Manual V1.0

Contextproject 2015

This document is a manual for the program we developed for the context project 2015 at Delft University of Technology.

Health Informatics Group 5/E
6/25/2015

Contents

Command line interface (CLI)

The program has a command line interface (cli) as well as a graphical user interface (GUI). You can use the cli to run a script as well as to speed up the gui use.

Available commands

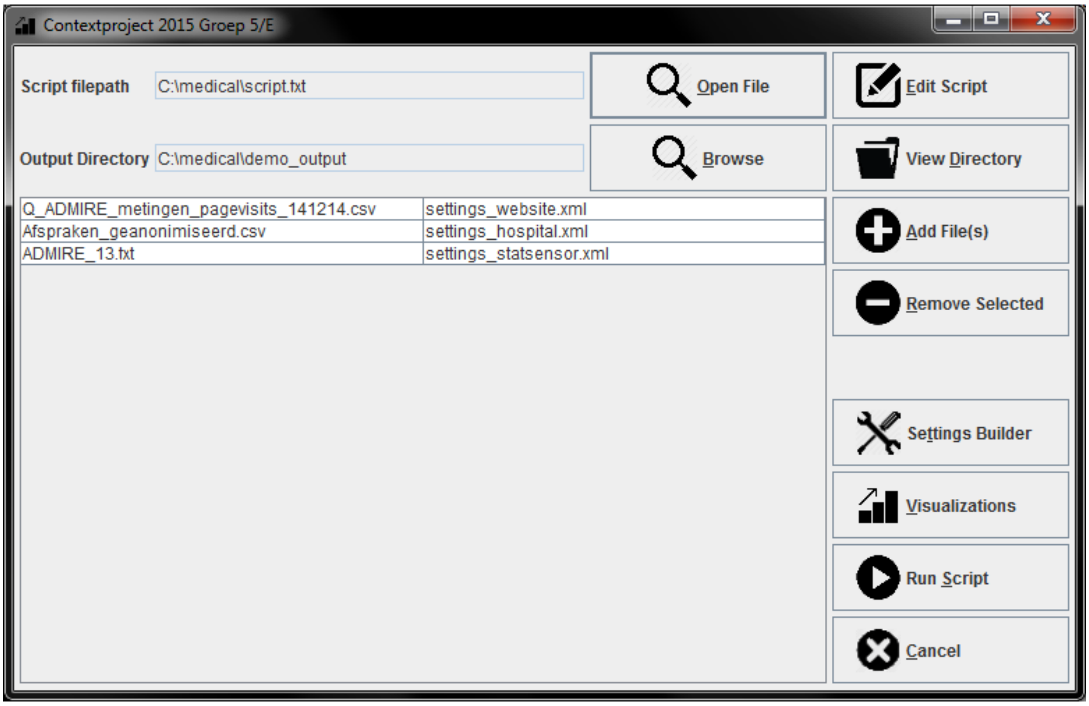
Command	Description
-f *<data file> <settings file>*	Adds a new data to the program. You can add as many files as you want.
-s *<script file>*	Specify the script file to use.
-o *<output directory>*	Specify the output directory to use. If the directory does not exist, it will be created.
-nogui	By default, the gui will show. If –nogui is specified the program will be cli only. The script will be run immediately and no gui will show.

Examples

Command

```
java -jar Contextproject2015.jar
-f "Q_ADMIRE_metingen_pagevisits_141214.csv" "settings_website.xml"
-f "Afspraken_geanonimiseerd.csv" "settings_hospital.xml"
-f "measured creatinine/ADMIRE_13.txt" "settings_statsensor.xml"
-o "demo_output" -s "script.txt"
```

Result: The GUI shows and all the passed arguments are displayed in the GUI.



Script filepath: C:\medical\script.txt

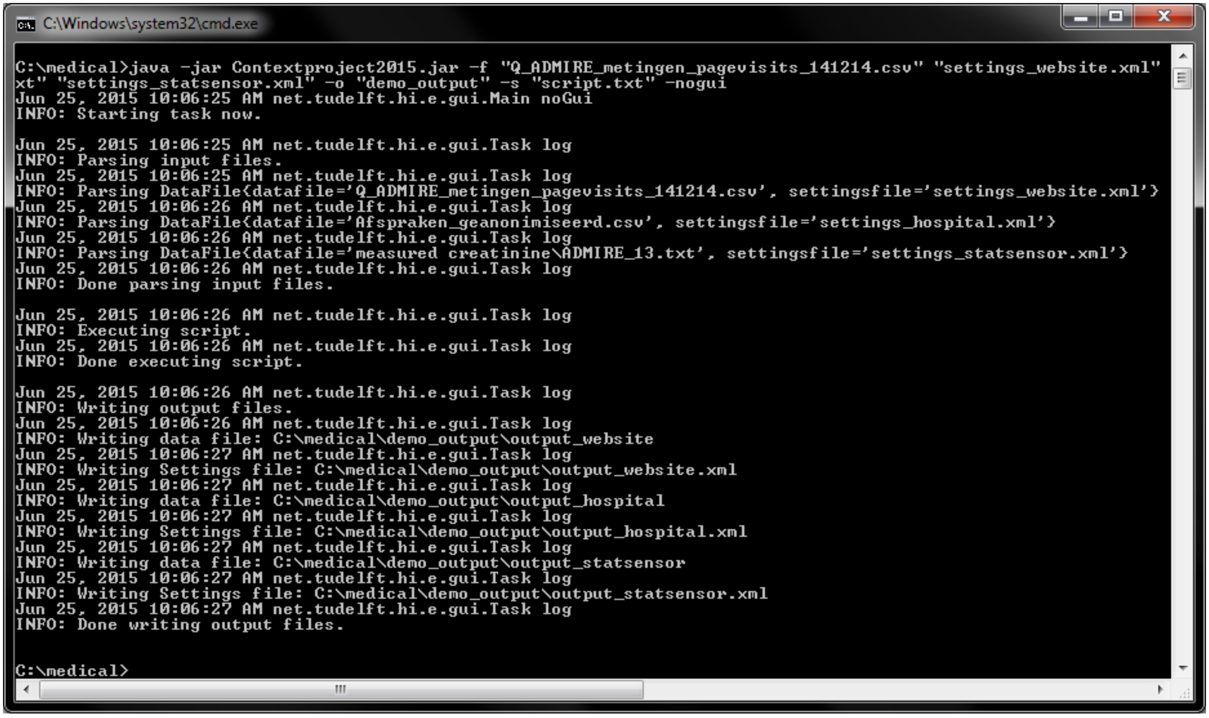
Output Directory: C:\medical\demo_output

Q_ADMIRE_metingen_pagevisits_141214.csv	settings_website.xml
Afspraken_geanonimiseerd.csv	settings_hospital.xml
ADMIRE_13.txt	settings_statsensor.xml

Command

java -jar Contextproject2015.jar
-f "Q_ADMIRE_metingen_pagevisits_141214.csv" "settings_website.xml"
-f "Afspraken_geanonimiseerd.csv" "settings_hospital.xml"
-f "measured creatinine/ADMIRE_13.txt" "settings_statsensor.xml"
-o "demo_output" -s "script.txt" –nogui

Result: The script file is executed and the log is displayed to the terminal.



