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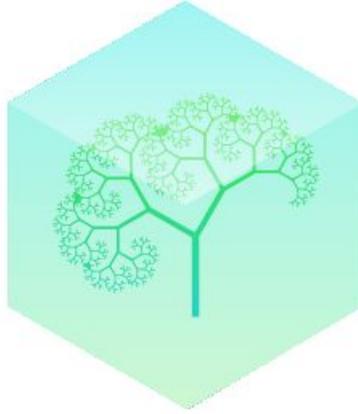
Vitriol

Software Test Document
GROUP MALLORN

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1   Introduction

1.1   Document overview

This document is the software test description of the Vitriol software development project. It contains the description of tests list in software test plan. These tests are executed during integration and verification phases:

- Software Integration tests,
- Software Verification tests.

1.2   Abbreviations and Glossary

1.2.1   Abbreviations

1.2.2   Glossary

1.3   References

2   Tests   preparations

This section contains tasks and recommendations before executing tests.

2.1   Choose sub-section name

2.1.1   Hardware preparation

2.1.2   Software preparation

2.1.3   Other test preparation

2.1.4 Safety, security and privacy precautions

3 Tests descriptions

3.1 Choose sub-section name

Test ID	T-00	
Test description	Data understanding module analysis	
Initial Conditions	A database and a table is connected to the Vitriol and a task is started	
Tests inputs	N/A	
Tests outputs	Variables describing the properties of the dataset is calculated such as is_dense, is_continuos etc.	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	Values of mentioned variables are calculated	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the	Values should be coherent with

	execution reaches data understanding module procedure call, observe the values of the calculated variables.	data column structures

Test ID	T-01	
Test description	Dropping special data columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table with at least one special data column	
Tests outputs	A database table with dropped special data column	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The columns of the table consists of special data such as ID, name, address are removed from the dataset	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started

2	In debugging mode, when the execution reaches, observe the columns of the dataset and compare them with the known special data columns.	The columns which consists of special data should be removed.

Test ID	T-02	
Test description	Drop operation on sparse columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table with at least one sparse (has more than 85% empty cells) data column	
Tests outputs	A database table with dropped sparse columns	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The columns of the table consists of sparse data (has more than 85% empty cells) removed from the dataset	
Test procedure		

Step number	Operator actions	Expected result & Eval. crit.
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the columns of the dataset and compare them with the known sparse data columns.	The columns which consists of sparse data should be removed.

Test ID	T-03	
Test description	Drop operation on sparse rows	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table with at least one sparse (has more than 85% empty cells) data row	
Tests outputs	A database table with dropped sparse rows	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The rows of the table consists of	

	sparse data (has more than 85% empty cells) removed from the dataset	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the rows of the dataset and compare them with the known sparse data rows.	The rows which consists of sparse data should be removed.

Test ID	**T-04**	
Test description	Converting string typed columns to numeric representation	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table with at least one string type column	
Tests outputs	A database table with converted string type columns to numeric type	

Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The columns of the table consists of string type converted to numeric type	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the columns of the dataset with string type and compare them with the known result.	The rows which consists of string type data should be removed.

Test ID	**T-05**	
Test description	Implement statistical imputation methods on continuous columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	

Tests inputs	A database table that has at least one continuous data column with at least one empty cell	
Tests outputs	A database table whose continuous columns filled with related column's mean value	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The continuous columns of the table that contain empty cell/s filled with the mean value of that column	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the continuous columns of the dataset with empty cell/s and compare them with the result.	The continuous columns which contains of empty cell/s should be filled with related column's mean value.
3		

Test ID	T-06	
Test description	Implement statistical imputation methods on categorical columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table that has at least one categorical data column with at least one empty cell	
Tests outputs	A database table whose categorical columns filled with related column's most frequent value	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The categorical columns of the table that contain empty cell/s filled with the most frequent value of that column	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the categorical columns of the	The categorical columns which contains of empty cell/s should be filled with related column's

	dataset with empty cell/s and compare them with the result.	most frequent value.

Test ID	**T-07**	
Test description	Implement machine learning based imputation methods on continuous columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table that has at least one continuous data column with at least one empty cell	
Tests outputs	A database table whose continuous columns filled with regression algorithms (linear regression, gradient boosting regression, decision tree regression)	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	

Expected results and criteria	The continuous columns of the table that contain empty cell/s filled with the MLlib regression algorithms	

Test procedure

Step number	Operator actions	Expected result & Eval. crit.
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the continuous columns of the dataset with empty cell/s and compare them with the result.	The continuous columns which contains empty cell/s should be filled with one of the MLlib regression algorithms.

