  - Process discovery and conformance
  - Process model simplification
  - Trace clustering
  - Concept drift
  - Process model summarization
  - Remaining time prediction
Research

R+D projects and contracts

△ **3 R+D projects from 2012**
- Supported by the Spanish Ministry of Economy
- Unstructured processes
- **Domains**: E-Learning, Marketing, Health

△ **4 R+D contracts from 2014**
- Structured and unstructured processes
- **Topics**: process discovery, pattern extraction, trace clustering
- **Domains**: Health (3), Government (1)

△ **Transfer technology activities**
- IV edition of the USC program for transfer technology
Teaching

▶ **Business Process Management**

- Subject from 2009/2010
- Bachelor Degree in Computer Science Engineering of the University of Santiago de Compostela
- Foundations of business process management
- **From 2015/2016** includes process mining activities
  (Theory: 3 hours + Exercises: 8 hours)

▶ **3 Master Thesis** (from 2013)

▶ **6 Degree Thesis** (from 2012)
DisCo – Distributed Computing R&D Group
University of Zaragoza

• Research topics:
  – Business Intelligence, data & process mining
  – Big-Data & cloud computing
  – Integration of heterogeneous computing environments

• Some of the projects under development
  – “BAI4SOW: Soft computing as a tool for Business Artificial Intelligence”, granted by MINECO
  – “LEBIS: Large-scale Business Intelligence integrating ecosystems of service providers”, MINECO
  – “DJ-Running: Emotions, location and music for sport performance improvement of long-distance runners”, MINECO
  – Industrial pilots: Up&Scrap, EFOR, Health&Care, etc.
UPC

• Research: since 2008, has contributed in fundamental research for:
  • Process Discovery
  • Conformance checking

• Tools:
  • PMLAB, genet, rbminer, aim, cd, ...
  • Contributions to ProM

• Industrial Projects:
  • Intel Corporation: *Discovery of memory protocols, extraction of behavior*
  • Diputacio de Tarragona: *Discovery and Visualization of citizen’ processes*
  • CA Technologies: *Precision improvement, event abstraction for unstructured processes*
UPC

• Participation in Spanish/International Projects
  • 1 Project by the Ministry of Science and Innovation (2011-2013)
  • 1 Project by the Ministry of Economy (2015-2017)

• Initiatives on Process Mining
  • IEEE Task Force
  • SRC on Process Mining
  • PM4HC

• We failed at:
  • Marie Curie ITN on PM (with TU/e, Tartu University, Universidad de Zaragoza, Freiburg University, University of Stuttgart, Pontificia Universidad Católica de Chile, Viseo Technologies, CA Technologies, Fluxicon): 2013-2015
## Overall Grid of Activities

<table>
<thead>
<tr>
<th>Group</th>
<th>Fundamental Research</th>
<th>Technology transfer/Applications</th>
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<tbody>
<tr>
<td>CA</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>G2</td>
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**Legend:**
- **Green** (High)
- **Yellow** (Medium)
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• Books and articles aimed at practitioners?  
• New process mining MOOCs?  
• How to make process mining an integral part of Six Sigma?  
• How to better utilize the LinkedIn Process Mining Group?  
• Do we need a new Process Mining Manifesto?  
• … |
| 17:25-17:30 | Closing |
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
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.
[Society Briefs]

Abstract:
 Presents information on the development of IEEE Standard 1849, the XES Standard.

Published in: IEEE Computational Intelligence Magazine (Volume: 12, Issue: 2, May 2017)
XES Certification Proposal

- **RfC1** • Jun 7
- **RfC2** • June 21
- **RfA** • Jul 5
- **Approved** • Jul 19
XES Certification

X1 X2

D1 D2

C1 C2

B1 B2

A1 A2
SW Event  Ext. Proposal

- RfC1 • Jul 20
- RfC2 • Aug 24
- RfA • Sep 7
- Approved? • Sep 21
- Now
SW Event Extension

- Software events
Action points

- XES Certification
  - Certify existing tools

- XES Software Extensions
  - Software Event (to be approved)
  - Software Communication (to be proposed)
  - Software Telemetry (to be proposed)

- Provide data sets via 4TU data center
New data sets

December 7 Felix Mannhardt
- Sepsis Cases- Event Log

February 6 Boudewijn van Dongen
- BPI Challenge 2017

April 21 Maikel Leemans
- NASA Crew Exploration Vehicle (CEV) Software Event Log

April 21 Maikel Leemans
- Apache Commons Crypto 1.0.0 - Stream CbcNopad Unit Test Software Event Log
XES Certification

Proposal on how to obtain a certification for your tool
Tools supporting XES

• Celonis Process Mining
• Disco
• Icris Process Mining Factory
• Minit
• myInvenio
• ProcessGold Enterprise Platform
• ProM
• ProM Lite
• QPR Process Analyzer
• RapidProM
• Rialto Process
• SNP Business Process Analysis
• …
Motivation

• What does it mean if two different tools support XES?