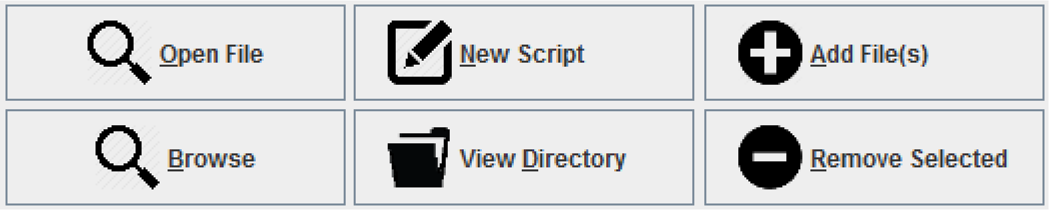
```
C:\medical>java -jar Contextproject2015.jar -f "Q_ADMIRE_metingen_pagevisits_141214.csv" "settings_website.xml"
xt" "settings_statsensor.xml" -o "demo_output" -s "script.txt" -nogui
Jun 25, 2015 10:06:25 AM net.tudelft.hi.e.gui.Main noGui
INFO: Starting task now.

Jun 25, 2015 10:06:25 AM net.tudelft.hi.e.gui.Task log
INFO: Parsing input files.
Jun 25, 2015 10:06:25 AM net.tudelft.hi.e.gui.Task log
INFO: Parsing DataFile{datafile='Q_ADMIRE_metingen_pagevisits_141214.csv', settingsfile='settings_website.xml'}
Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Parsing DataFile{datafile='Afspraken_geanonimiseerd.csv', settingsfile='settings_hospital.xml'}
Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Parsing DataFile{datafile='measured creatinine\ADMIRE_13.txt', settingsfile='settings_statsensor.xml'}
Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Done parsing input files.

Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Executing script.
Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Done executing script.

Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Writing output files.
Jun 25, 2015 10:06:26 AM net.tudelft.hi.e.gui.Task log
INFO: Writing data file: C:\medical\demo_output\output_website
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Writing Settings file: C:\medical\demo_output\output_website.xml
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Writing data file: C:\medical\demo_output\output_hospital
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Writing Settings file: C:\medical\demo_output\output_hospital.xml
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Writing data file: C:\medical\demo_output\output_statsensor
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Writing Settings file: C:\medical\demo_output\output_statsensor.xml
Jun 25, 2015 10:06:27 AM net.tudelft.hi.e.gui.Task log
INFO: Done writing output files.


C:\medical>
```

Graphical user interface (GUI)

Hotkey navigation

You can use the keyboard to quickly navigate the graphical user interface. All the buttons in our program have a unique hotkey combination to invoke the button without actually clicking it. To use the hotkeys press the 'alt' key + 'button specific' key. You can easily see what key is specific to what button. The button title has one character underlined, which indicates the specific key to invoke the button press.

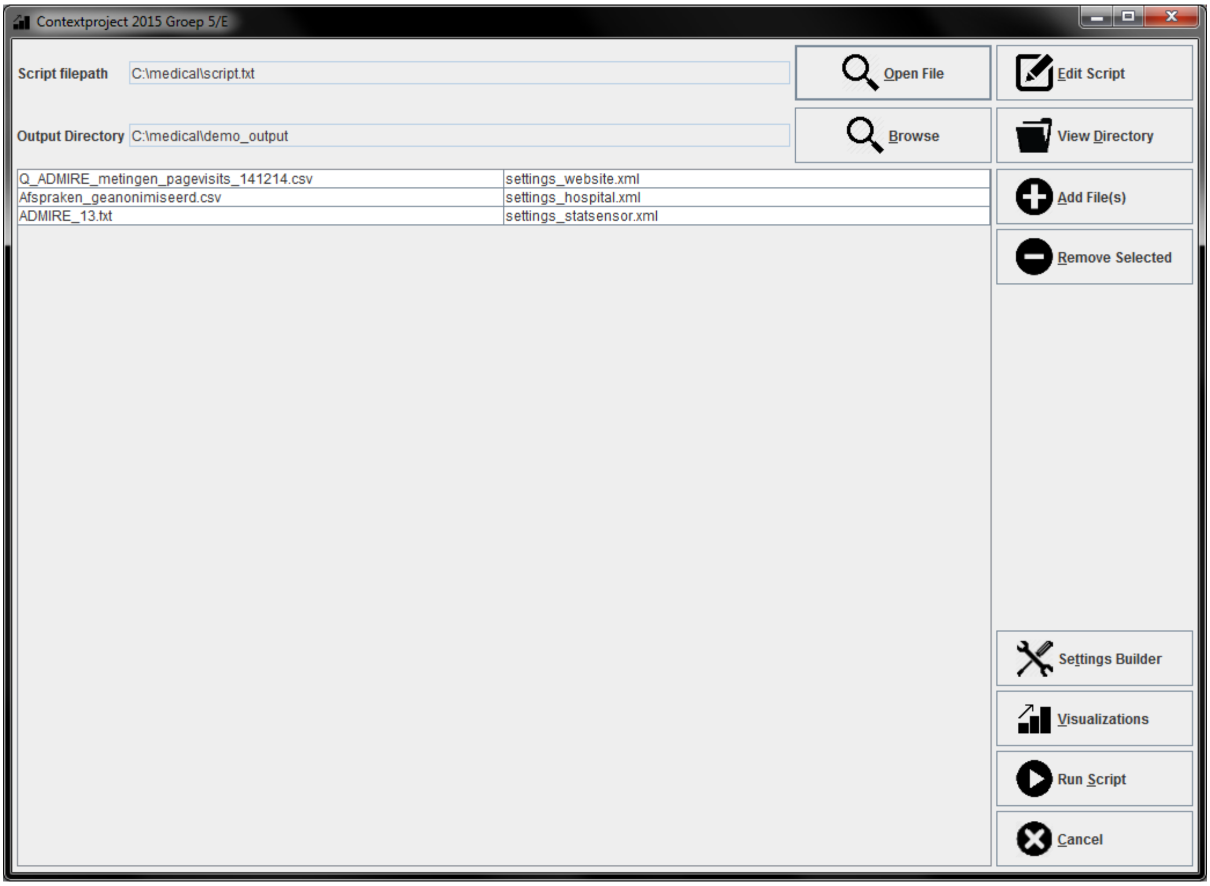
Example



Button	Key Combination
Open File	alt + o
Browse	alt + b
New Script	alt + n
View Directory	alt + d
Add File(s)	alt + a
Remove Selected	alt + r

Input Interface

When you start this program, this is the first thing you will see. Here you can import all the necessary files to start the analysis of the program.



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Script filepath C:\medical\script.txt

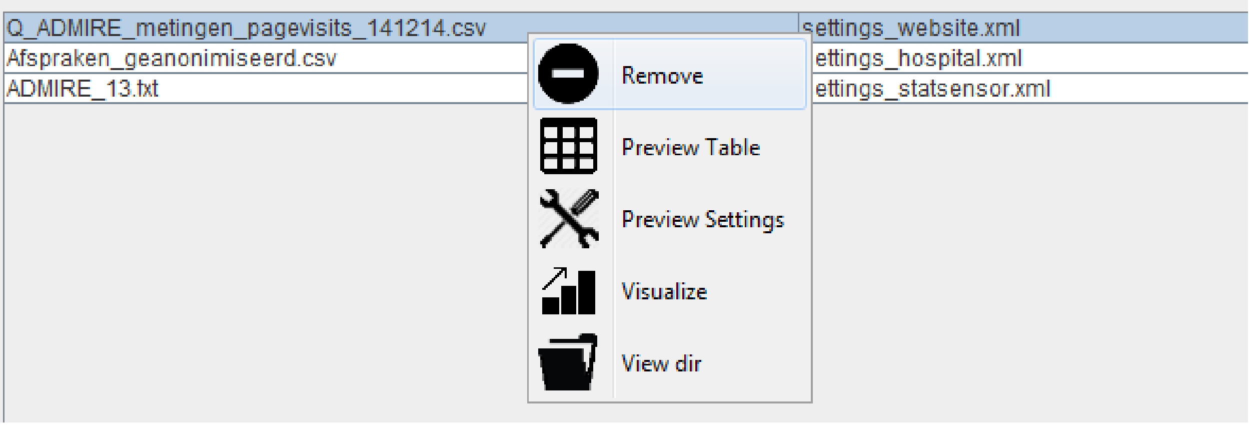
Output Directory C:\medical\demo_output

Q_ADMIRE_metingen_pagevisits_141214.csv	settings_website.xml
Afspraken_geanonimiseerd.csv	settings_hospital.xml
ADMIRE_13.txt	settings_statsensor.xml

As you can see, we can select the script file at the top of the program. After it is selected, we can edit the script by pressing the edit script button. This will open the default editor of the file specified by user's operating system.
Beneath we can select the output directory and view it if necessary. If the directory does not exist, it will be created.

In the bottom right you can jump straight to the visualizations, as well as the settings builder of the XML-files or start running your script.

