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Master's thesis

A Case Study and Proof of Concept of the Application of Machine Learning to Polarion's ALM Software

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Katedra . . . softwarového inženýrství

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May 16, 2018

Acknowledgements

I would like to thank to my supervisor for his extraordinary leading and valuable advices during the whole process of writing this thesis.

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In V Praze on May 16, 2018

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Citation of this thesis

Sláma, Michal. *A Case Study and Proof of Concept of the Application of Machine Learning to Polarion's ALM Software*. Master's thesis. Czech Technical University in Prague, Faculty of Information Technology, 2018.

Abstrakt

Machine learning (ML) is becoming essential part any software application. Its same for application lifecycle management (ALM) which hides great opportunities to improve using, processing or behaviour of the whole system based on the ML principles. This work contains description of ML principles relevant for using in the ALM environment. For the specific software is used Polarion which is worldwide successful enterprise solution for ALM. This thesis provides analysis its core business and user cases and possible ways how to integrate ML to improve Polarion in different areas. As Polarion must that customer's data are not exposed to any possible threat ensure on all levels we will discuss the way how to achieve this goal by a different kind of architecture or implementation.

Klíčová slova Strojové učení, životní cyklus softwarových aplikací, ALM

Abstract

Sem doplňte ekvivalent abstraktu Vaší práce v angličtině.

Keywords Machine learning, application lifecycle management, ALM

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Todo list

Introduction

The revolution is just beginning, but it's real – and the time to act is now. In fact, it is yours for the taking to harness a broad platform, services and ecosystem to transform your business. A unified approach to application lifecycle management is not a futuristic technology trend. It's here today, and the good news is that you don't have to completely stop and reset, but can smoothly transition from squeezing the most out of your existing business processes to making your organization thrive.

Kurt Bittner
Analyst
Forrester Research

We live in the world that is changing rapidly. No part of life is free to this changes and the software development needs more then others to adapt every day to new requirements and technologies. This demand leads to a new level of management for software development where tools, process, implementation, testing and reporting are organized on one place with goal to keep and improve traceability and productivity as high as possible. This comes hand by hand with automation in the form of ML that moves user experience and reporting to the next level. One of such product is Polarion[1] and this work will analyze it's user cases and find out what places are good candidates for using ML techniques to improve business value of the product.

The aim of the thesis

The aim of this thesis is to analyze and identify machine learning (ML) use cases that would prove valuable for Polarion's application lifecycle management (ALM) software. A proof of concept prototype will be supplied for the selected use case.

1. Analyze and describe Polarion in order to identify suitable use cases to apply ML to.
2. Provide a review of ML frameworks and algorithms that are relevant for such an application.
3. Describe several use cases for ML and define their benefit to both ALM as a business and the users that deploy it.
4. Choose a scenario from the previous investigation and implement a proof of concept prototype.
5. Discuss the possibility of the full implementation and deployment of the previous prototype into the production environment.

Polarion

Organizations must accelerate innovation to stay competitive in most industries. Unlocking team synergies across disparate software development teams is paramount. Many organizations are still struggling with the old way of doing things. They focus on isolated process optimization instead of driving business value through comprehensive synchronization. With Polarion ALM, customers have been able to get their teams out of their silos and orchestrate development efforts across the entire application lifecycle. This approach has empowered stakeholders to better perform tasks in context and quickly make sound decisions based on real-time access to information.

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of product lifecycle management (PLM) and manufacturing operations management (MOM) software, systems and services with over 15 million licensed seats and more than 140,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with its customers to provide industry software solutions that help companies everywhere achieve a sustainable competitive advantage by making real the innovations that matter. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

2.1 ALM

2.2 Reporting

2.3 Using

2.3.1 Licenses

Machine learning

3.1 Frameworks

3.1.1 TensorFlow

3.1.2 Theano

3.1.3 Caffe

3.1.4 AML - AWS

3.1.5 Microsoft CNTK

3.2 Algorithms

3.2.1 LDA

Creating work items with ML

- 4.1 User experience
- 4.2 Architecture
- 4.3 Realization of prototype

ML in production environment

Security

implement own ML server using just shareable libraries and provides to customers ability to using ML technics.

Validity

The value of the enhancement

Conclusion

Bibliography

- [1] Polarion ALM. [online], [cit. 2018-05-01s]. Dostupné z: <https://polarion.plm.automation.siemens.com/>

List of abbreviations used

ALM Application lifecycle management

Polarion Polarion ALM

ML Machine learning

CD contains

| | | |
|--|------------------|---|
| | readme.txt | stručný popis obsahu CD |
| | thesis | zdrojová forma práce ve formátu L ^A T _E X |
| | text | text práce |
| | thesis.pdf | text práce ve formátu PDF |
| | thesis.ps | text práce ve formátu PS |