

DATA DRIVEN BUSINESS DEVELOPMENT - LOAN DATA

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EXECUTIVE SUMMARY

Executive summary - A brief summary (1-2 pages) of the key findings in the report.

-----Introduction Paragraph -----

-----problem statement Paragraph -----

-----overview of the work performed Paragraph -----

-----Overview of the key findings and recommendations -----

ABBREVIATIONS

Eg.

ML – Machine Learning

LIST OF FIGURES

Figure 1 - Molka, T., Gilani, W. & Zeng, X.-J. (2013). Dotted Chart and Control-Flow Analysis for a Loan Application Process. Business Process Management Workshops, Tallinn, Estonia, pp. 219-220. Berlin, Heidelberg: Springer.... 10

LIST OF TABLES

No table of figures entries found.

CONTENT

Introduction	7
Background	7
Problem statement	8
Goals and Objectives.....	8
Limitations.....	8
Theory and key concepts	9
Data driven business development.....	9
Robotic process automation	9
Machine learning	10
Loan Application process	10
State-of-the-art analysis.....	11
Summary	11
Develeopment.....	12
Design description.....	12
Concept Overview	12
System Architecture	12
Summary	12
Evaluation and results.....	13
Data	13
Model	13
Implementation	13
Business value.....	13
Conclusion and Recommendations.....	14
Further work	14
Attachments.....	15
Source code.....	15
References	16

INTRODUCTION

BACKGROUND

Smooth transition to problems statement...

PROBLEM STATEMENT

Applying for a loan is a tedious process that demands that the applicants are interviewed by a loan officer. This takes up unnecessary time and resources of both the customers and the bank. Is applied machine learning a way for the applicants to get instant response on their loan applications, without having to physically interact with the bank? Will this yield a positive result for the bank, freeing resources and doing as good of a job as the loan officers?

GOALS AND OBJECTIVES

The overall goal of this report is to explore the possibility of automating the approval process of loan applications using machine learning.

The following objectives has been set to achieve this:

- Research
 - Evaluate key concepts to be included in the theoretical framework of this paper.
 - Chart the standard application process of loans.
 - Research the existing field of Robot Process Automation.
 - Identify state-of-art solutions in Robot Process Automation. Analyse their evaluations to find elements of interest for this project.
 - Explore similar data sets to the one used in this project to consider further implementation of the model.
 - Investigate the business value of the development of similar systems.
- Development
 - Collect data.
 - Explore the data set.
 - Structure the RPA system.
 - Pre-process data.
 - Create model.
 - Create app for automatic processing of new loan data.
 - Deploy app.
- Evaluation
 - Evaluate data used for training and testing. Evaluate the similarity to other loan data.
 - Evaluate the model for predicting approval.
 - Evaluate the app and its implementations.
 - Evaluate the business value of this system.
 - Compare machine learning vs programming.
- Recommendations and further work

LIMITATIONS

This paper is limited by the data used and the short project scope. The principal of garbage in, garbage out takes full effect in every machine learning project. A model can only be as good as the quality of the data it uses to train. The project spans over three weeks and this will also impact decisions regarding improving the model, and the paper in general.

THEORY AND KEY CONCEPTS

Present the chapter..... usually the main objective is to present key concepts or underlying

DATA DRIVEN BUSINESS DEVELOPMENT

The Economist published an article named “The world’s most valuable resource is no longer oil, but data”, informing us that the five most valuable listed companies in the world are data companies. Companies such as Google and Facebook have a tremendous value, but their most popular services are free (The world’s most valuable resource is no longer oil, but data, 2017). What is their value?

Their value lies in the data they accumulate about you, the consumer. Google and Facebook, revenue-wise, are mainly advertisement companies, and profits from selling ads to other companies (Sweney & Canon, 2021). Their effectiveness as advertisement companies comes from their ability to tailor ads to different users on their platform, therefore increasing the value of each advertisement. This shows that there is value in data.

Other businesses can take part of this discovered value, by utilizing their data to its fullest potential. Data. Data gathered in a business can be used internally to help the business to separate themselves in a competitive ecosystem, providing better products and services to their competitors. Data can also be used commercially by selling it to external businesses (Werger et al., 2020).