The user can right click on the table of files to display a context menu. This is displayed below.

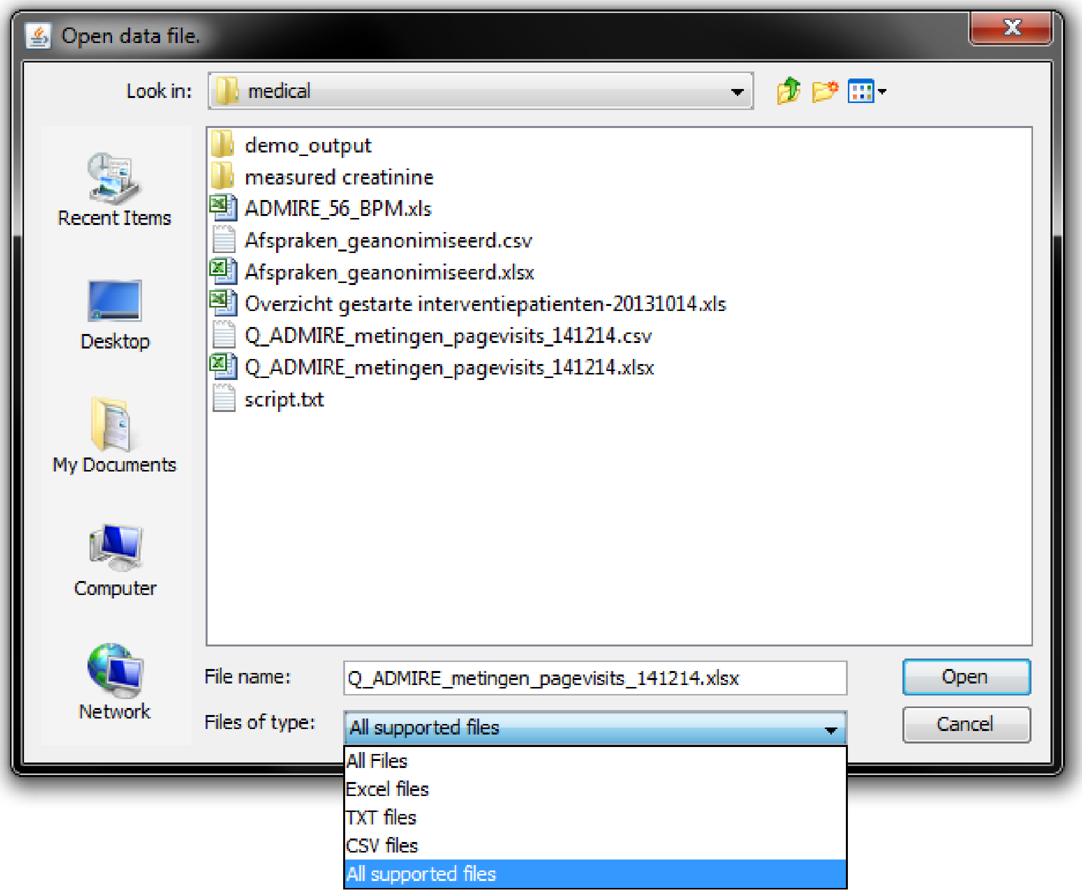


Q_ADMIRE_metingen_pagevisits_141214.csv	settings_website.xml
Afspraken_geanonimiseerd.csv	ettings_hospital.xml
ADMIRE_13.txt	ettings_statsensor.xml

Using the context menu, you can quickly do operations using that data file such as: preview the table, visualize the table.

Adding files

In the middle part of this interface, you can see the files you have selected and start adding more by pressing the “Add File(s)” button. You can import csv files, as well as excel files into this program. For each file, you will need to select a separate XML file so the program can detect all the columns and formats in the data file.



Open data file.

Look in: medical

- demo_output
- measured creatinine
- ADMIRE_56_BPM.xls
- Afspraken_geanonimiseerd.csv
- Afspraken_geanonimiseerd.xlsx
- Overzicht gestarte interventiepatienten-20131014.xls
- Q_ADMIRE_metingen_pagevisits_141214.csv
- Q_ADMIRE_metingen_pagevisits_141214.xlsx
- script.txt

File name: Q_ADMIRE_metingen_pagevisits_141214.xlsx

Files of type: All supported files

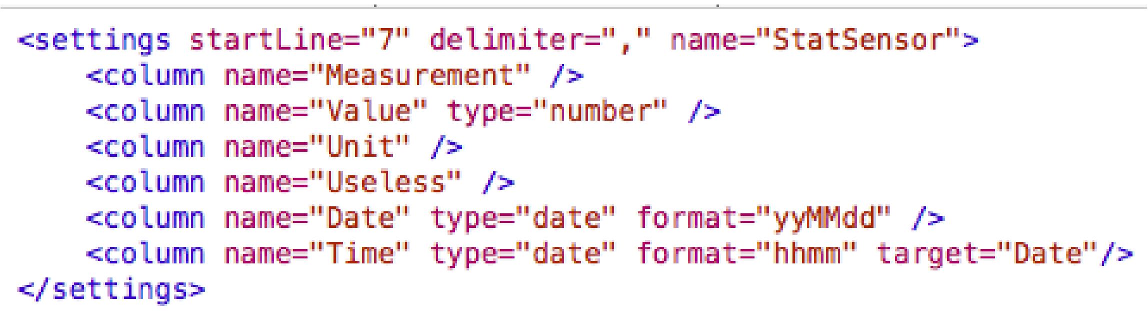
XML-file

For each data file there has to be a XML-file select so that the program can detect the column names and the format of the file.

This is what is specified in the XML-file:

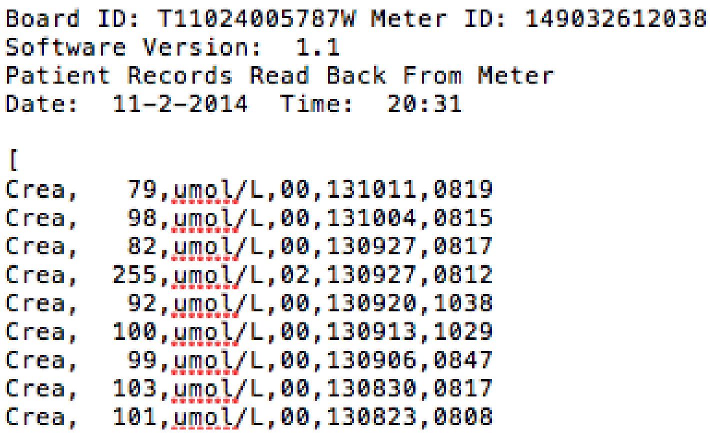
- *Name of the table*
- *Delimiter of the values*
- *Start line of the data*
- *Each column with its name and format*

Here is an example of a XML-file for the given data file:



```
<settings startLine="7" delimiter="," name="StatSensor">
    <column name="Measurement" />
    <column name="Value" type="number" />
    <column name="Unit" />
    <column name="Useless" />
    <column name="Date" type="date" format="yyMMdd" />
    <column name="Time" type="date" format="hhmm" target="Date"/>
</settings>
```

Data file:

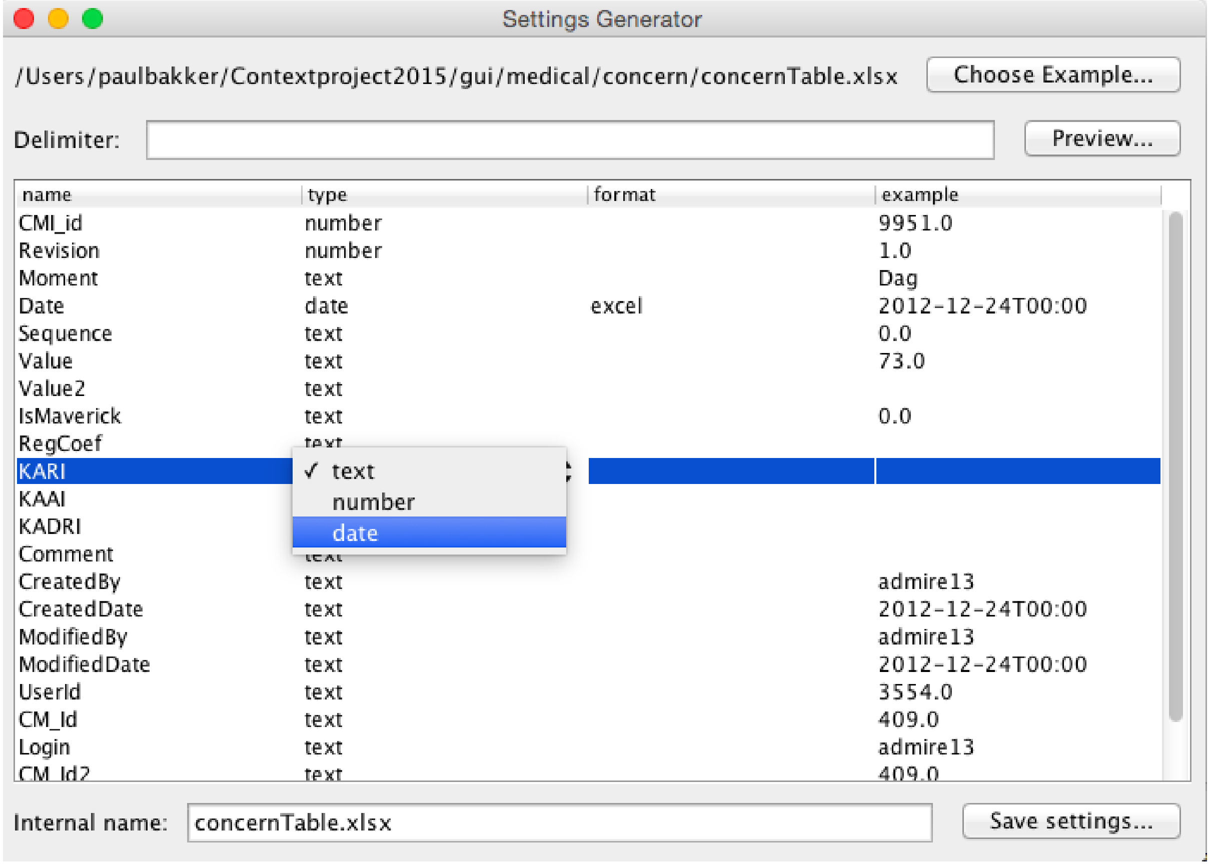


```
Board ID: T11024005787W Meter ID: 149032612038
Software Version:  1.1
Patient Records Read Back From Meter
Date:  11-2-2014  Time:  20:31

[
Crea,    79,umol/L,00,131011,0819
Crea,    98,umol/L,00,131004,0815
Crea,    82,umol/L,00,130927,0817
Crea,   255,umol/L,02,130927,0812
Crea,    92,umol/L,00,130920,1038
Crea,   100,umol/L,00,130913,1029
Crea,    99,umol/L,00,130906,0847
Crea,   103,umol/L,00,130830,0817
Crea,   101,umol/L,00,130823,0808
```

The term target is only used in the case of time. This is used to couple the date value with the time value so we can sort the created table by time.

Settings Builder

Creating a XML-file for each file you want to import can be cumbersome so we also created a Settings builder. This will create most of the XML-file automatically for the user. The user only needs to specify the delimiter and format of each column.



/Users/paulbakker/Contextproject2015/gui/medical/concern/concernTable.xlsx

Delimiter:

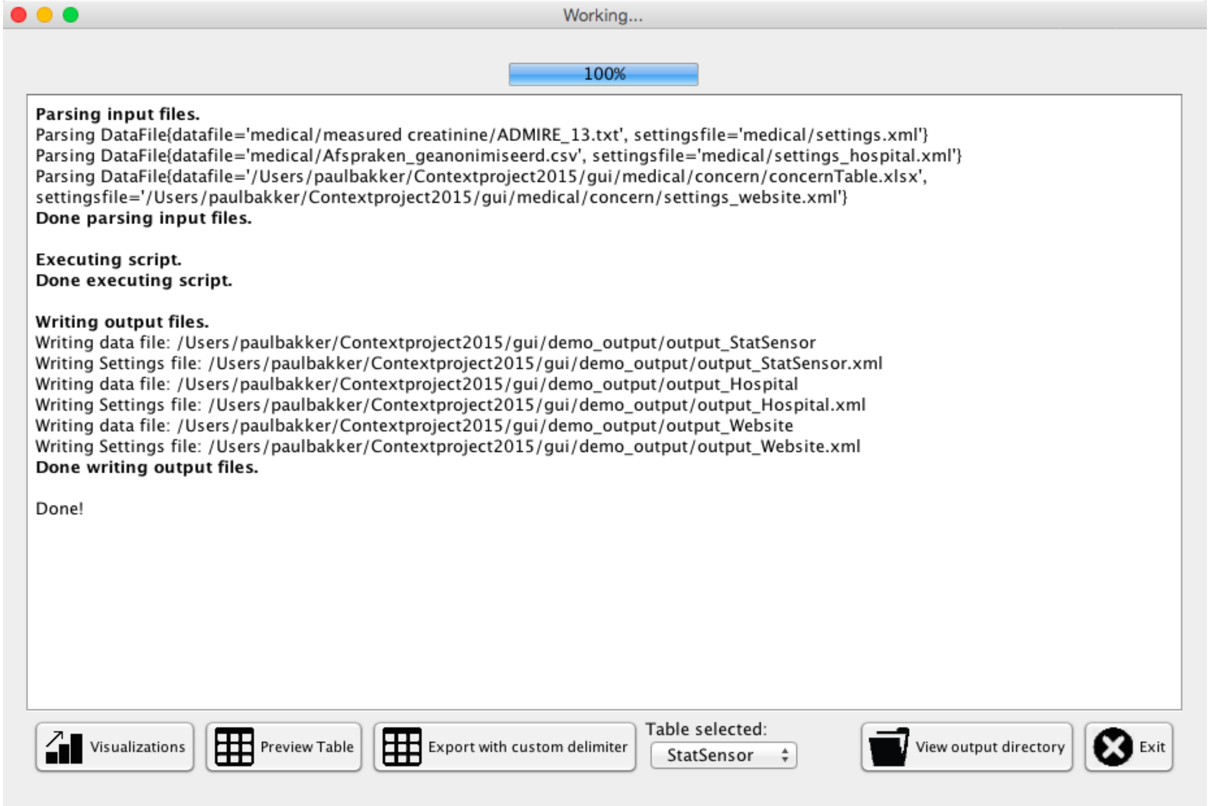
name	type	format	example
CMI_id	number		9951.0
Revision	number		1.0
Moment	text		Dag
Date	date	excel	2012-12-24T00:00
Sequence	text		0.0
Value	text		73.0
Value2	text		
IsMaverick	text		0.0
RegCoef	text		
KARI			
KAAI			
KADRI			
Comment	text		
CreatedBy	text		admire13
CreatedDate	text		2012-12-24T00:00
ModifiedBy	text		admire13
ModifiedDate	text		2012-12-24T00:00
UserId	text		3554.0
CM_Id	text		409.0
Login	text		admire13
CM_Id2	text		409.0

Internal name: concernTable.xlsx

To make importing files that were the output of a previous analysis much easier we automatically create a XML-file of the output, making using the program in rapid succession a lot faster.

Progress Interface

When the script is running, we will show what is happening in the program and give errors if something went wrong. After the script is finished this interface will also give you some option on what to do with the output.



