StackProf

Logiciel de mesures sur profils empilés

version 1.01 (30 mai 2021)

Json export file format
English description

Object content description

Item name	Type	Value type	details
GeneratedByAppRelease	key-value pair	string	constant by app release: 1.01
contentType	key-value pair	string	constant by app release: resultExport
versionFormat	key-value pair	string	constant by app release: 0.8
bUseGeoRef	key-value pair	boolean	indicates if the project uses georeferencing
bIncludeProfilesCurvesData	key-value pair	boolean	file content state about profile curves data
boxContent	key-value pair	string	allBoxes | onlyOneBox
bWarningFlagByUser_setLinearRegressionData_asEmpty	key-value pair	boolean	Content state of linear regression data for flagged profiles.
bWarningFlagByUser_setProfilesCurvesData_asEmpty	key-value pair	boolean	Content state of profiles curve data for flagged profiles.
exportDate	key-value pair	string	
exportDateFormat	key-value pair	string	constant by app release
imagesSet_geoRefInfos	object		georeferencing data used by the project
computationMainMode	key-value pair	number (integer)	constant by app release
computationParameters	object		stacked profiles computation parameters
inputFiles	object		Project input files
pixelValueResolution	object		Pixel factors values for each input component
routeName	key-value pair	string	Name of the trace used in the project
stackedProfilBoxes	Array	exportedBox	
stackedProfil rangesX0AndLinearRegressionModels	Array	StackedProfilBox rangesX0AndLinearRegressionModels	
profilCurves	object		

Sub-objects description

Project input file and parameters

ImagesSet_geoRefInfos object

Item name	Type
coordRefSys_coordTrans	object
imageGeoRef	object

```
Example :
"imagesSet_geoRefInfos": {
  "coordRefSys_coordTrans": {
    "EPSG_code": "EPSG:32633"
  },
  "imageGeoRef": {
    "pathAndFilename": {
      "absolutePath": "/home/laurent/homework3/reftest1",
      "filename": "Px1_Num5_DeZoom1_LeChantier.tif"
```

```
    },
    "worldFileContent": {
      "0_A_xScale": 0.5,
      "1_D_rotationTerms_1": 0,
      "2_B_rotationTerms_2": 0,
      "3_E_yScale": -0.5,
      "4_C_xTranslationTerm": 350697.75,
      "5_F_yTranslationTerm": 4754094.75
    }
  }
}
```

CoordRefSys_coordTrans object

Item name	Type	Value type	Details	Value example
EPSG_code	key-value pair	string	format is: EPSG:<string>	EPSG:32633

For project not using georeferencing, the EPSG Code value is "notSet":
```
"coordRefSys_coordTrans": {
    "EPSG_code": "EPSG:notSet"
}
```

ImageGeoRef object

Item name	Type	Details
pathAndFilename	object (PathAndFilename object)	Not used by project. Path and filename of the background image, set at project creation.
worldFileContent	object	World file data used in project

WorldFileContent object

World file data content as described here: https://en.wikipedia.org/wiki/World_file

Item name	Type	Value type	Details
0_A_xScale	key-value pair	number (double)	
1_D_rotationTerms_1	key-value pair	number (double)	
2_B_rotationTerms_2	key-value pair	number (double)	
3_E_yScale	key-value pair	number (double)	
4_C_xTranslationTerm	key-value pair	number (double)	
5_F_yTranslationTerm	key-value pair	number (double)	

