ITEA Office
High Tech Campus 69 - 3
5656 AG Eindhoven
The Netherlands

T + 31 88 003 6136
E info@itea3.org
W www.itea3.org

ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

ITEA3 14035 Reflexion

React to Effects Fast by Learning, Evaluation, and eXtracted InformatiON

Project details

Project leader:	Bas Huijbrechts
Email:	bas.huijbrechts@tno.nl
Website:	www.esi.nl/research/research-in-projects/reflexion.dot

Name: Simulation-driven Machine Learning		
Input(s):	Main feature(s)	Output(s):
▪ Mechatronic system with too little or no data to do data science or machine learning.	▪ Data synthesis through simulation ▪ Connection of simulation environment, simulation driver and data science platform.	▪ ML model

Unique Selling Proposition(s):	▪ Data is generated rather than collected, therefore the data can exist before the mechatronic system is realized. ▪ For condition monitoring it is expensive and also not intended to collect data of all conditions, especially the failure ones. The methods allow data generation in this critical area. ▪ Knowledge of the engineer is going into the generation of the data. Therefore, prior knowledge/generalization is already added which makes validation over several data sets more successful. See: C. Sobie, C. Freitas, and M. Nicolai (2017) *Simulation-driven machine learning: Bearing fault classification*. Mechanical Systems and Signal Processing
Integration constraint(s):	▪ JupyterLab ▪ Simcenter Amesim
Intended user(s):	▪ Engineers, ▪ Researcher ▪ Data Scientists
Provider:	▪ Siemens Industry Software NV
Contact point:	▪ Mike Nicolai - Mike.Nicolai@siemens.com
Condition(s) for reuse:	▪ License and/or Service Project

Latest update: 2018-10-25

Name: Unsupervised Learning Document Processing Pipeline		
Input(s):	Main feature(s)	Output(s):
▪ A large number of digital documents (DOC, PDF, etc.) ▪ Additional Structural data relating to those documents	▪ Automatic parsing and extraction of Text and Paragraphs ▪ Document Clustering to help quickly sift through large numbers of documents without reading them all	▪ Document Map with 2D similarity ▪ Paragraph Map with topical zones

Unique Selling Proposition(s):	▪ Quickly scan and index complex document collections without pre-sorting or tagging the data. ▪ Does not require set up of ontologies to get started ▪ Speeds up know-your-customer tasks
Integration constraint(s):	▪ Requires a microservice based infrastructure (Docker) ▪ Benefits from a visualization layer to analyze the embedding results
Intended user(s):	▪ Compliance officers, Document analysts, Insurance and Finance subject matter experts, Controllers
Provider:	▪ SynerScope
Contact point:	▪ Jan-Kees.Buenen@synerscope.com
Condition(s) for reuse:	▪ Commercial license is available

Latest update: 2018-10-17

Name: Human-machine Framework for System Verification Testing based on Log File Classification		
Input(s):	Main feature(s)	Output(s):
▪ Log files of system usage actions (text / keywords)	▪ Partitioning of log files into clusters based on similarity ▪ Categorization of clusters into user-defined labels, e.g. “normal/exceptional behaviour” ▪ Classification of log files in accordance with the user-defined labels ▪ Web-browser interface to allow experts communicate with the machine learning algorithms ▪ Expert feedback to update existing models.	▪ Usage clusters ▪ Usage models (probability graphs) ▪ Labelled logs

Unique Selling Proposition(s):	▪ Automatic retrieval of usage types from data ▪ Provides insights in normal / exceptional system behavior ▪ Mechanism in place for the expert in the loop via web-browser interface ▪ Continuously adapts to represent current usage types
Integration constraint(s):	▪ Python 3.6 ▪ Flask 1.0.2 ▪ React 16.5.2
Intended user(s):	▪ System and Test Designers
Provider:	▪ Embedded Systems Innovation by TNO (ESI) www.esi.nl
Contact point:	▪ Bas Huijbrechts – bas.huijbrechts@tno.nl
Condition(s) for reuse:	▪ Free to use
	Latest update: 2018-10-18

Name: Semantic Graph Extraction from Relevant Domain Knowledge Documentation		
Input(s):	Main feature(s)	Output(s):
▪ Dataset of domain specific documents	▪ Document classification into relevant/not relevant ▪ Semantic graph construction	▪ Labelled documents into relevant/not relevant ▪ Semantic graphs