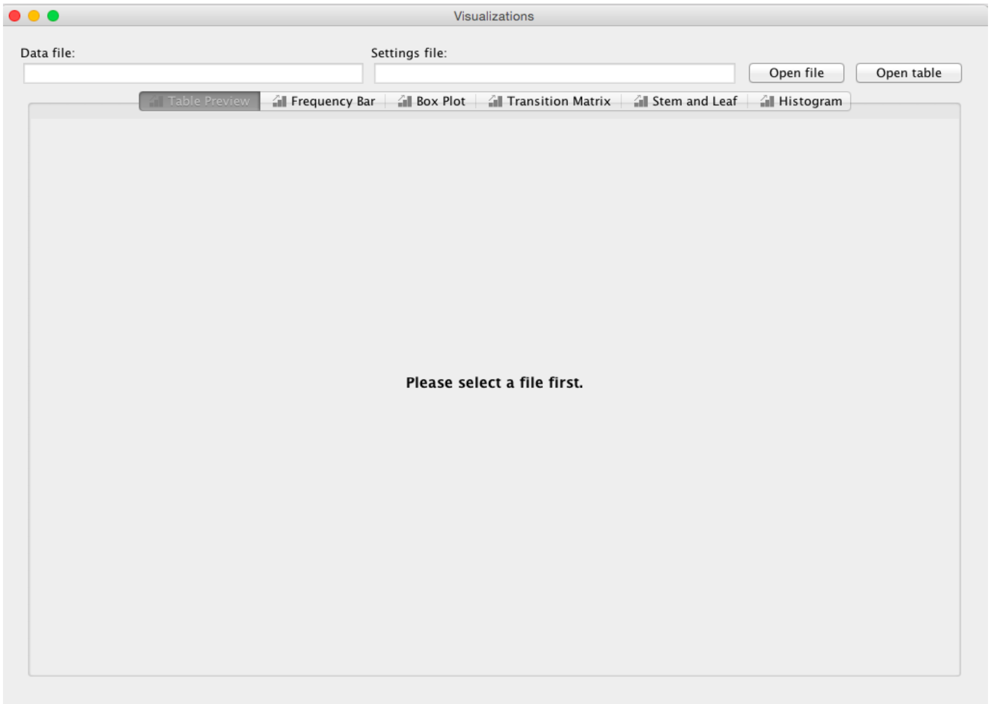
```
Parsing input files.
Parsing DataFile{datafile='medical/measured creatinine/ADMIRE_13.txt', settingsfile='medical/settings.xml'}
Parsing DataFile{datafile='medical/Afspraken_geanonimiseerd.csv', settingsfile='medical/settings_hospital.xml'}
Parsing DataFile{datafile='/Users/paulbakker/Contextproject2015/gui/medical/concern/concernTable.xlsx',
settingsfile='/Users/paulbakker/Contextproject2015/gui/medical/concern/settings_website.xml'}
Done parsing input files.

Executing script.
Done executing script.

Writing output files.
Writing data file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_StatSensor
Writing Settings file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_StatSensor.xml
Writing data file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_Hospital
Writing Settings file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_Hospital.xml
Writing data file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_Website
Writing Settings file: /Users/paulbakker/Contextproject2015/gui/demo_output/output_Website.xml
Done writing output files.

Done!
```

You can start immediately with visualizing the selected table from the output, which we will discuss in the next section of this manual. You can also preview the created table so you can see if the script worked as intended, this also shows the selected table from the output.
It is also possible to export a file again with a different delimiter. The default delimiter of this program is ';' as this is used by Excel.

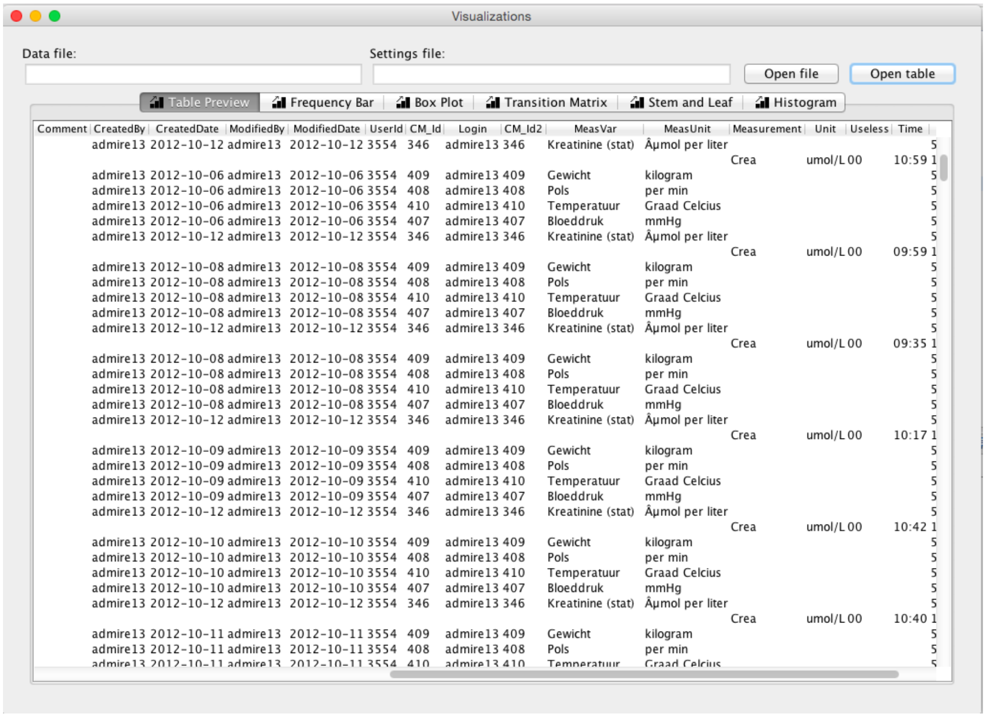
On the right side, there is a button to open the output directory where you will find the exported data files, the automatically created XML-files of those data files and serializable files of each data file. The serializable files are used for visualization, which we will discuss next.

Visualization

This program can also visualize the data before you load the newly created into an analysis program. We create a ser file separate from the other output files to feed into the visualizations. After you ran the script, you can directly jump into the visualization GUI but you can also start the visualization GUI right away and import a ser file. You can also import csv and excel files with their XML-files into the visualization GUI, but not every feature will work if you import those files instead of the ser file. We will discuss this in the separate visualizations. If you open a file, you will see the table first and can then determine what to visualize.