ComputationParameters object

Item name	Type	Value type	Details
baseComputationMethod	key-value pair	string	mean | median
correlationScoreMapParameters	object		
pixelExtractionMethod	key-value pair	string	nearestPixel | biLinearInterpolation2x2 (2x2 means: four surrounding pixels)
profilOrientation	key-value pair	string	progressDirectionAlongTraceIsFromFirstToLastPoint | progressDirectionAlongTraceIsFromLastToFirstPoint

```
Example:
"computationParameters": {
  "baseComputationMethod": "median",
  "correlationScoreMapParameters": {
    "PX1_PX2": {
      "bUse": true,
      "option_thresholdRejection": {
        "bUse": true,
        "rejectValueIfBelow": 170
      },
      "option_weighting": {
        "bUse": true,
        "weightExponent": 2
      }
    },
    "ZOther": {
      "bUse": true,
      "option_thresholdRejection": {
        "bUse": false,
        "rejectValueIfBelow": 0
      },
      "option_weighting": {
        "bUse": false,
        "weightExponent": 6
      }
    }
  },
  "pixelExtractionMethod": "biLinearInterpolation2x2",
  "profilOrientation": "progressDirectionAlongTraceIsFromFirstToLastPoint"
}
```

CorrelationScoreMapParameters object

Item name	Type	Value type	Details
PX1_PX2	object		Presents only if project uses Px1 and Px2
ZOther	object		Presents only if project uses deltaZ

CorrelationScoreMapParameters PX1_PX2 and ZOther objects

Item name	Type	Value type	Details
bUse	key-value pair	boolean	indicates if the file is used as weighting
option_thresholdRejection	object		
option_weighting	object		

Option_thresholdRejection object

Item name	Type	Value type	Details
bUse	key-value pair	boolean	indicates if the option is used.
rejectValueIfBelow	key-value pair	number (double)	

Option_weighting object

Item name	Type	Value type	Details
bUse	key-value pair	boolean	indicates if the option is used.
weightExponent	key-value pair	number (integer)	range from 2 to 6

InputFiles object

Item name	Type
inputCorrelationScoreMaps	object
inputDisplacementMaps	object

InputCorrelationScoreMaps object

Item name	Type	Details
PX1_PX2	object (Input file with attributes object)	Object fields empty if correlation score map file not used.
ZOther	object (Input file with attributes object)	Object fields empty if correlation score map file not used

InputDisplacementMaps object

Item name	Type
PX1	object (Input file with attributes object)
PX2	object (Input file with attributes object)
ZOther	object (Input file with attributes object)

Input file with attributes objet

Item name	Type	Details
attributes	Object (FileAttributes object)	Presents only if according input file is indicated.
pathAndFilename	Object (PathAndFilename object)	

PixelValueResolution

Item name	Type	Details
PX1	object (micmacStep and spatialResolution object)	Presents only if project uses Px1 and Px2
PX2	object (micmacStep and spatialResolution object)	Presents only if project uses Px1 and Px2
ZOther	object (micmacStep and spatialResolution object)	Presents only if project uses deltaZ

Example :
```
  "pixelValueResolution": {
  "PX1": {
    "micmacStep": 1,
    "spatialResolution": 1
  },
  "PX2": {
    "micmacStep": 1,
    "spatialResolution": 1
  },
  "ZOther": {
  "micmacStep": 1,
  "spatialResolution": 1
  }
}
```

MicmacStep and spatialResolution object

Item name	Type	Value type
micmacStep	key-value pair	number (double)
spatialResolution	key-value pair	number (double)

ExportedBox object

Item name	Type	Value type	Details
boxId	key-value pair	number (integer)	Box Id. First boxId along the trace is 1 (one) like in ascii export file
azimuthDegree	key-value pair	number (double)	See below
centerPoint	object (Point2D array)		Image pixel location of the box center point
centerPoint_lon_lat	object		See below
distanceFromFirstPointOfTrace	object		See below
oddPixelLength	key-value pair	number (integer)	Box length in pixel
oddPixelWidth	key-value pair	number (integer)	Box width in pixel
unitVectorDirection	object (Point2D array)		unit vector direction of the box in image coordinates systems
idxSegmentOwnerOfCenterPoint	key-value pair	number (integer)	Segment Id of the trace which contains the point. Segment Id starts from zero.

```
Example :
{
  "azimuthDegree": -46.554,
  "boxId": 0,
  "centerPoint": [
    13714.675,
    24693.073
  ],
  "centerPoint_lon_lat": {
    "lat": 42.8150452,
    "lon": 13.2576237
  },
  "distanceFromFirstPointOfTrace": {
    "meter": 20.53
  },
  "idxSegmentOwnerOfCenterPoint": 0,
  "oddPixelLength": 11,
  "oddPixelWidth": 301,
  "unitVectorDirection": [
    -0.726022,
    -0.6876715
  ]
}
```