Test ID	**T-08**	
Test description	Implement machine learning based imputation methods on categorical columns	
Initial Conditions	Vitriol is started, a database and a table is provided and a task is started	
Tests inputs	A database table that has at least one categorical data column with at least one empty cell	
Tests outputs	A database table whose categorical columns filled with	

	classification algorithms (logistic regression, gradient boosting classification, naive bayes)	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	The categorical columns of the table that contain empty cell/s filled with the MLlib classification algorithms	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure a table is connected to Vitriol and a task is started	Vitriol shows the task is started
2	In debugging mode, when the execution reaches, observe the categorical columns of the dataset with empty cell/s and compare them with the result.	The categorical columns which contains empty cell/s should be filled with one of the MLlib classification algorithms.
3		

Test ID	T-09	
Test description	Notification mechanism	
Initial Conditions	Vitriol is started	
Tests inputs	At least one notify database table with a false condition	
Tests outputs	In the web side notification mechanism alert and shows the unread messages.	
Assumptions & Constraints	N/A	
Expected results and criteria	Messages will be shown in notification bar.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure user login to system and messages are written to the database	Profile page will be shown automatically
2	In debugging mode, when the any messages are written to the database observe de notification alert in the notify bar.	Messages are will be shown in the notification bar

Test ID	T-10	
Test description	Connection of the new database methods	

Initial Conditions	Vitriol is started and user fill the necessary informations.	
Tests inputs	A database that has ip number,name,database type and user name.	
Tests outputs	Selected table will be copy to the Vitriol server.	
Assumptions & Constraints	User has the at least databse ip number,name type and user name before connecting to the system.	
Expected results and criteria	Selected table will be copied to the Vitriol servers.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure user login to system and filled the connect new database informations.	Pop-up diagram will be opened and the inform the user about process
2	In debugging mode,connect new database task is processed observe the tables with remote database and Vitriol server.	Selected table will be copied to the Vitriol servers.
3		

Test ID	T-11	
Test description	Random model generator implementation to show the existence and usability of new ML algorithms.	
Initial Conditions	Vitriol is started and a database with a proper table is connected.	
Tests inputs	N/A	
Tests outputs	A produced machine learning model	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	A random machine learning model is generated which is ready to run	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Call generate_random_model method	Procedure finishes without an exception
2	Train the model with a sample dataset to test its usability	Models trains without an exception

Test ID	T-12	
Test description	Analysis results of a learning problem for meta-learning module.	
Initial Conditions	Vitriol is started and a proper dataset is provided to the system.	
Tests inputs	N/A	
Tests outputs	Analysis results are stored in variables describing the problem	
Assumptions & Constraints	The dataset is not empty.	
Expected results and criteria	All the metrics defining the problem are calculated.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Run Vitriol with a new learning task after connecting a table.	A new learning task is in progress.
2	In debugging mode, observe the values of the analysis variables and check.	All values relevant to the problem type are computed correctly.

Test ID	T-13	
Test description	Evaluation results of a learning model for meta-learning module.	
Initial Conditions	Vitriol is started and a machine learning model is generated.	
Tests inputs	A generated machine learning model and a dataset to train.	
Tests outputs	Evaluation result depending on the type of the problem; classification or regression.	
Assumptions & Constraints	A model is generated and a non-empty train-test dataset is provided.	
Expected results and criteria	Model trains with the data without an exception and the evaluation metric values are calculated correctly.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	In debugging mode generate a random model and call evaluation procedure.	Model is generated and trained. Evaluation method gives the metrics values.
2	Check evaluation results for unreasonable and invalid values.	All values are within the expected range.

Test ID	T-14	
Test description	Session time logs are compared with real values.	
Initial Conditions	Vitriol is started	
Tests inputs	Real time values of the user's	
Tests outputs	N/A	
Assumptions & Constraints	User should login to the system	
Expected results and criteria	Usage history of the user	
Test procedure		
Step number	Operator actions	Expected result & Eval. crit.
1	Make sure the user has successfully login to the system	Profile page will be shown
2	Check calculated times with the Vitriol time	Local time and Vitriol time will be same as calcualted.

Test ID	T-15	
Test description	Statistics results from database.	
Initial Conditions	Vitriol is started and a proper dataset is provided to the system.	
Tests inputs	A dataset that numerical values	
Tests outputs	Mean,median,mode,number of rows etc.	
Assumptions & Constraints	Numerical dataset will be provided	
Expected results and criteria	Statistics of the dataset will be shown to the user in graphical way.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure the Vitriol is started and user clicks on the display database section.	Choose table menu will be shown and Vitriol should wait the user selection.
2	In debugging mode, observe the values of the analysis variables and check.	Selected table dataset's statistics will be shown in graphical page