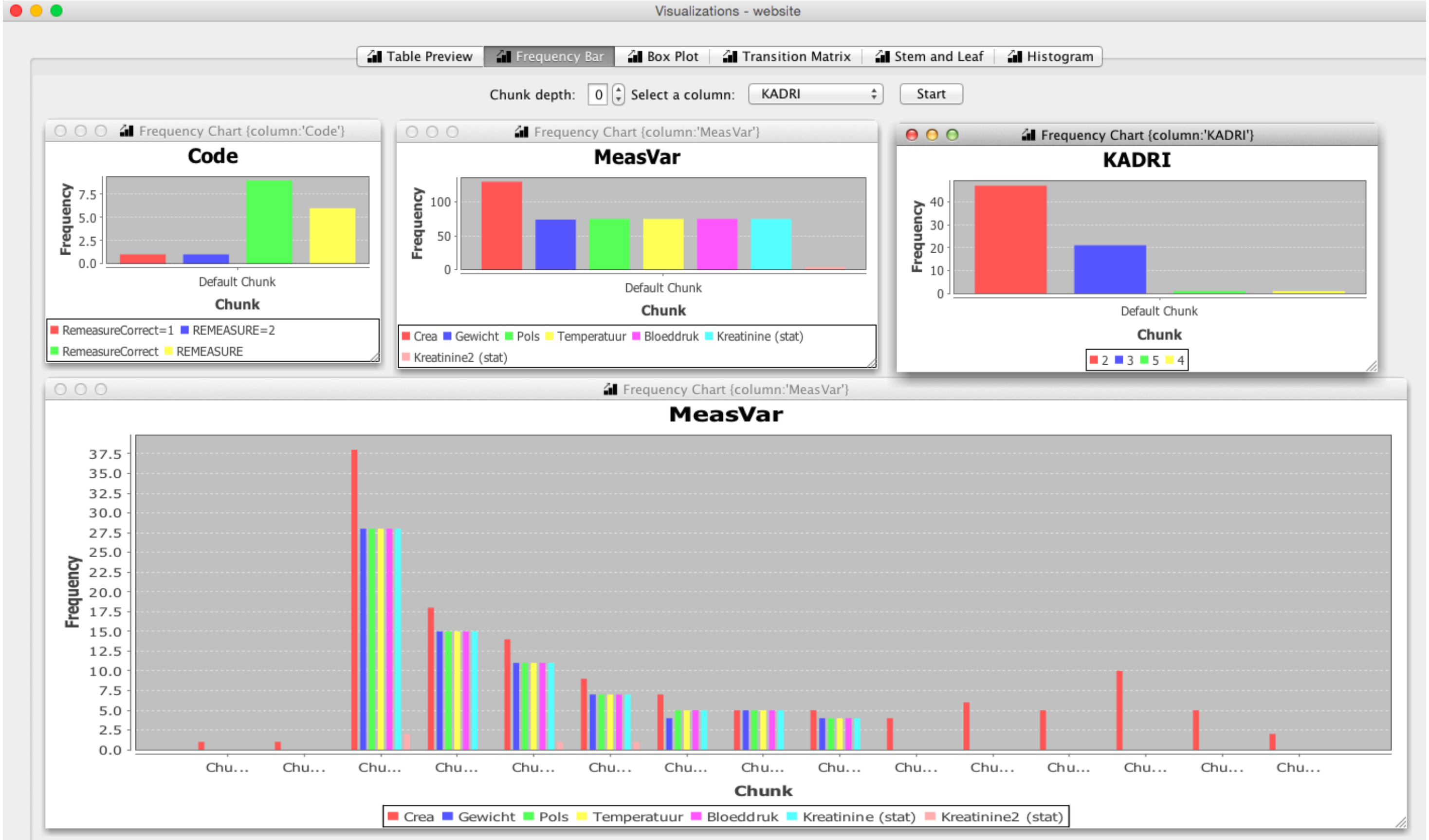
Please select a file first.



```
Comment|CreatedBy| CreatedDate |ModifiedBy|ModifiedDate |UserId|CM_Id|  Login  |CM_Id2|     MeasVar      |   MeasUnit     |Measurement| Unit   |Useless| Time
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      10:59 1
        admire13 2012-10-06 admire13  2012-10-06 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-06 admire13  2012-10-06 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-06 admire13  2012-10-06 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
        admire13 2012-10-06 admire13  2012-10-06 3554  407    admire13 407     Bloeddruk         mmHg                                           5
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      09:59 1
        admire13 2012-10-08 admire13  2012-10-08 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-08 admire13  2012-10-08 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-08 admire13  2012-10-08 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
        admire13 2012-10-08 admire13  2012-10-08 3554  407    admire13 407     Bloeddruk         mmHg                                           5
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      09:35 1
        admire13 2012-10-08 admire13  2012-10-08 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-08 admire13  2012-10-08 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-08 admire13  2012-10-08 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
        admire13 2012-10-08 admire13  2012-10-08 3554  407    admire13 407     Bloeddruk         mmHg                                           5
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      10:17 1
        admire13 2012-10-09 admire13  2012-10-09 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-09 admire13  2012-10-09 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-09 admire13  2012-10-09 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
        admire13 2012-10-09 admire13  2012-10-09 3554  407    admire13 407     Bloeddruk         mmHg                                           5
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      10:42 1
        admire13 2012-10-10 admire13  2012-10-10 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-10 admire13  2012-10-10 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-10 admire13  2012-10-10 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
        admire13 2012-10-10 admire13  2012-10-10 3554  407    admire13 407     Bloeddruk         mmHg                                           5
        admire13 2012-10-12 admire13  2012-10-12 3554  346    admire13 346     Kreatinine (stat) Âµmol per liter                                5
                                                                                                                  Crea          umol/L 00      10:40 1
        admire13 2012-10-11 admire13  2012-10-11 3554  409    admire13 409     Gewicht           kilogram                                       5
        admire13 2012-10-11 admire13  2012-10-11 3554  408    admire13 408     Pols              per min                                        5
        admire13 2012-10-11 admire13  2012-10-11 3554  410    admire13 410     Temperatuur       Graad Celcius                                  5
```

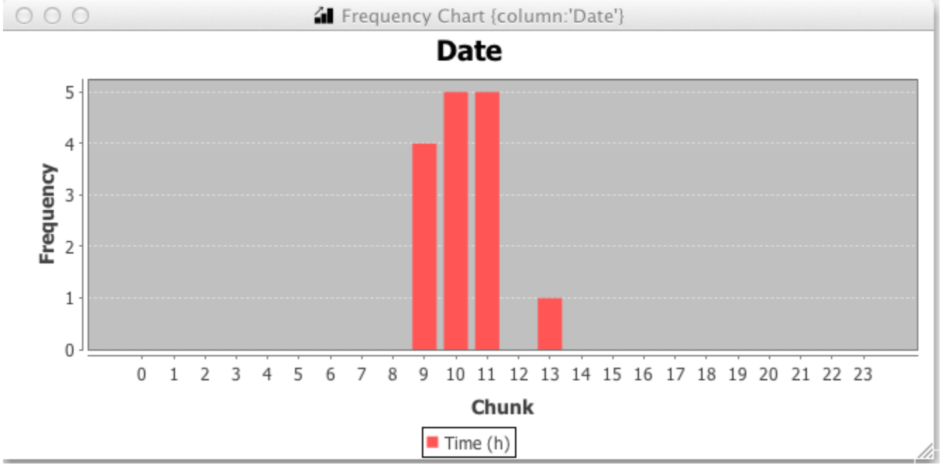
Frequency chart

First you can make a frequency chart based on each column. This can show you the frequency of the unique values in that column. If you have imported a ser file our jumped straight from the progress UI to the visualization you can also determine the frequency of values or codes per chunk. This can also be done if you have chunked more than one time with the chunk depth. Codes can be visualized with the option “*CODE*”.



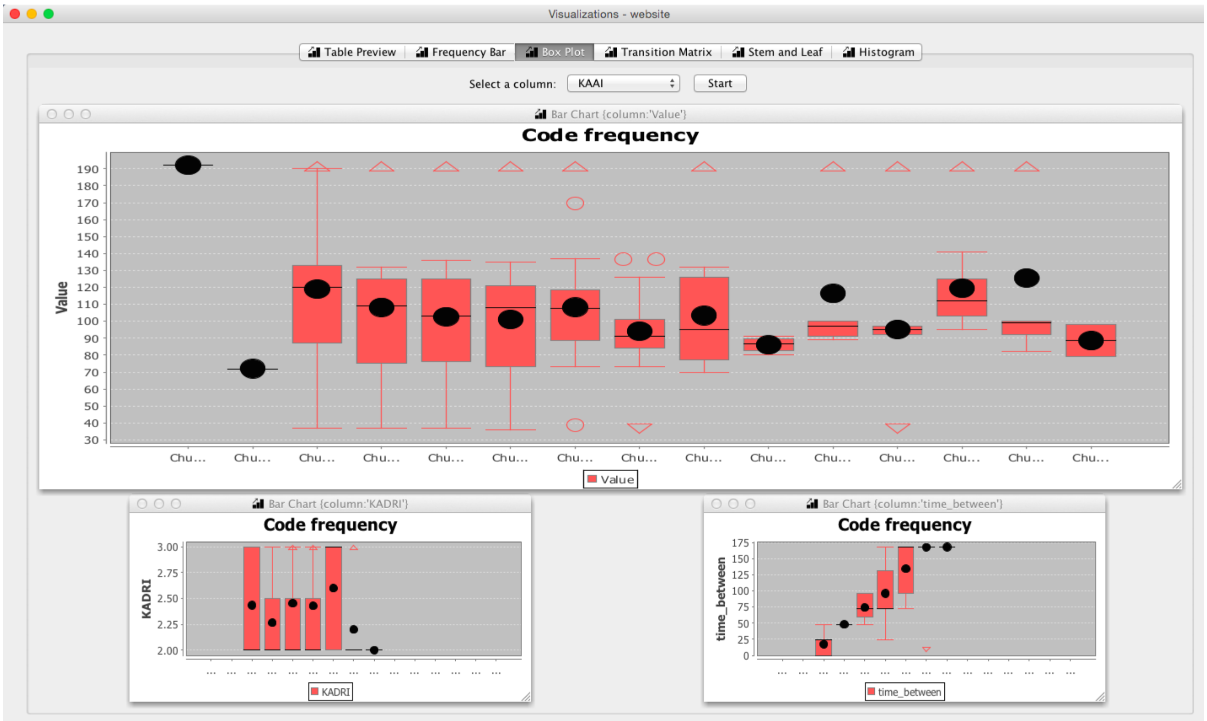
Chunk depth: 0 Select a column: KADRI

If you have a time column in your file, the frequency has also the possibility to show this without labels but with the hours as indexes as shown below:



Box Plot

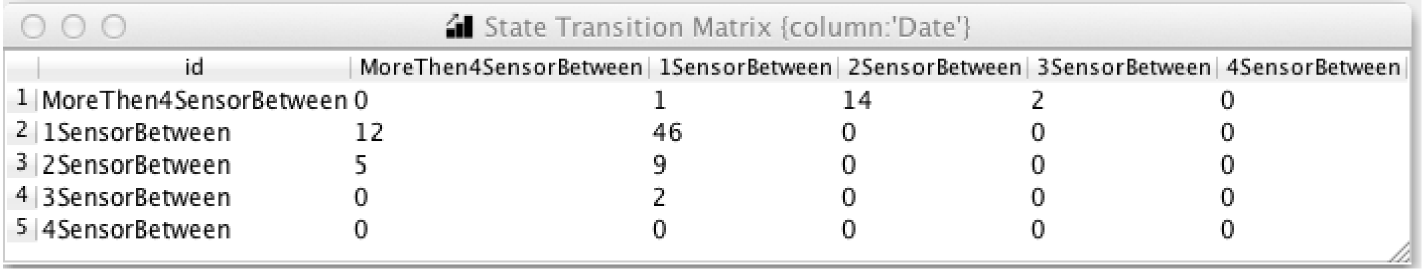
A boxplot can be made of every column in which values are only integers. The columns with strings or dates are automatically filtered out in the dropdown to avoid errors. Importing a ser file does not provide extra features in a box plot. If there are chunks in the data in the boxplot will visualize the data per chunk.



Select a column: KAAI

State Transition Diagram

If you want to determine the transitions between codes in the data, you only have to select the column on which you want to sort the data. Only columns containing dates will be visible in the dropdown to avoid errors.

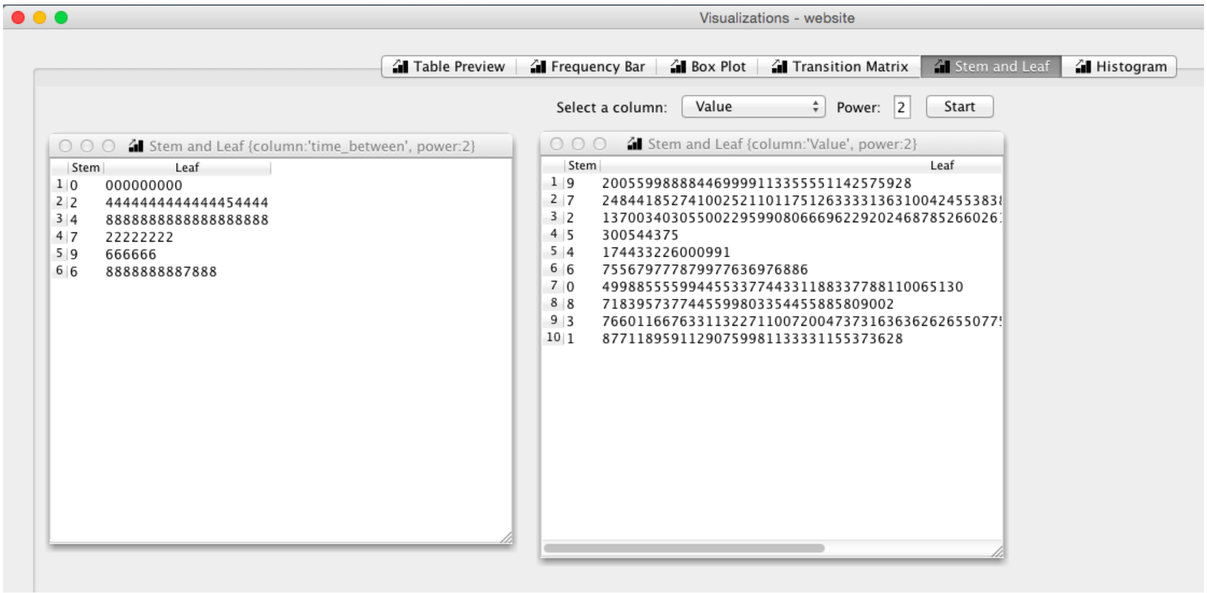


State Transition Matrix {column:'Date'}

	id	MoreThen4SensorBetween	1SensorBetween	2SensorBetween	3SensorBetween	4SensorBetween
1	MoreThen4SensorBetween	0	1	14	2	0
2	1SensorBetween	12	46	0	0	0
3	2SensorBetween	5	9	0	0	0
4	3SensorBetween	0	2	0	0	0
5	4SensorBetween	0	0	0	0	0

Stem Leaf Plot and Histogram

The final visualization is stem leaf plot and histogram. This will give an indication on what kind of range of values are in a selected column. This is only possible on column with integers and other column are filter out of the dropdown.



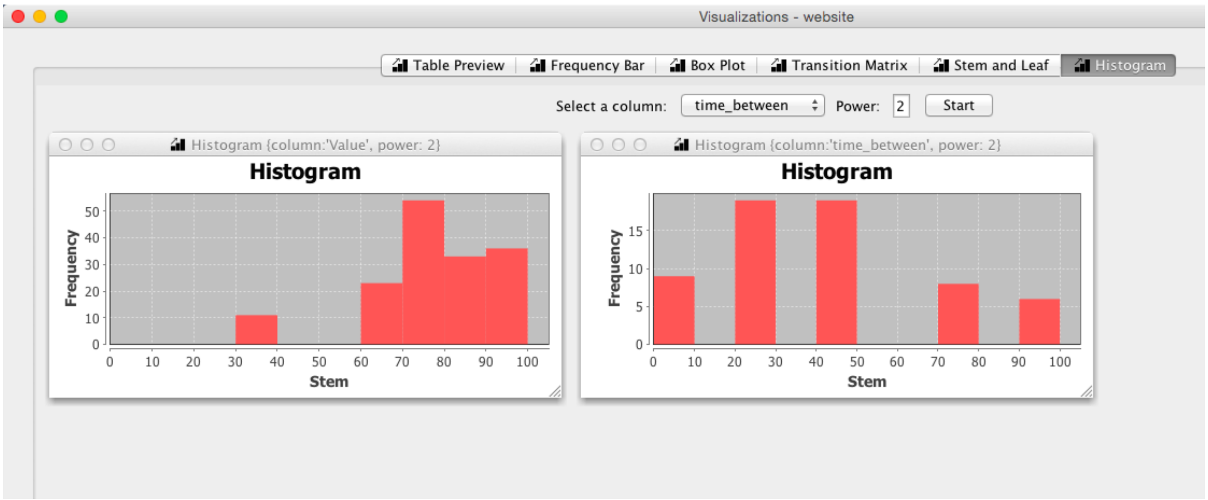
Select a column: Value Power: 2

Stem and Leaf {column:'time_between', power:2}

	Stem	Leaf
1	0	000000000
2	2	4444444444444454444
3	4	8888888888888888888
4	7	22222222
5	9	666666
6	6	8888888887888

Stem and Leaf {column:'Value', power:2}

	Stem	Leaf
1	9	200559988884469999113355551142575928
2	7	2484418527410025211011751263333136310042455383
3	2	1370034030550022959908066696229202468785266026
4	5	300544375
5	4	17443322600991
6	6	755679777879977636976886
7	0	499885555994455337744331188337788110065130
8	8	7183957377445599803354455885809002
9	3	7660116676331132271100720047373163636262655077
10	1	87711895911290759981133331155373628



Select a column: time_between Power: 2

Script

To perform analysis on the data you need to create a script. In the script, you specify what kind of operation you want to perform in a given order, so performing sequential data analysis. Here we will give some examples of each operation and the combining of operations. There is a separate document explaining the script syntax in more detail see ‘Script Syntax Definition.pdf’.

