**Requirements specification**

***Automatically add missing data***

*8vance Matching Technologies BV*

*Venlo*

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**Glossary**

**KSC**

Knowledge, Competence, Skills. This is the data in a profile providing information about the person's competence and skills.

**H**

This can refer to the high indication of the level of urgency or importance of a requirement.

**M**

This can refer to the medium indication of the level of urgency or importance of a requirement.

**L**

This can refer to the low indication of the level of urgency or importance of a requirement.

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# Introduction

## Purpose

The company 8vance Matching Technologies BV uses scrape techniques to collect a large amount of data in a short time span. The problem is that this data often misses interesting information - a complete list of skills of persons in particular (this missing data is called [KSC](#KSC)). The [KSC](#KSC) data gives an overview what a person is capable of.

The company wants to have a product that can solve this problem (this product will be called product B1 from now on). Product B1 should be able to automatically add the missing [KSC](#KSC) data for all the profiles and must be integrated in the company's server. Product B1 is basically a piece of algorithm functionality for the server that will add data to the profiles, meaning it won't have any interaction with users.

The company also wants to have a product that can be used to analyze algorithms on correct input and output, and performance (this product will be called product B2 from now on). Product B2 is a general tool that should be able to analyze various different algorithms. There're three users for product B2:

* Programmers (algorithm developers). They'll want to use the product to test the algorithm on correct input and output, and performance. If the analysis overall negative, it's a sign the algorithm needs to be improved.
* Data scientists. They'll want to use the product to look for correct and incorrect predictions of the algorithm to find possible flaws they need to fix in their models.
* Other users. The previous two users are the main users of the product. There're also other users who don't want to use the product with a problem-solution mindset, but who're just interested what predictions the algorithm comes up with and how well it performs.

To summarize, the company wants to have the following two products:

* Product B1: Server-side algorithm functionality. An algorithm that supplements the missing [KSC](#KSC) data for profiles that can be integrated into the server as a compiled Python library.
* Product B2: Algorithm analysis tool. A stand-alone application to test various algorithms on correct input, output, and performance.

## Goal of this document

All of the requirements of these two products are discussed within this document. Every requirement in this document have a certain urgency and importance factor.

The urgency factor indicates how early the requirement needs to be implemented. Requirements with a high ([H](#H)) urgency need to be implemented first before everything else. Requirements with a medium ([M](#M)) urgency should be implemented as soon as no high urgency requirements are left. Requirements with a low ([L](#L)) urgency can be implemented as soon as no medium urgency requirements are left.

The importance factor indicates which requirements have higher priority than others. Requirements with a high ([H](#H)) priority indication need to be implemented no matter what, as soon as possible (this doesn't mean they have to be rushed!). Requirements with a medium ([M](#M)) priority also need to be implemented, but not necessarily straight away. Requirements with a low ([L](#L)) priority are things that would be nice to have (like an enhancement of the user experience/interface, additional features, etc.). This roughly translates to the MoSCoW notation as follows: high priority = must have, medium priority = should have, low priority = could have.

(a summary introducing the upcoming chapters)

## Intended audience and reading suggestions

(...)

## Project scope

(...)

In product B1, only the profiles of LinkedIn are supported to predict the missing [KSC](#KSC) data for. Whenever *profiles* are mentioned within this document, only the *LinkedIn profiles* are meant (read reference [R.1](#R1) why this decision was made).

## References

|  |  |
| --- | --- |
| **Reference code** | **Reference** |
| R.1 | Research document |

# Overall description

## Product perspective

Product B1, the server-side algorithm functionality, serves as an extension for the current profile matching algorithm, which aims to improve the overall profile matching results by adding missing [KSC](#KSC) data to the profiles. This product will be integrated in the server's Django framework.

Product B2, the algorithm analysis tool, is a new self-contained product. This product should work without a internet connection and doesn't have any interconnection with other existing products or external databases.

## Product functions

In this section, the major functions the product must perform or must let the user perform are briefly summarized. Details will be provided in chapter 3 and 4 for the different products separately.

### Product B1 - Server-side algorithm functionality

* The algorithm is able to predict missing skills for a selection of profiles.
* The algorithm can calculate a certainty score for every predicted skill per profile.