Unique Selling Proposition(s):	▪ User-assisted classification of documents ▪ Continuous adaptation of classifier to represent relevant/not relevant documents ▪ Automatic construction of semantic graphs from documentation
Integration constraint(s):	▪ Python 3.6 ▪ Gensim's doc2vec library ▪ Sci-kit learn library ▪ Standford CoreNLP 3.9.1 ▪ hearst_patterns_python ▪ Neo4j 3.5 ▪ ImageMagick 7.0
Intended user(s):	▪ Domain experts of high-tech industries
Provider:	▪ Embedded Systems Innovation by TNO (ESI) www.esi.nl
Contact point:	▪ Bas Huijbrechts – bas.huijbrechts@tno.nl
Condition(s) for reuse:	▪ Free to use
	Latest update: 2018-10-02

Name: Semantic-based Jupyter Notebook Search Engine		
Input(s):	Main feature(s)	Output(s):
▪ Repositories of Jupyter Notebooks ▪ Semantic Graphs of domain knowledge (based on Semantic Graph Extraction from Relevant Domain Knowledge Documentation)	▪ Multi-dimensional search (text, semantic graph, data structure) ▪ Search results adapted to user's feedback	▪ Jupyter Notebooks

Unique Selling Proposition(s):	▪ Leverages on semantic graphs to expand queries to encompass broader, domain-specific concepts ▪ Automatically adapts its search strategy based on user's feedback
Integration constraint(s):	▪ Python 3.6 ▪ Semantic Graphs (see form above) ▪ Flask 1.0 ▪ React 16.5.2 ▪ Neo4j 3.5 ▪ Elasticsearch 6.4.1
Intended user(s):	▪ Domain experts of high-tech systems
Provider:	▪ Embedded Systems Innovation by TNO (TNO-ESI) www.esi.nl
Contact point:	▪ Bas Huijbrechts – bas.huijbrechts@tno.nl
Condition(s) for reuse:	▪ Free to use

Latest update: 2018-10-02

Name: Yanomaly		
Input(s):	Main feature(s)	Output(s):
▪ Text log files ▪ Numeric data	▪ Unsupervised AI based anomaly detection	▪ Anomaly scores and root cause analysis scores

Unique Selling Proposition(s):	▪ Capability of processing both text logs and numeric data ▪ Capability of processing multivariate data generated by complex systems ▪ Unsupervised training: no need for annotated examples of known anomalies
Integration constraint(s):	▪ Runs on Ubuntu Linux in docker containers ▪ Connectors available with REST API, OSI PI, MQTT
Intended user(s):	▪ Service desk personnel ▪ Maintenance personnel ▪ Plant operators
Provider:	▪ Yazzoom
Contact point:	▪ David Verstraeten, engineering manager and partner, David.verstraeten@yazzoom.com
Condition(s) for reuse:	▪ Commercial product with yearly or perpetual software license fee
	Latest update: 2018-10-22

Name: Distributed Plugin Adapters		
Input(s):	Main feature(s)	Output(s):
▪ System to be tested	▪ Distributed platform and implementation independent way to connect to systems (directly or over a network).	▪ Tested system

Unique Selling Proposition(s):	▪ Platform independent ▪ Implementation independent ▪ Distributed ▪ Potential testing standard
Integration constraint(s):	▪ Google protocol buffers (open source) ▪ Websockets (web-standard)
Intended user(s):	▪ Testers and automated testing tools
Provider:	▪ Axini B.V.
Contact point:	▪ Machiel van der Bijl (vdbijl@axini.com)
Condition(s) for reuse:	▪ Axini Licence
	Latest update: 2018-10-29

Name: Safe Evaluation Sandbox		
Input(s):	Main feature(s)	Output(s):
▪ Code with potential side-effects	▪ Fast and secure sandbox to execute code with potential malicious side-effects	▪ Safe execution within safety parameters or an error

Unique Selling Proposition(s):	▪ Linux platform ▪ Fast ▪ Implementation independent
Integration constraint(s):	▪ Linux
Intended user(s):	▪ Creators of tools that allow arbitrary code execution
Provider:	▪ Axini B.V.
Contact point:	▪ Machiel van der Bijl (vdbijl@axini.com)
Condition(s) for reuse:	▪ MIT license

Latest update: 2018-10-29