Test ID	T-16	
Test description	Sample table contents are checked with the real values.	
Initial Conditions	Vitriol is started and a proper dataset is provided to the system.	
Tests inputs	Sample dataset	
Tests outputs	N/A	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	Sample table will be shown to the user	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure Vitriol is started and user select the create task module.	Pop-up menu will be shown and asks the which table will be shown.
2	Make sure the valid selection.	New pop-up will show samples of the table

Test ID	T-17	
Test description	K-means clustering on the regression metadata	
Initial Conditions	System is started and provided with a table of regression metadata.	
Tests inputs	N/A	
Tests outputs	Created clusters on metadata.	
Assumptions & Constraints	Regression metadata is created correctly.	
Expected results and criteria	Regression metadata is clustered and reasonable clusters are generated.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	In debugging mode, run cluster generator procedure from metalearner.ranker	The method runs without an exception.
2	Check the centroids and members of clusters.	Centroids and memberships are valid and reasonable.

Test ID	T-18	
Test description	K-means clustering on the classification metadata	
Initial Conditions	System is started and provided with a table of classification metadata.	
Tests inputs	N/A	
Tests outputs	Created clusters on metadata.	
Assumptions & Constraints	Classification metadata is created correctly.	
Expected results and criteria	Classification metadata is clustered and reasonable clusters are generated.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	In debugging mode, run cluster generator procedure from metalearner.ranker	The method runs without an exception.
2	Check the centroids and members of clusters.	Centroids and memberships are valid and reasonable.

Test ID	T-19	
Test description	RSS services	
Initial Conditions	Vitriol is started.	
Tests inputs	N/A	
Tests outputs	Real time news about machine learning and big data	
Assumptions & Constraints	N/A	
Expected results and criteria	In profile page user can see the news about the machșne learning and big data	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure the Vitriol is started.	Profile page will be opened and RSS news shown right side of the profile page

Test ID	T-20	
Test description	Selection of most proper model for a given problem	
Initial Conditions	Vitriol is started a problem dataset is provided and a model creation task is started.	
Tests inputs	Task start command and the problem dataset.	
Tests outputs	Selected machine learning model	
Assumptions & Constraints	The dataset is not empty	
Expected results and criteria	A machine learning model which is trained on the data is generated.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Start a model generation task after connecting a dataset.	Task is started without an exception.
2	Check the model and evaluation results after the procedure finishes.	Model is generated on the data and runnable.

Test ID	T-21	
Test description	Getting tasks from website & running last added task	
Initial Conditions	Vitriol is started and create task module processed.	
Tests inputs	Sample tasks created and waited for the results.	
Tests outputs	N/A	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	Tasks finished same order as they requested.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Make sure the Vitriol is started and create task module is processed.	Requested data will be asked to the user
2	In debugging mode, wait for the finished tasks as they ordered.	Successful message will be shown to the usetr

Test ID	T-22	
Test description	Reducing high dimensional data to 2 and 3 dimensions	
Initial Conditions	Vitriol is started and a proper dataset is provided.	
Tests inputs	A dataset with a high number of dimensions.	
Tests outputs	Reduced dataset having 2 or 3 dimensions according to the task.	
Assumptions & Constraints	N/A	
Expected results and criteria	2 or 3 dimensional data reduced with t-sne algorithm.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Call tsne method with 2 or 3 target dimensions on a high dimensional dataset.	Method runs with success.
2	Check resultant dataset.	Output dataset has the desired number of columns.

Test ID	T-23	
Test description	Choosing data sector from the web	
Initial Conditions	Vitriol is started connect ne database module selected	
Tests inputs	Different type of datasets	
Tests outputs	N/A	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	Data sector will be written to the Vitriol databases and send tot machine learning side.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Connect new database module started.	User fill the necessary information
2	Compare the selected dataset type with the Vitriol database	User select type of the dataset and clicks copy button

Test ID	T-24	
Test description	Shell script	
Initial Conditions	Vitriol is started and create task module is selected.	
Tests inputs	Sample scripts that run on local	
Tests outputs	Trigger to the machine learning side.	
Assumptions & Constraints	The provided dataset is a non-empty and valid MySQL table	
Expected results and criteria	machine learning side is started to the process.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Create task module selected.	User choose type of the task
2	Shell script run on the backend and wake up to the machine learning side.	Machine learning algorithms are started to run.

Test ID	T-25	
Test description	Visualize dataset	
Initial Conditions	Vitriol is started and a proper dataset is provided.	
Tests inputs	A dataset with 2 or 3 dimensions.	
Tests outputs	Visualized dataset according to the task.	
Assumptions & Constraints	N/A	
Expected results and criteria	Visualized data distribution or created classification or clustering model.	
Test procedure		
Step number	**Operator actions**	**Expected result & Eval. crit.**
1	Call t-sne method to get 2 or 3 target dimensions on a high dimensional dataset.	Method runs with success.
2	Visualize the dataset with visualization procedure according to its type.	Specified visuals are created.