### Product B2 - Algorithm analysis tool

* The user can import an algorithm he wants to analyze.
* The user can provide a data source for the algorithm to use for the analysis.
* The user can save and load analysis results.
* The application can write returned values from the algorithm to a external target.
* The application can show analysis results of the algorithm such as the predictions, certainty scores of predictions, execution time, memory cost, and more.

## User classes and characteristics

Product B1 is a piece of algorithm functionality for the server that will add data to the profiles. It won't have any interaction with users.

Product B2 will mainly be used by the following users:

* Programmers (algorithm developers). They'll want to use the product to test algorithms on correct input and output, and performance. If the analysis is overall negative, it's a sign the algorithm needs to be improved. It's anticipated these users will use all of the product's functionality frequently.
* Data scientists. They'll want to use the product mainly to look for correct and incorrect predictions of the algorithm to find possible flaws they need to fix in their models. It's anticipated these users will use the product frequently.
* Other users. The previous two users are the main users of the product. There're also other users who don't want to use the product with a problem-solution mindset, but who're just interested what predictions the algorithm comes up with and how well it performs. It's anticipated these users only want to use the product's functionalities that allows them to see this information, occasionally.

## Operating environment

Product B1 will be integrated in the Django framework, which runs on a UNIX-like server.

Product B2 is a stand-alone tool which has to be able to run on any operation system, assuming the user has installed the required libraries used by the product. This product must be able to run on systems without any network connection.

## Design and implementation constraints

* The documentation of both products have to be written in English.

### Product B1 - Server-side algorithm functionality

* The algorithm has to work with huge amounts of data which can't all be read into memory. There has to be a solution to split and read the data in smaller parts.
* The algorithm has to be able to be integrated in the server's Django framework.
* The algorithm has to be able to predict missing skills of one profile in 1 second or less.
* Due to a limited amount of time and experience in data science, the algorithm will be written in Python 2.7 instead of possible better-performing alternatives. Python is also an ideal choice because Django is a Python framework.

### Product B2 - Algorithm analysis tool

* The tool has to function without an internet connection.
* The tool must be able to run on any operating system.

## User documentation

There'll be additional documentation provided for product B2. This documentation will contain information for all the users how the product can be used. So basically, the documentation will be a user manual.

## Assumptions and dependencies

### Product B1 - Server-side algorithm functionality

* The algorithm won't communicate with the server's Apache Cassandra database. All save and read operations are done outside of the algorithm.
* The input data type for the algorithm must have a JSON format.
* The input data for the algorithm must contain all the necessary data fields for a typical LinkedIn profile.

### Product B2 - Algorithm analysis tool

TODO

# Requirements regarding the server-side algorithm functionality

(This whole chapter will be rewritten. Features and rules will be separated and mentioned in different sections in this chapter. Every feature will have a separate description / motivation, list of functions, applicable rules, urgency / importance indications, and scenarios describing user actions. Non-functional requirements will be discussed in a separate chapter. This chapter will start with an overall description of how the product will work.)

The following table contains the requirements for product A.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| **High** | **Medium** | **Low** | **High** | **Medium** | **Low** |
|  | The algorithm is created in Python. |  |  |  |  |  |  |
|  | The algorithm can be integrated in the server's existing Django framework. |  |  |  |  |  |  |
|  | The input data type for the algorithm must have a JSON format. |  |  |  |  |  |  |
|  | The input data must contain all the necessary data fields (specified in the research document) of the profiles. |  |  |  |  |  |  |
|  | The algorithm can parse the profile data of a selection of profiles to the wanted syntax. |  |  |  |  |  |  |
|  | The algorithm can write the parsed profile data of a selection of profiles to a external target (database/file). |  |  |  |  |  |  |
|  | The algorithm can predict missing skills for a selection of profiles. |  |  |  |  |  |  |
|  | The algorithm can write the predicted missing skills of a selection of profiles to a external target (database/file). |  |  |  |  |  |  |
|  | The algorithm can calculate a certainty score for every predicted skill in a profile. |  |  |  |  |  |  |
|  | The algorithm can calculate a certainty score for every skill for a profile. |  |  |  |  |  |  |
|  | The algorithm can determine whether or not user-specified skills are correct. |  |  |  |  |  |  |
|  | The algorithm can flag and exclude the incorrect user-specified skills. |  |  |  |  |  |  |
|  | The algorithm can write the flagged incorrect user-specified skills to a external target (database/file). |  |  |  |  |  |  |
|  | The algorithm can calculate an certainty score for every determination of whether or not a user-specified skill is correct or incorrect. |  |  |  |  |  |  |
|  | The algorithm can predict missing skills for every profile in 1 second or less. |  |  |  |  |  |  |