Azimuth degree

Azimuth degree indicates the box orientation from a vertical axis. This value is an angle in decimal degree.
The angle is measured clockwise from a vertical axis (value zero is North and goes up). This value depends of the profiles orientation.
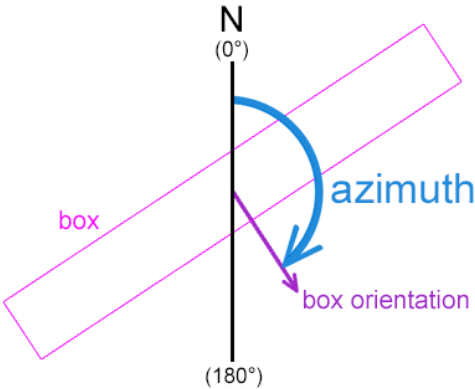
Point2D array (double)

Item index	
0	x
1	y

CenterPoint_lon_lat object

Item name	Type	Value type	Details
lat	key-value pair	number (double)	WGS84 latitude decimal degree of the box center point
Lon	key-value pair	number (double)	WGS84 longitude decimal degree of the box center point

DistanceFromFirstPointOfTrace object

Distance, along the trace, between the box center and the first point of the trace.
If the project uses georeferencing:

Item name	Type	Value type	Details
meter	key-value pair	number (double)	unit is meter

If the project does not use georeferencing:

Item name	Type	Value type	Details
pixel	key-value pair	number (double)	unit is image pixel

StackedProfilBox_rangesX0AndLinearRegressionModels object

Item name	Type	Value type	
boxId	key-value pair	number (integer)	First boxId along the trace is 1 (one) like in ascii export file
Parall	object		
Perp	object		
ZOther	object		

Parall, Perp and ZOther StackedProfilBox_rangesX0AndLinearRegressionModels object

Item name	Type
Bookmark	object
LinearRegressionModel	object
XRangesForLinRegr withX0	object
modelResult	object

Note: For flagged profile and bWarningFlagByUser_setLinearRegressionData_asEmpty at true,
      LinearRegressionModel and modelResult objects do not exist in the file.

x ranges and X0 locations
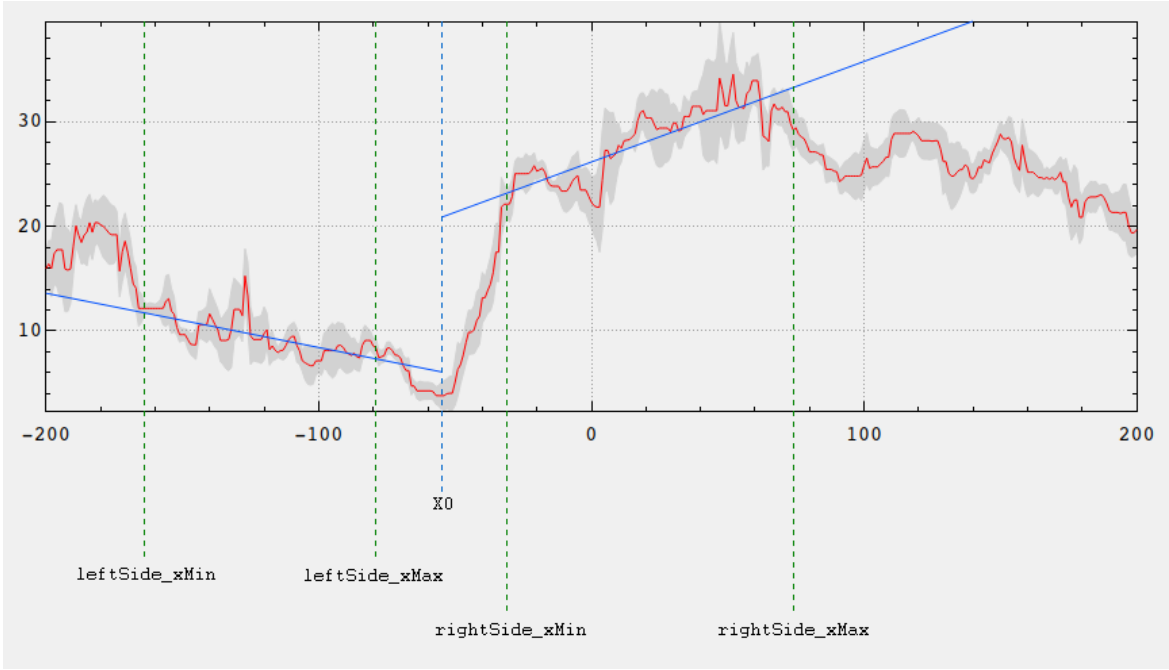
Example of ranges and X0 locations