Example operations

Here we will give an example for each operation to make clear what is does:

CONSTRAINT

Table with the name website

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire14	23-06-14	164	Lopen	Crea
Admire13	25-06-14	154	Rennen	Crea
Admire15	23-06-14	163	Lopen	Crea
Admire16	23-06-14	143	Eten	Crea
Admire13	26-06-14	137	Drinken	Crea

We can filter on each column given a specific value. So if we use the following script:

CONSTAINT [website].[Login] == “Admire13”

This has as output the following table:

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire13	25-06-14	154	Rennen	Crea
Admire13	26-06-14	137	Drinken	Crea

CODE

Table with the name website

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire14	23-06-14	164	Lopen	Crea
Admire13	25-06-14	154	Rennen	Crea
Admire15	23-06-14	163	Lopen	Crea
Admire16	23-06-14	143	Eten	Crea
Admire13	26-06-14	137	Drinken	Crea
Admire13	27-06-14	133	Drinken	Crea

We can create a code for different kind of behaviors in the data. If we want to add a code to the records where the comment “Eten” is followed by “Drinken” only once.

CODE [website] ON {1 [website].[Comment] == “Eten” } {1 [website].[Comment] == “Drinken” } AS “code_eten_drinken”

This has as output:

Login	Date	Value	Comment	MeasVar	Code
Admire13	23-06-14	145	Wandelen	Crea	
Admire13	24-06-14	140	Fietsen	Crea	
Admire14	23-06-14	164	Lopen	Crea	
Admire13	25-06-14	154	Rennen	Crea	
Admire15	23-06-14	163	Lopen	Crea	
Admire16	23-06-14	143	Eten	Crea	
Admire13	26-06-14	137	Drinken	Crea	
Admire13	27-06-14	133	Drinken	Crea	

As you notice, no code is added as “Eten” in column Comment isn’t followed by “Drinken” once, but twice. We can change the 1 into a 2, but if we don’t care how many times “Eten” is followed by “Drinken” but still want to add these records to a code we can simply use this code:

CODE [website] ON {1 [website].[Comment] == “Eten” } {* [website].[Comment] == “Drinken” } AS “code_eten_drinken”

Which now gives as output:

Login	Date	Value	Comment	MeasVar	Code
Admire13	23-06-14	145	Wandelen	Crea	
Admire13	24-06-14	140	Fietsen	Crea	
Admire14	23-06-14	164	Lopen	Crea	
Admire13	25-06-14	154	Rennen	Crea	
Admire15	23-06-14	163	Lopen	Crea	
Admire16	23-06-14	143	Eten	Crea	Code_eten_drinken
Admire13	26-06-14	137	Drinken	Crea	Code_eten_drinken
Admire13	27-06-14	133	Drinken	Crea	Code_eten_drinken

CONNECT

Table with the name website

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire13	25-06-14	164	Lopen	Crea
Admire13	26-06-14	154	Rennen	Crea
Admire13	27-06-14	163	Lopen	Crea
Admire13	28-06-14	143	Eten	Crea
Admire13	29-06-14	137	Drinken	Crea
Admire13	30-06-14	133	Drinken	Crea

Table with the name sensor

Value	CreateDate	Time
145	23-06-14	09:15
140	24-06-14	09:43
163	25-06-14	09:56
255	26-06-14	05:34
163	27-06-14	23:12
143	27-06-14	13:21
137	28-06-14	11:11

We can connect these two tables by selecting on which column we want to merge for each table:

CONNECT [website].[Date] TO [sensor].[CreateDate]

This will merge the two Date columns no matter the name and sort the table based on the created column. Columns with the same name will also be merged into one, while columns that only exist in one table will left empty in the records of the other table.

Login	Date	Value	Comment	MeasVar	Time
Admire13	23-06-14	145	Wandelen	Crea	
	23-06-14	145			09:15
Admire13	24-06-14	140	Fietsen	Crea	
	24-06-14	140			09:43
Admire13	25-06-14	164	Lopen	Crea	
	25-06-14	163			09:56
Admire13	26-06-14	154	Rennen	Crea	

	26-06-14	255			05:34
Admire13	27-06-14	163	Lopen	Crea	
	27-06-14	143			13:21
	27-06-14	163			23:12
Admire13	28-06-14	143	Eten	Crea	
	28-06-14	143			11:11
Admire13	29-06-14	137	Drinken	Crea	
Admire13	30-06-14	133	Drinken	Crea	

CHUNK

Table with the name sensor

Value	CreateDate	Time
145	23-06-14	09:15
140	24-06-14	09:43
163	25-07-14	09:56
255	26-07-14	05:34
163	27-07-14	23:12
143	27-07-14	13:21
137	28-08-14	11:11

We can split the data into different chunks based on time. Therefore, we can chunk for example on year, month and day. We can also chunk on a number of years, months or days. In this example, we will chunk on one month:

CHUNK [website] USING MONTH 1

This gives the following output:

Value	CreateDate	Time	Chunk
145	23-06-14	09:15	Chunk 0
140	24-06-14	09:43	Chunk 0
163	25-07-14	09:56	Chunk 1
255	26-07-14	05:34	Chunk 1
163	27-07-14	23:12	Chunk 1
143	27-07-14	13:21	Chunk 1
137	28-08-14	11:11	Chunk 2

BETWEEN

Table with the name website

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire13	25-06-14	164	Lopen	Crea
Admire13	26-06-14	154	Rennen	Crea
Admire13	27-06-14	163	Lopen	Crea
Admire13	30-06-14	143	Rennen	Crea
Admire13	29-06-14	137	Drinken	Crea
Admire13	30-06-14	133	Drinken	Crea

We can determine the time between the comments “Lopen” and “Rennen” by using the following operation:

BETWEEN [website].[Comment] [Website].[Date] [Website].[Date] "Lopen" "Rennen”

This will give the following output in which the values in time_before are hours:

Login	Date	Value	Comment	MeasVar	
Admire13	23-06-14	145	Wandelen	Crea	Time_before
Admire13	24-06-14	140	Fietsen	Crea	
Admire13	25-06-14	164	Lopen	Crea	24
Admire13	26-06-14	154	Rennen	Crea	
Admire13	27-06-14	163	Lopen	Crea	72
Admire13	30-06-14	143	Rennen	Crea	
Admire13	29-06-14	137	Drinken	Crea	
Admire13	30-06-14	133	Drinken	Crea	

COMBINE

Table with the name website

Login	Date	Value	Comment	MeasVar
Admire13	23-06-14	145	Wandelen	Crea
Admire13	24-06-14	140	Fietsen	Crea
Admire13	25-06-14	164	Lopen	Crea
Admire13	26-06-14	154	Rennen	Crea
Admire13	27-06-14	163	Lopen	Crea
Admire13	28-06-14	143	Eten	Crea
Admire13	29-06-14	137	Drinken	Crea
Admire13	30-06-14	133	Drinken	Crea

Table with the name sensor

Value	CreateDate	Time
145	23-06-14	09:15
140	24-06-14	09:43
163	25-06-14	09:56
255	26-06-14	05:34
163	27-06-14	23:12
143	27-06-14	13:21
137	28-06-14	11:11

We can combine these two tables by selecting on which column we want to merge for each table, the difference with connect, is that records are combined here instead of kept in their original state:

COMBINE [website].[Date] TO [sensor].[CreateDate]

Login	Date	Value	Comment	MeasVar	Value	CreateDate	Time
Admire13	23-06-14	145	Wandelen	Crea	145	23-06-14	09:15
Admire13	24-06-14	140	Fietsen	Crea	140	24-06-14	09:43
Admire13	25-06-14	164	Lopen	Crea	163	25-06-14	09:56
Admire13	26-06-14	154	Rennen	Crea	255	26-06-14	05:34
Admire13	27-06-14	163	Lopen	Crea	163	27-06-14	23:12
Admire13	27-06-14	163	Lopen	Crea	143	27-06-14	13:21
Admire13	28-06-14	143	Eten	Crea	137	28-06-14	11:11