## Overall product description

Product B1 can be seen as a algorithm package, containing various different functions that return different values. The package will have a function that does some pre-processing of the input data and the resulting data is returned. This data can then be used to call a function that will return predictions for the missing skills per profile. This function has two additional parameters which indicate if you:

1. want it to also return certainty scores per prediction (for every *predicted* skill);
2. want it to also return certainty scores of every skill in the system.

It's important to know that this product will not communicate with a external target. So reading any data from a external data source or writing any data to a external target has to be done outside this product.

## Features

### Pre-process data

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can pre-process the profile data of a selection of profiles to the wanted syntax. |  |  |  |  |  |  |

The algorithm needs to pre-process some of the profile data to be able to use it for further calculations. For instance, some data fields contain unwanted information and other fields need to be converted to a numeric representation of the data.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm reads the input data. |  |  |  |  |  |  |
|  | The algorithm removes unwanted information in the data per data field if necessary. |  |  |  |  |  |  |
|  | The algorithm converts the data per data field to another representation of the data if necessary. |  |  |  |  |  |  |
|  | The algorithm returns the processed data. |  |  |  |  |  |  |

#### Rules

There're no rules applicable for this requirement.

#### User actions

There're no user actions for this requirement.

### Missing skill prediction

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can predict the missing skills for a selection of profiles. |  |  |  |  |  |  |

The algorithm should be able to predict which skills are missing in every profile.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm reads the input data. |  |  |  |  |  |  |
|  | The algorithm performs operations to predict the missing skills per profile. |  |  |  |  |  |  |
|  | The algorithm returns the missing skills per profile. |  |  |  |  |  |  |

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can only predict the missing skills if the input data has been pre-processed if pre-processing is required. |  |  |  |  |  |  |

Pre-processing of the data isn't always required, unless conversions of the data to another format need to be done. For instance, if a string needs to be converted to a integer because the algorithm uses the integer values.

#### User actions

There're no user actions for this requirement.

### Calculate certainty score per prediction

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can calculate a certainty score for every predicted skill in a profile. |  |  |  |  |  |  |

It's important for the users to know how certain the algorithm is about the predicted skills. For instance, if the certainty score of a predicted skill is high even though that skill shouldn't be applicable for the profile in question, something could be wrong with the algorithm.

#### Functions

The following functions can start when function [a2f1](#a2f1) has been executed.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm calculates the certainty scores of every predicted skill per profile. |  |  |  |  |  |  |
|  | The algorithm returns the certainty scores. |  |  |  |  |  |  |

#### Rules

There're no rules applicable for this requirement.

#### User actions

There're no user actions for this requirement.

### Control credibility of user-specified skills

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can determine whether or not user-specified skills are correct. |  |  |  |  |  |  |

The profiles already have skills defined by their respective owners. However, it's possible that they don't own a skill even though they say they do. The algorithm should check the credibility of the person owning a particular skill.

#### Functions

The following functions can start when function [a2f1](#a2f1) has been executed.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm calculates the credibility score per user-specified skill per profile. |  |  |  |  |  |  |
|  | The algorithm returns the credibility score per user-specified skill per profile. (For every user-specified skill per profile which credibility score is high enough, the skill is credible. Otherwise the skill isn't credible.) |  |  |  |  |  |  |

#### Rules

There're no rules applicable for this requirement.

#### User actions

There're no user actions for this requirement.

### Exclude incredible user-specified skills

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm can flag and exclude the incredible user-specified skills per profile from the data source. |  |  |  |  |  |  |

Excluding incredible skills from profiles can improve 8vance's matching algorithm to create more accurate matches. Skills from one profile can be deemed incredible if there's no overlap in these skills with the skills of other similar profiles.

#### Functions

The following functions can start when function [a4f1](#a4f1) has been executed.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The algorithm adds a flag to the user-specified skills per profile if the credibility score is low. |  |  |  |  |  |  |

#### Rules

There're no rules applicable for this requirement.