Bookmark object

Item name	Type	Value type	Details
bWarningFlagByUser	key-value pair	boolean	Indicates if the user has flagged the profile (true means that the flag is on)

LinearRegressionModel object

Item name	Type
left	object
right	object

Example :
```
"LinearRegressionModel": {
    "left": {
        "bComputed": true,
        "intercept": -7.415378295386905,
        "slope": -0.094030611383928,
        "stdErrorOfIntercept": 0.0520360898687041,
        "stdErrorOfSlope": 0.0166648860038223,
        "stdErrorOfTheRegression": 0.0763681015603261,
        "sumsq": 0.0233283477437131
    },
    "right": {
        "bComputed": true,
        "intercept": -7.180971120535714,
        "slope": -0.368837488113839,
        "stdErrorOfIntercept": 0.146301706856422,
        "stdErrorOfSlope": 0.0468540444349039,
        "stdErrorOfTheRegression": 0.214712205237771,
        "sumsq": 0.184405324312267
    }
}
```

Left and right LinearRegressionModel object

Item name	Type	Value type	Details
bComputed	key-value pair	boolean	Indicates if the linear regression model on the two sides was computed with valid result for yOffsetAtX0 and sigmabSum
intercept	key-value pair	number (double)	Intercept of the line equation of the computed linear regression model
slope	key-value pair	number (double)	Slope of the line equation of the computed linear regression model
stdErrorOfIntercept	key-value pair	number (double)	Estimated standard deviation of the error in estimating the intercept. See used formula below.
stdErrorOfSlope	key-value pair	number (double)	Estimated standard deviation of the error in estimating the slope. See used formula below.
stdErrorOfTheRegression	key-value pair	number (double)	Standard error of the regression. See used formula below.
sumsq	key-value pair	number (double)	Sum of squares of the residuals from the best-fit line

Formulas of the linear regression standard deviations values

Estimated standard deviation of the error in estimating the slope

$$stdErrorOfTheSlope = \frac{stdErrorOfTheRegression}{\sqrt{x\ values\ count}} * \frac{1}{stdDev[X]}$$

Estimated standard deviation of the error in estimating the intercept

$$stdErrorOfIntercept = \frac{stdErrorOfTheRegression}{\sqrt{x\ values\ count}} * \sqrt{1 + \frac{Mean[X]*Mean[X]}{Variance[X]}}$$

Standard error of the regression

$$stdErrorOfTheRegression = \sqrt{(1/(x\ values\ count - 2) * sumsq)}$$

XRangesForLinRegr_withX0 object

Item name	Type
XRange_left	object (XRange object)
XRange_right	object (XRange object)
x0ForYOffsetComputation	object (X0ForYOffsetComputation object)