• Can one tool successfully import a XES log file that was exported by another tool?
Levels
Certification Objectives

Import

• Show an artifact, for example a discovered process model, that shows that the relevant imported attributes have been used.

Export

• Export the data, as loaded in the tool, to a XES event log that shows that the relevant loaded attributes have been exported.

• B1: 📁 🔄 ⏰

• C2: 🔍 ⚡️
Import: Logs

Real-life

• Sanitized BPIC logs
• Tools should not crash when importing these log files

Artificial

• Tools should not crash, but should furthermore show that the relevant attributes from every log were used
## Real-life logs

<table>
<thead>
<tr>
<th>Event log</th>
<th>Traces</th>
<th>Events</th>
<th>Size in KB</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPIC12</td>
<td>13,087</td>
<td>262,200</td>
<td>72,363</td>
</tr>
<tr>
<td>BPIC13_closed_problems</td>
<td>1,487</td>
<td>6,660</td>
<td>4,090</td>
</tr>
<tr>
<td>BPIC13_incidents</td>
<td>7,554</td>
<td>65,533</td>
<td>38,627</td>
</tr>
<tr>
<td>BPIC13_open_problems</td>
<td>819</td>
<td>2,351</td>
<td>1,370</td>
</tr>
<tr>
<td>BPIC15_1</td>
<td>1,199</td>
<td>52,217</td>
<td>40,261</td>
</tr>
<tr>
<td>BPIC15_2</td>
<td>832</td>
<td>44,354</td>
<td>33,616</td>
</tr>
<tr>
<td>BPIC15_3</td>
<td>1,409</td>
<td>59,681</td>
<td>45,673</td>
</tr>
<tr>
<td>BPIC15_4</td>
<td>1,053</td>
<td>47,293</td>
<td>36,131</td>
</tr>
<tr>
<td>BPIC15_5</td>
<td>1,156</td>
<td>59,083</td>
<td>44,961</td>
</tr>
<tr>
<td>BPIC17 – Offer log</td>
<td>42,995</td>
<td>193,849</td>
<td>107,557</td>
</tr>
<tr>
<td>BPIC17</td>
<td>31,509</td>
<td>1,202,267</td>
<td>565,373</td>
</tr>
</tbody>
</table>
## Artificial logs

<table>
<thead>
<tr>
<th>Event log</th>
<th>Level / Flag</th>
<th>Event attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LevelA1</td>
<td>A1</td>
<td>🗿</td>
</tr>
<tr>
<td>LevelA2</td>
<td>A2</td>
<td>🕵️ (โบราณ + รอบ)</td>
</tr>
<tr>
<td>LevelB1</td>
<td>B1</td>
<td>🗿, 🔄, 🔄</td>
</tr>
<tr>
<td>LevelB2</td>
<td>B2</td>
<td>🕵️ (โบราณ + รอบ), 🔄</td>
</tr>
<tr>
<td>LevelC1</td>
<td>C1</td>
<td>🗿, 🗺️</td>
</tr>
<tr>
<td>LevelC2</td>
<td>C2</td>
<td>🕵️ (โบราณ + รอบ), 🗺️</td>
</tr>
<tr>
<td>LevelD1</td>
<td>D1</td>
<td>🗿, 📅, 🗺️, 🗺️, 🌏, 🌕, 🕠, ☀</td>
</tr>
<tr>
<td>LevelD2</td>
<td>D2</td>
<td>🕵️ (โบราณ + รอบ), 📅, 🗺️, 🗺️, 🌏, 🌕, 🕠, ☀</td>
</tr>
<tr>
<td>FlagX1</td>
<td>X1</td>
<td>🗺️ (only non-standard attributes)</td>
</tr>
<tr>
<td>FlagX2</td>
<td>X2</td>
<td>🕵️, 🗹 (only non-standard attributes)</td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>Tool</th>
<th>Meta</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Name</td>
<td>• Authors</td>
</tr>
<tr>
<td>• Vendor</td>
<td>• Date</td>
</tr>
<tr>
<td>• Version</td>
<td>• History</td>
</tr>
<tr>
<td>• Requested cert. level(s)</td>
<td></td>
</tr>
<tr>
<td>– Import (if applicable)</td>
<td></td>
</tr>
<tr>
<td>– Export (if applicable)</td>
<td></td>
</tr>
</tbody>
</table>
Import

• Name of import log
• Walk-through with screenshots showing that the log is imported successfully
• If artificial log: Walk-through with screenshots showing that the attributes contained in the log were used

Export

• Walk-through with screenshots showing that the current data as stored by the tool is exported successfully to a log
• Walk-through with screenshots showing that the attributes as contained in the log match the current data as stored by the tool
Sample Reports

ProM 6.7
• Import/Export
  – A-D, X

Disco 2.0.0
• Import/Export
  – A1-D1
Discussion

Comments?

