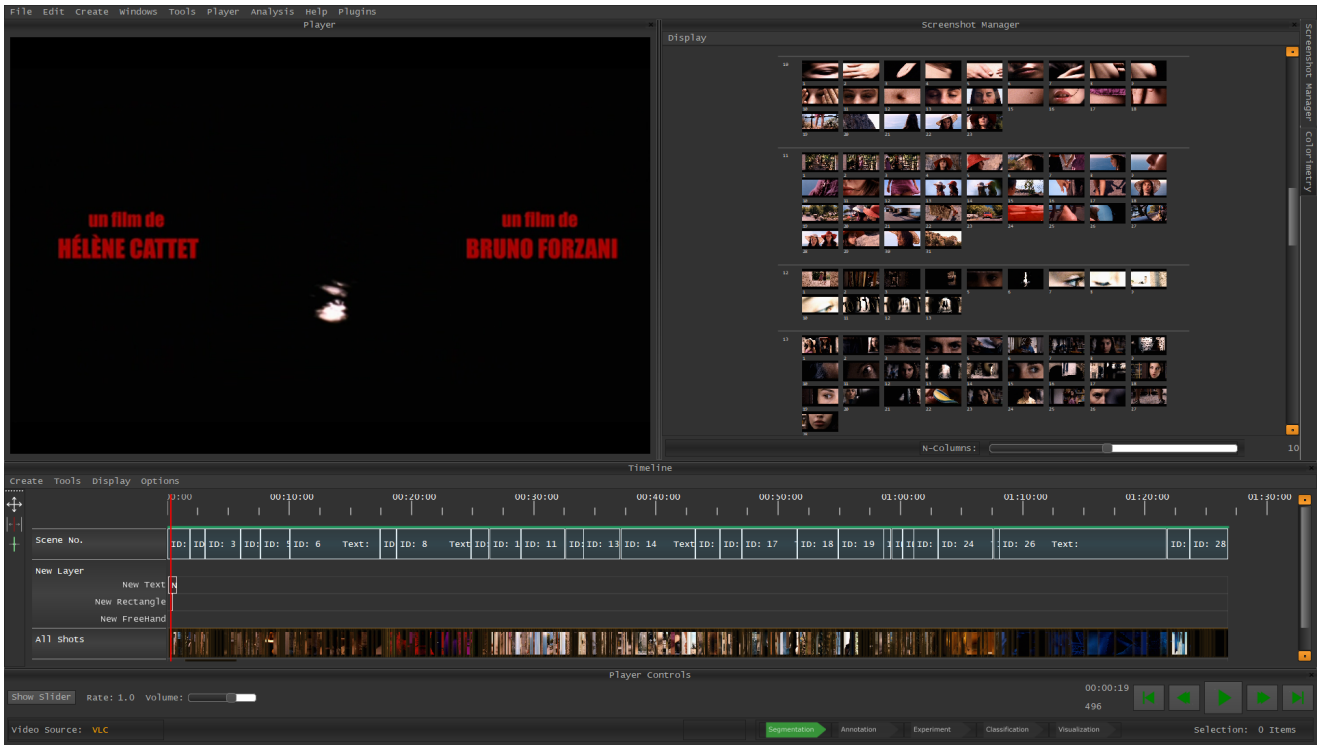
VIAN

Datamodel, JSON Serialization and XML Export Format



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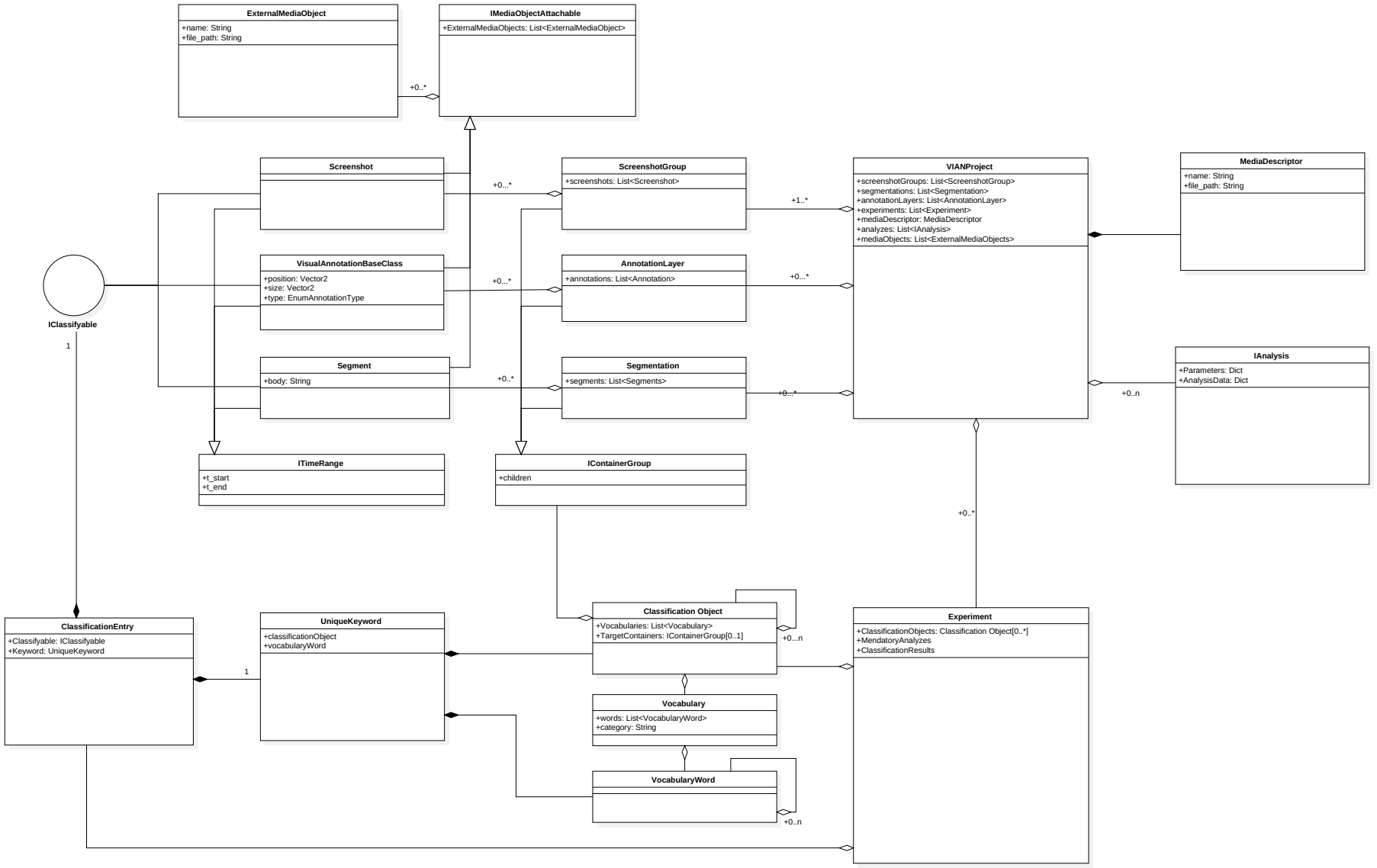
ExternalMediaObject
+name: String
+file_path: String
IMediaObjectAttachable
+ExternalMediaObjects: List<ExternalMediaObject>
+0..*
Screenshot
ScreenshotGroup
+screenshots: List<Screenshot>
+0...*
+1..*
VIANProject
+screenshotGroups: List<ScreenshotGroup>
+segmentations: List<Segmentation>
+annotationLayers: List<AnnotationLayer>
+experiments: List<Experiment>
+mediaDescriptor: MediaDescriptor
+analyzes: List<IAnalysis>
+mediaObjects: List<ExternalMediaObjects>
MediaDescriptor
+name: String
+file_path: String
VisualAnnotationBaseClass
+position: Vector2
+size: Vector2
+type: EnumAnnotationType
AnnotationLayer
+annotations: List<Annotation>
+0...*
+0...*
IClassifyable
1
Segment
+body: String
Segmentation
+segments: List<Segments>
+0..*
+0...*
+0..n
IAnalysis
+Parameters: Dict
+AnalysisData: Dict
ITimeRange
+t_start
+t_end
IContainerGroup
+children
+0..*
ClassificationEntry
+Classifyable: IClassifyable
+Keyword: UniqueKeyword
1
UniqueKeyword
+classificationObject
+vocabularyWord
Classification Object
+Vocabularies: List<Vocabulary>
+TargetContainers: IContainerGroup[0..1]
+0...n
Experiment
+ClassificationObjects: Classification Object[0..*]
+MendatoryAnalyzes
+ClassificationResults
Vocabulary
+words: List<VocabularyWord>
+category: String
VocabularyWord
+0..n