#### User actions

There're no user actions for this requirement.

# Requirements regarding the stand-alone application

(This whole chapter will be rewritten. Features and rules will be separated and mentioned in different sections in this chapter. Every feature will have a separate description / motivation, list of functions, applicable rules, urgency / importance indications, and scenarios describing user actions. Non-functional requirements will be discussed in a separate chapter. This chapter will start with an overall description of how the product will work.)

The following table contains the requirements for product B.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| **High** | **Medium** | **Low** | **High** | **Medium** | **Low** |
|  | The user can import an algorithm he wants to analyze. |  |  |  |  |  |  |
|  | The user can select/specify a data source for the algorithm. (it's important that the structure of the data source is the same as the one used to create the algorithm) |  |  |  |  |  |  |
|  | The application runs locally (without any network connection). |  |  |  |  |  |  |
|  | The user can select/specify a dump target which is used to dump algorithm-specific data (for instance, for pre-processing). |  |  |  |  |  |  |
|  | The user can save the algorithm analysis results. |  |  |  |  |  |  |
|  | The user can load and view previous algorithm analysis results. |  |  |  |  |  |  |
|  | If an algorithm is selected, a data source is specified and no analysis is running (see b8), the user can run an analysis of the algorithm. |  |  |  |  |  |  |
|  | The user can kill the analysis process at any given time. |  |  |  |  |  |  |
|  | The user can see the analysis' progress. |  |  |  |  |  |  |
|  | The user can run one analysis at a time. (heavy cpu load) |  |  |  |  |  |  |
|  | The application should be horizontally scalable in such a way that more visuals can be included for the analysis. (GUI tab control so more viewpoints of the analysis can be supported?) |  |  |  |  |  |  |
|  | The result of the analysis shows the execution time of the algorithm. (ticking clock when analysis starts and ends?, optional?) |  |  |  |  |  |  |
|  | The result of the analysis shows the cpu cost per line in the algorithm. (optional?) |  |  |  |  |  |  |
|  | The result of the analysis shows the memory cost per line in the algorithm. (optional?) |  |  |  |  |  |  |
|  | The result of the analysis shows the predictions. (predicted skills per profile, in a simple table) |  |  |  |  |  |  |
|  | The result of the analysis shows the certainty score per prediction. (predicted skill per profile, all skills per profile, certainty bar graph per profile?, overall certainty bar graph?, can be sorted) |  |  |  |  |  |  |
|  | The result of the analysis shows information about the algorithm's code structure (lines of code, comments, statements, classes, cyclomatic complexity) (optional?) |  |  |  |  |  |  |
|  | When the analysis is done, the user can search for the analysis results for a particular profile. |  |  |  |  |  |  |
|  | When viewing the analysis results of a particular profile, the user can search for a particular prediction (predicted skill / owned skill). |  |  |  |  |  |  |
|  | When an analysis is running, the user can't do any actions apart from killing the analysis process. (to save cpu load) |  |  |  |  |  |  |

## Overall product description

Product B2 is a stand-alone algorithm analysis tool. With this tool, users can import algorithms they want to analyze.

## Features

ADD REFERENCE PER REQUIREMENT

### Select algorithm

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The user can select an algorithm he wants to analyze. |  |  |  |  |  |  |

The user should be able to select all kinds of algorithms he wants to analyze. *However, the algorithm must have a certain structure for it to be able to be analyzed.*

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The application has a UI element that allows the user to select an algorithm when it's triggered. |  |  |  |  |  |  |
|  | The application offers a means for the user to select an algorithm. |  |  |  |  |  |  |
|  | The application offers a means for the user to the cancel the selection of an algorithm. |  |  |  |  |  |  |
|  | The application shows the selected algorithm on the UI. |  |  |  |  |  |  |
|  | The application warns the user if he wants to select a new algorithm if an algorithm has already been selected. |  |  |  |  |  |  |

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | Only one algorithm can be selected at a time. |  |  |  |  |  |  |