Example :
```
"XRangesForLinRegr_withX0": {
  "XRange_left": {
    "XRange": {
      "bValid": true,
      "xMax": 0,
      "xMin": -5
    }
  },
  "XRange_right": {
    "XRange": {
      "bValid": true,
      "xMax": 5,
      "xMin": 0
    }
  },
  "x0ForYOffsetComputation": {
    "bValid": true,
    "x0": 0
  }
}
```

XRange object

Item name	Type	Value type	Details
bValid	key-value pair	boolean	Indicates if xMin and xMax values are valid
xMin	key-value pair	number (integer)	
xMax	key-value pair	number (integer)	

X0ForYOffsetComputation object

Item name	Type	Value type	Details
bValid	key-value pair	boolean	Indicates if x0 value is valid
x0	key-value pair	number (integer)	x location of the profile center to compute yOffsetAtX0

ModelResult object

Item name	Type	Value type	Details
bComputed	key-value pair	boolean	Indicates if the linear regression model on the two sides was computed with valid result for yOffsetAtX0 and sigmabSum
sigmabSum	key-value pair	number (double)	Sum of leftSide_stdErrorOfIntercept and rightSide_stdErrorOfIntercept
yOffsetAtX0	key-value pair	number (double)	The offset measure at the profile center position (see X0 below)

Example :
"modelResult": {
  "bComputed": true,
  "sigmabSum": 0.198337796725126,
  "yOffsetAtX0": 0.234407174851190
}

Profil curves data

- Export file with bIncludeProfilesCurvesData at true contains profils curves data.
- Flagged profile with bWarningFlagByUser_setProfilesCurvesData_asEmpty at true leads to null json value for each data point.

ProfilCurves object

Item name	Type
columnsInfo	object
content	array

ColumnsInfo object

Item name	Type
methodMajorMinor_by_component	array
title_by_component	array

MethodMajorMinor_by_component array (string)

Item index	value
0	N/A
1	y meaning of major curve for the perpendicular component : mean | weightedMean | median | weightedMedian
2	meaning of the absolute deviation around y for the perpendicular component: absDevAroundMean | absDevAroundWeightedMean | absDevAroundMedian | absDevAroundWeightedMedian
3	y meaning of major curve for the parallel component : mean | weightedMean | median | weightedMedian
4	meaning of the absolute deviation around y for the parallel component: absDevAroundMean | absDevAroundWeightedMean | absDevAroundMedian | absDevAroundWeightedMedian
5	y meaning of major curve for the deltaZ component : mean | weightedMean | median | weightedMedian
6	meaning of the absolute deviation around y for the deltaZ component: absDevAroundMean | absDevAroundWeightedMean | absDevAroundMedian | absDevAroundWeightedMedian

Title_by_component array

Item index	
0	x
1	Perp
2	Perp
3	Parall
4	Parall
5	deltaZ
6	deltaZ

Content array

Item name	Type	Value type	
boxId	key-value pair	number (integer)	First boxId along the trace is 1 (one) like in ascii export file
values	array	ValuesForX array	

ValuesForX array

Values for x and according profil data values, as described by columnsInfo.

PathAndFilename object

Item name	Type	Value type	Details
absolutePath	key-value pair	string	absolute path to the file with '/' character separating directories
filename	key-value pair	string	

FileAttributes object

Item name	Type	Value type	Details
basetype	key-value pair	number (integer)	See Basetype description table
fileSize	key-value pair	number (integer)	file size in byte
height	key-value pair	number (integer)	image height in pixel
nchannels	key-value pair	number (integer)	image channels amount
width	key-value pair	number (integer)	image width in pixel

Basetype description table
Data type integer values come from OpenImageIO (include/OpenImageIO/typedesc.h)

Value in export file	Input file data type
2	unsigned byte
4	16 bits unsigned integer
5	16 bits signed integer
11	32 bits float (decimal)