1 Introduction

Essentially, VIAN projects are represented as a directory system. VIAN serializes its projects into a json file and a collection of mostly numeric analysis result which are hold in a sqlite database. (Currently there exist additional binary files that stored in a projects filesystem, but these will be deprecated shortly.)

```
VIAN FileSystem:
Root -  |
        | - myproject.json
  | - data ------- |
      | - database.sqlite
  | - results  // contains visualizations
  | - export   // default exported data
  | - shots    // default exported shots
```

Since a lot of the data stored is application and python specific, VIAN supports an XML export of its projects, its elements are described in this document. Links between different entities are serialized using the ID attribute. IDs are guaranteed to be unique and declared before referenced in the document.

Additionally the VIAN project json file is described at the end of this document by an example.

2 XML Schema

2.1 Element: ANNOTATION_DOCUMENT

```
<ANNOTATION_DOCUMENT AUTHOR="author" FORMAT="2.8" VERSION="2.8">

@AUTHOR: The Person that created the File
@DATE: The creation date
@VERSION: The VIAN version this file was produced with
```

2.2 Element: HEADER

```
<HEADER PROJECT_NAME="107_1_1_Leave Her to Heaven_1945">

## HEADER
@ PROJECT_NAME: The name of the project
```

2.3 Element: MEDIA_DESCRIPTOR

```
<MEDIA_DESCRIPTOR DURATION="9807872" FPS="30" IS_RELATIVE="False" MEDIA_URL="//abs_path
    /3774_1_1_Blade_Runner_2049_DVD.m4v" TIME_UNITS="milliseconds" YEAR="1982"/>

@FPS: a float indicating the fps of this media
@IS_RELATIVE: if MEDIA_URL is relative or not {True, False}
@MEDIA_URL: Absolute or relative path to the media
@YEAR: The creation year of the media
```

2.4 Element: TIME_ORDER and TIME_SLOT

```
<TIMER_ORDER>
  <TIME_SLOT TIME_SLOT_ID="ts0" TIME_VALUE="0"/>
  <TIME_SLOT TIME_SLOT_ID="ts1" TIME_VALUE="19300"/>
  <TIME_SLOT TIME_SLOT_ID="ts2" TIME_VALUE="56300"/>
  <TIME_SLOT TIME_SLOT_ID="ts3" TIME_VALUE="91700"/>
  ...
</TIMER_ORDER>

@TIME_SLOT_ID: A string that can be referenced by the serialization of any ITimeRange
    implementing object
@TIME_VALUE: The time of this slot in MS
```

VIAN uses an implicit timeline, that is, each Segment, Visual Annotation or Screenshot object stores it's media time directly. In the XML export format, a list of TIME_SLOTS is created, and each serialization of an object media-time information references one or two TIME_SLOTS.

Note: Currently TIME_SLOTS are unique, thus for each time there can not be more than one TIME_SLOT.

2.5 Element: SEGMENTATION and SEGMENT

```
<SEGMENTATION ID="7660852745" NAME="Main Segmentation">
  <SEGMENT BODY="Some Annotation Text" ID="1697026929" T_END="ts4" T_START="ts3"/>
</SEGMENTATION>

##SEGMENTATION
@ID: Unique ID of this segmentation
@NAME: The name of this segmentation

#SEGMENT
@BODY: The annotation text
@ID: The unique ID of this annotation
@T_END: A reference to a TIME_SLOT where this annotation ends
@T_START: A reference to a TIME_SLOT where this annotation starts
```

The first kind of annotation supported by VIAN are called "Segment" and are aggregated in a Tier called "Segmentation". A segment has a start and end-point and may have a text body.

2.6 Element: SCREENSHOTS and SCREENSHOT

```
<SCREENSHOTS>
  <SCREENSHOT ID="2373585929" T_START="ts69"/>
  <SCREENSHOT ID="7301671299" T_START="ts70"/>
  <SCREENSHOT ID="7129636405" T_START="ts71"/>
  ...
</SCREENSHOTS>

@ID: The unique id of this screenshot
@T_START: A reference to a TIME_SLOT indicating the start of this annotation
```

The second type of annotations are "Screenshots", which are aggregated in "ScreenshotGroups". A screenshot only has a start-time in the XML export.