#### User actions

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Selecting an algorithm to analyze. |
| **Description** | 1. The user triggers an UI element to indicate he wants to select an algorithm to analyze. 2. The application shows a means for the user to select an algorithm. [1] 3. The user selects an algorithm. [2] 4. The application closes the means for the user to select an algorithm. 5. The application shows the selected algorithm on the UI. |
| **Exceptions** | [1] If an algorithm has already been selected, the application shows a warning message saying that an algorithm has already been selected. The user can indicate if he wants to proceed or cancel the selection. If the user chooses to cancel the selection, the use case ends right then.  [2] The user is also able to cancel the selection of an algorithm. If the user cancels the selection, the use case ends right then. |
| **Result** | An algorithm has been selected to be analyzed. |

### Specify/select data source for the algorithm

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The user can specify/select a data source for the algorithm. |  |  |  |  |  |  |

The algorithm will need some data so it can be executed and analyzed. The user can specify a data source (e.g. a local database connection) or select a data source (e.g. a file). It's important that the structure of the data source is the same as the one used to create the algorithm. The application needs to check if a connection can be made to the data source.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The application has an UI element that allows the user to select a data source when it's triggered. |  |  |  |  |  |  |
|  | The application offers a means for the user to select a data source. |  |  |  |  |  |  |
|  | The application offers a means for the user to cancel the selection of a data source. |  |  |  |  |  |  |
|  | The application has an UI element that allows the user to specify a data source when it's triggered. |  |  |  |  |  |  |
|  | The application offers a means for the user to specify a data source. |  |  |  |  |  |  |
|  | The application offers a means for the user to cancel the specification of a data source. |  |  |  |  |  |  |
|  | The application shows the selected/specified data source on the UI. |  |  |  |  |  |  |
|  | The application writes the data from the data source to the dump target if no data from that data source is found in the dump target (see requirement [a8](#a8)). |  |  |  |  |  |  |
|  | The application checks if a connection can be made to the data source. |  |  |  |  |  |  |

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | A data source can either be selected or specified. A newly selected or specified data source will overwrite the previously selected or specified data source. |  |  |  |  |  |  |
|  | A data source can only be selected or specified if an algorithm has been selected. |  |  |  |  |  |  |
|  | A data source can only be selected or specified if a dump target has been specified (see requirement [a8](#a8)). |  |  |  |  |  |  |
|  | If a data source has already been selected or specified and an error occurs when the user tries to select or specify a new data source, the old data source will continue being used as the data source. |  |  |  |  |  |  |

#### User actions

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Selecting a data source for the algorithm. |
| **Description** | 1. The user triggers an UI element to indicate he wants to select a data source for the algorithm. 2. The application shows a means for the user to select a data source. [1] 3. The user selects a data source. [2] 4. The application closes the means for the user to select a data source. 5. The application checks and notifies the user if any data from the selected data source has ever been written to the dump target. 6. The application writes the data from the data source to the dump target (refer to requirement [a9](#a9)). 7. The application saves the selected data source as the current data source. 8. The application shows the selected data source on the UI. |
| **Exceptions** | [1] If a data source has already been selected or specified, the application shows a warning message saying that an algorithm has already been selected or specified. The user can indicate if he wants to proceed or cancel the selection. If the user chooses to cancel the selection, the use case ends right then.  [2] The user is also able to cancel the selection of a data source. If the user cancels the selection, the use case ends right then. |
| **Result** | A data source for the algorithm has been selected. |

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Specifying a data source for the algorithm. |
| **Description** | 1. The user triggers an UI element to indicate he wants to specify a data source for the algorithm. 2. The application shows a means for the user to specify a data source. [1] 3. The user specifies a data source. [2] 4. The user starts a connection test to validate if a connection can be made with the specified data source (refer to requirement ). 5. The application closes the means for the user to specify a data source. 6. The application checks and notifies the user if any data from the selected data source has ever been written to the dump target. 7. The application writes the data from the data source to the dump target (refer to requirement [a9](#a9)). 8. The application saves the specified data source as the current data source. 9. The application shows the specified data source on the UI. |
| **Exceptions** | [1] If a data source has already been selected or specified, the application shows a warning message saying that an algorithm has already been selected or specified. The user can indicate if he wants to proceed or cancel the specification. If the user chooses to cancel the specification, the use case ends right then.  [2] The user is also able to cancel the specification of a data source. If the user cancels the specification, the use case ends right then. |
| **Result** | A data source for the algorithm has been specified. |