Data and physical assets have a lot in common. It can be bought and sold. It makes us more efficient and able to win, and keep, customers. Having it, without using it is a waste. It degrades over time and must be maintained. The big differences are that it does not become less when used and it is easily made accessible to everyone (Treder, 2019).

Data should be treated as every other asset. Give it a price, inventory it, maintain it, refine it and increase its value (Treder, 2019).

ROBOTIC PROCESS AUTOMATION

“RPA is the technological imitation of human worker with the goal of automating structured tasks in a fast and cost efficient manner”(Aguirre & Rodriguez, 2017). RPA is not a physical robot, but a software created to do repetitive operational processes that usually are performed by humans. RPA can be used to automate processes based on structured data and deterministic outcomes. One of the huge advantages of RPA is that it can be implemented on top of already existing systems, across platforms. They are also made to not require programming skills to use them (Aguirre & Rodriguez, 2017).

Some benefits of RPA are as following: Reduced costs by automating processes, increasing productivity and less employees. Better customer experience by freeing up resources, giving more time to focus on customers. Lowering risk by removing the highest cause of errors, the humans. RPA can leverage your existing systems, so you don’t need to replace your infrastructure (Mitra, 2018).

MACHINE LEARNING

Machine learning is the application of algorithms that makes sense of data. By using self-learning algorithms, we can turn data into something much more valuable; knowledge, by spotting patterns and making predictions. Instead of relying on humans to make complicated models by making rules, ML offers a faster way of capturing knowledge and provides you with the ability to make data-driven choices (Raschka & Mijalili, 2019).

There are three different kind of machine learning. Supervised learning uses labelled data to train up a model, giving direct feedback to make predictions. Unsupervised learning has no labels or feedback, but works by finding hidden structure in the data. Reinforcement learning is a decision process that works by rewarding wanted behaviour. Reinforcement learning knows nothing to start with, so decisions are random, but every time it does something right, its rewarded, and will therefore do it similarly the next time (Raschka & Mijalili, 2019).

LOAN APPLICATION PROCESS

The loan application summarized by a control-flow analysis:

- Application is submitted, but not necessarily finished.
- All applications are either internally pre-accepted, declined, cancelled by applicant, or contacted by call.
- Now that all applications are completed by call, the same decision process is initiated, and the application in finalized.
- Now remains approval, registration, and activation.

After this application process, the loan is offered, and a new process starts around the applicants answer (Molka et al., 2013).

The Norwegian newspaper “Finansavisen” published an article last year about the long processing times of loan applications. You could expect to wait up to three weeks for processing in some Norwegian banks, at the time (Parr, 2020).