Approval?
Evaluate interest in developing JSON-based Business Process Trace Representation


Aleksander Slominski, Vinod Muthusamy
IBM Research

https://goo.gl/ofKMHx
Motivation: Google Trends
Compare Interest in XML and JSON

https://trends.google.com/trends/explore?cat=5&date=today%20y&q=XML,JSON

https://goo.gl/ofKMhx
Why JSON representation for Business Process Traces?

JSON is the most popular format today (previous slide)

XML is not dead but we need to move to where developers are?

Updated XES standard for JSON representation? New standard?

That should be community decision?

Before we do anything let find out what BPM developers want or anybody involved in Business Process?

https://goo.gl/ofKMhx
Proposed next steps:

1. Quick one-minute survey: open https://goo.gl/Nhosgt and provide your input (see the right side screenshot of the questions)

2. If you are interested in working on JSON format please join Slack server for discussion https://bpm2json-invite.mybluemix.net/ to get invitation to join Slack server: passcode is ‘hola’ (The survey data will be automatically posted to Slack server channel #survey to be used for discussion)

Slides link: https://goo.gl/ofKMHx
https://goo.gl/ofKMhx
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
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<tbody>
<tr>
<td>16:00 – 16:05</td>
<td>Welcome</td>
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| 16:05 – 16:15 | Overview of Activities and Developments in the Process Mining Space in 2016-2017  
(Wil van der Aalst)  
This session will provide a quick overview of the goals of the task force and its activities. It also reflects on its activities and the developments in the process mining space. |
| 16:15 – 16:30 | Process Mining in Spain  
(Josep Carmona)  
This session will provide an overview of the process mining activities in Spain. Josep Carmona, also the host of this year’s BPM conference, will summarize and reflect on initiatives in Spain. |
| 16:30 – 17:00 | XES Standardization and Certification  
(Eric Verbeek)  
On November 11th, 2016, the IEEE Standards Association has officially published the XES Standard as IEEE Std 1849TM-2016: IEEE Standard for eXtensible Event Stream (XES) for Achieving Interoperability in Event Logs and Event Streams. The IEEE Task Force on Process Mining has been driving the standardization process for over six years, because the standard allows for the exchange of event data between different process mining tools.  
Eric Verbeek will give a short update on XES developments and then focus on XES certification. Recently, the XES WG accepted the XES Certification proposal distinguishing different levels of XES support for import and export (A1-D2). Now it is time to operationalize the certification process and the task force should play a key role in this. Eric will explain the different certification levels and discuss the organization. |
| 17:00 – 17:25 | Brainstorming Session on New Activities  
(All)  
The mission of the task force is to “promote the research, development, education and understanding of process mining”.  
The goal of this session is to think of new activities or ways to strengthen existing ones. Example questions include:  
- What are new success process mining stories and data sets?  
- Should there be a stand-alone process mining conference or not?  
- New workshops or special sessions (SSCI, CEC, WCCI, KDD, ICML, PAW, etc.)?  
- Best Process Mining Dissertation Award in 2018?  
- Do we need a database with tool information?  
- Books and articles aimed at practitioners?  
- New process mining MOOCs?  
- How to make process mining an integral part of Six Sigma?  
- How to better utilize the LinkedIn Process Mining Group?  
- Do we need a new Process Mining Manifesto?  
- … |
| 17:25 – 17:30 | Closing |
Brainstorming Session on New TF 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 (BPI, ATAED, etc.)
- Industry meetings (PM Camp, etc.)

**Outreach Activities**
- Creating awareness
- Sharing data
- Advancing knowledge
- Advancing software
### Agenda

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<th>Details</th>
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- ... |
| 17:25 – 17:30  | **Closing**                                                             |         |
Any new ideas?

Use the task force!

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

Thanks!!

Next: Welcome Reception @ Barcelona Biomedical Research Park
Welcome Reception: Barcelona Biomedical Research Park

Mon Sep 11, 2017
7:00 PM - 9:00 PM
Carrer del Dr. Aiguader, 68, 08003 Barcelona, Spain

Description

(See below the location in Google Maps)