### Specify dump target

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The user can specify a dump target which is used to dump both the outputs of the algorithm as well as the result of an analysis. |  |  |  |  |  |  |

The dump target will likely be a locally installed MongoDB which is highly effective when dealing with large amounts of data. All the output data (pre-processed data, predictions, certainty scores, etc.) of the algorithm will be written to this dump target for future reference. The result of the algorithm analysis will also be written to this dump target for future reference.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The application has an UI element that offers the user to specify a dump target when it's triggered. |  |  |  |  |  |  |
|  | The application offers a means for the user to specify a dump target. |  |  |  |  |  |  |
|  | The application offers a means for the user to cancel the specification of a dump target. |  |  |  |  |  |  |
|  | If a dump target has been specified before, the information of this dump target will appear which can be modified by the user. |  |  |  |  |  |  |

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Specifying a dump target. |
| **Description** | 1. The user triggers an UI element to indicate he wants to specify the dump target. 2. The application shows a means for the user to specify the dump target. [1] 3. The user specifies the dump target. [2] 4. The application closes the means for the user to specify the dump target. 5. The application saves the specified dump target. 6. The application shows the specified data source on the UI. |
| **Exceptions** | [1] If a dump target has been specified before, the information for this dump target will appear which can be modified by the user.  [2] The user is also able to cancel the specification of the dump target. If the user cancels the specification, the use case ends right then. |
| **Result** | A data source for the algorithm has been specified. |

### Write data from data source to dump target

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The application writes the data from the data source to the dump target so it can be used by the algorithm. |  |  |  |  |  |  |

The dump target will likely be a locally installed MongoDB which is highly effective when dealing with large amounts of data. The data from the data source will be written to this dump target so that only one connection to a external source has to be open when executing the algorithm.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Writing the data from the data source to the dump target. |
| **Description** | 1. The application queries the user if he wants the application to write the data from the selected data source to the dump target. 2. The user accepts. [1] 3. The application writes the data from the data source to the dump target. [2] |
| **Exceptions** | [1] The user declines. The use case ends right then.  [2] An error occurs because the data source contains errors. The application lets the user know about this error, and the use case ends right then. |
| **Result** | The data from the data source has been written to the dump target. |

### Validate specified data source connection

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The user can test a specified data source connection for validation. |  |  |  |  |  |  |

The user can specify a data source connection (see requirement [a7](#a7)). The user must test if a connection can be made to his specified data source to determine if the specified connection is valid.

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The application has an UI element that offers the user to test the specified data source connection when it's triggered. |  |  |  |  |  |  |
|  | The application tests if a connection can be made to the specified data source. |  |  |  |  |  |  |
|  | The specified data source connection is deemed to be valid if a connection could be made to it in 10 seconds. |  |  |  |  |  |  |

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | The connection to the specified data source can only be tested if all fields for the specification of the data source are specified. |  |  |  |  |  |  |

#### User actions

|  |  |
| --- | --- |
| **ID** |  |
| **Name** | Validating a specified data source connection. |
| **Description** | 1. The user triggers an UI element to indicate he wants to test if a connection can be made to the specified data source. 2. The system creates a connection to the specified data source. [1] 3. The system deems the connection to be valid. |
| **Exceptions** | [1] The system can't create a connection to the specified data source. The system deems the connection to be invalid. The use case ends right then. |
| **Result** | The data from the data source has been written to the dump target. |

### Feature 2

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

(...)

### Feature 2

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

(...)

### Feature 2

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

(...)

### Feature 2

#### Description and priority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Requirement description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Functions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Function description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### Rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  |  |  |  |  |  |  |  |

(...)

#### User actions

(...)

## Global rules

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Rule description** | **Urgency** | | | **Importance** | | |
| [**H**](#H) | [**M**](#M) | [**L**](#L) | [**H**](#H) | [**M**](#M) | [**L**](#L) |
|  | When an analysis is running, the user can't do any actions apart from killing the analysis process. |  |  |  |  |  |  |

# Non-functional requirements

## Performance requirements

(...)

## Safety requirements

(...)

## Security requirements

(...)

## Software quality attributes

(...)

## Business rules

(...)

# User interface wireframes

(GUI sketches of product B2)