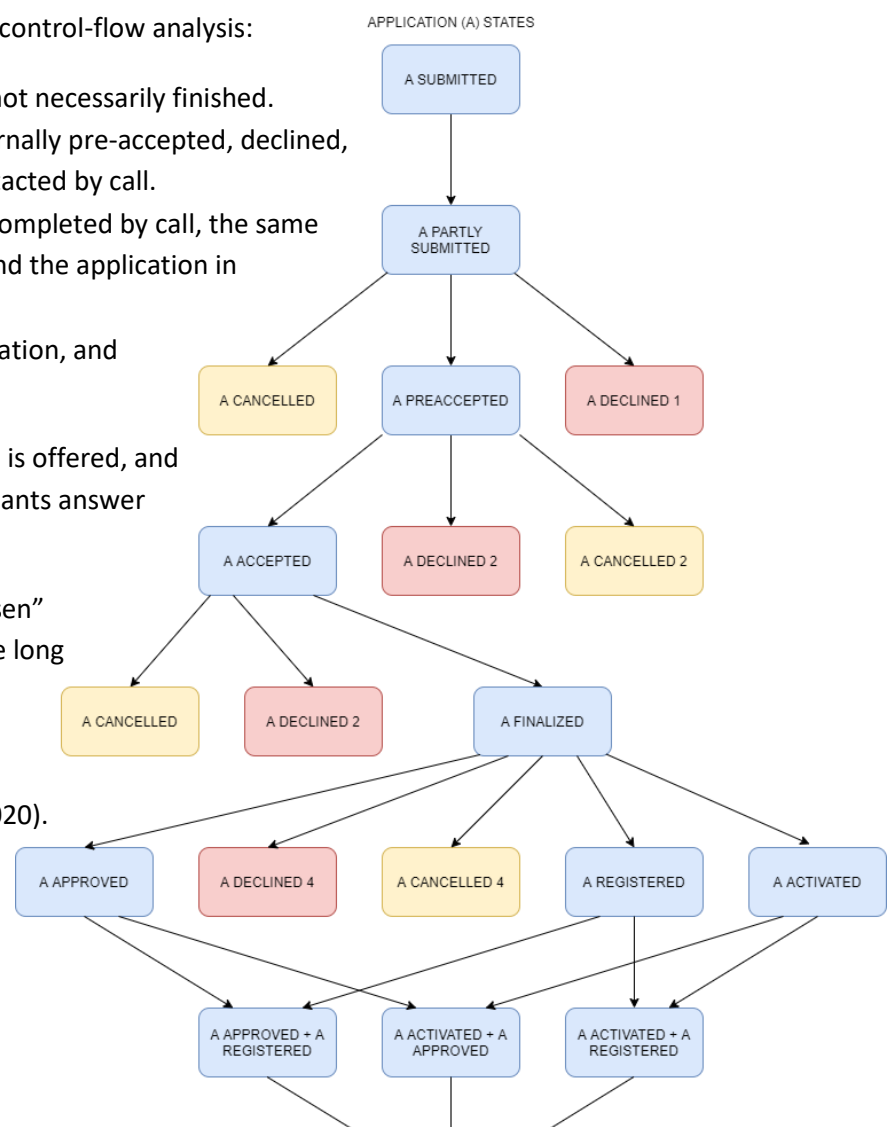


Figure 1 - Molka, T., Gilani, W. & Zeng, X.-J. (2013). Dotted Chart and Control-Flow Analysis for a Loan Application Process. Business Process Management Workshops, Tallinn, Estonia, pp. 219-220. Berlin, Heidelberg: Springer.

STATE-OF-THE-ART ANALYSIS

Some of the recent papers from the Business Process Management conference in 2020 gives an insight to the relevant state of art of the field of study RPA. The proceeding includes papers such as “A Conversational Digital Assistant for Intelligent Process Automation”, “How to Trust a Bot: An RPA User Perspective” and “From Robotic Process Automation to Intelligent Process Automation” (*Business Process Management: Blockchain and Robotic Process Automation Forum*, 2020).

The papers explore the use of machine learning combined with RPA interfaces to streamline the experiences of business processes. An example is how “A Conversational Digital Assistant for Intelligent Process Automation” solves the inexperience with the use an RPA with digital assistant, much like the ones we have at home, or in our phones. An example used is the simplification of the loan process. The assistant can help a loan officer without experience with machine learning, to automate the process of approving a loan, just by telling the digital assistant some key information (Rizk et al., 2020).

SUMMARY

Present the key results from this chapter

DEVELOPMENT

Present the chapter.....

in the first hand-in the goal is that you structure the following sub-sections in this report

some examples

DESIGN DESCRIPTION

CONCEPT OVERVIEW

Overall description of concept

SYSTEM ARCHITECTURE

<https://www.lucidchart.com/pages/examples/flowchart-maker>

<https://app.diagrams.net/>

SUMMARY

EVALUATION AND RESULTS

Present the chapter.....

in the first hand-in the goal is that you structure the following sub-sections in this report

DATA

Example

MODEL

Example

IMPLEMENTATION

Example

BUSINESS VALUE

Example

CONCLUSION AND RECOMMENDATIONS

Provide the reader with a reminder of project goal

What has the project group done

What is the key results?

What does the project group recommend based on the work done.

FURTHER WORK

Imagine you are in charge of project hand-over to a new project group

Provide a section about further work

- Improvements
- Loose threads

ATTACHMENTS

SOURCE CODE

Key source code

Link to github:

https://github.com/hellund/loan_application_processing.git

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