2.7 Element: ANNOTATION_LAYER and VISUAL_ANNOTATION

Finally there are ”Visual Annotations”, aggregated in ”Annotation Layers”, which represent vector graphics, that are placed on the screen.

```
1
2 <ANNOTATION_LAYER ID="5865990447" NAME="New Layer">
3   <VISUAL_ANNOTATION A_TYPE="AnnotationType.Rectangle" COLOR="[231, 20, 221]" ID="
      3736115394" POS="495, 81" RESSOURCE_PATH="" SIZE="986.1626617375231,
      248.42144177449177" TEXT="" T_END="ts68" T_START="ts67"/>
4 </ANNOTATION_LAYER>
5
6 ## ANNOTATION_LAYER
7 @ID: The unique id of this annotation layer
8 @NAME: The name of this annotation layer
9
10 ## VISUAL_ANNOTATION
11 @A_TYPE: The type of this annotation {AnnotationType.Rectangle, AnnotationType.Ellipse,
     AnnotationType.Line, AnnotationType.Text, AnnotationType.Image, AnnotationType.
     FreeHand}
12 @COLOR: The Color of this annotation
13 @ID: The unique id of this annotation
14 @POS: A vector2 indicating the screen position of this annotation
15 @RESSOURCE_PATH: If A_TYPE == AnnotationType.Image, this specifies the relative path to
     the Image-Source {.png, .jpg format}
16 @SIZE: A vector2 indicating the screen size of this annotation
17 @TEXT: If A_TYPE == AnnotationType.Text, this specifies the text of the annotation
18 @T_END: A reference to a TIME_SLOT, when the annotation ends
19 @T_START: A reference to a TIME_SLOT, when the annotation starts
```

Note that the export of visual annotations does currently not support:

- Export of keys on annotations
- Export of FreeHand annotations.

2.8 Element: EXPERIMENT

The process of data acquisition (i.e. creating segments, annotations and screenshots) and classification of these entities using vocabularies is splitted, such that different classifications can be performed on the same segments and annotations. The second process is contained in the Experiment entity.
Essentially a subject of interest (Classification Object), can be present in several tiers (the targets), and can be classified by multiple vocabularies. For each classification object a list of unique keywords is generated which can then be attached to the classification targets as tags. All this information is contained in an experiment.

> **Example:** The classification object ”Background” can be present in the scene segmentation as well as the screenshots, and would probably be classified with the vocabularies ”Color”, ”Shadows”.

```
<EXPERIMENT ID="8835132857" NAME="ERC Advanced Grant FilmColors">
    <CLASSIFICATION_OBJECTS>
      <CLASSIFICATION_OBJECT ID="3719655258" NAME="Global" PARENT="-1">
        <TARGET ID="1057466290"/>
        ...
      </CLASSIFICATION_OBJECT>
      ...
    </CLASSIFICATION_OBJECTS>
    <VOCABULARIES>
        <VOCABULARY CATEGORY="Key Words" ID="6613879615" INFO_URL="" NAME="
            Intertextuality Intermediality">
        <VOCABULARY_WORD ID="5429449722" INFO_URL="" NAME="allusion"/>
        <VOCABULARY_WORD ID="2997485372" INFO_URL="" NAME="citation"/>
        <VOCABULARY_WORD ID="3149334985" INFO_URL="" NAME="irony"/>
        ...
      </VOCABULARY>

    </VOCABULARIES>
    <KEYWORDS>
      <KEYWORD CLASSIFICATION_OBJECT_ID="3719655258" ID="8808338181" WORD_ID="5131968152
          "/>
      <KEYWORD CLASSIFICATION_OBJECT_ID="3719655258" ID="7010099893" WORD_ID="6882728027
          "/>
      <KEYWORD CLASSIFICATION_OBJECT_ID="3719655258" ID="6579133855" WORD_ID="6898493964
          "/>
      ...
    </KEYWORDS>
    <CLASSIFICATION>
      <KEYWORD KEYWORD_ID="2040265900" TARGET_ID="7776732753"/>
      <KEYWORD KEYWORD_ID="3250706923" TARGET_ID="7776732753"/>
      <KEYWORD KEYWORD_ID="7875625863" TARGET_ID="7776732753"/>
      ...
    </CLASSIFICATION>
  </EXPERIMENT>
```

2.9 Element: CLASSIFICATION_OBJECT

```
<CLASSIFICATION_OBJECT ID="6353598060" NAME="Global">
  <TARGET ID="1049798528"/>
</CLASSIFICATION_OBJECT>

@ID: The unique id of this classification object
@NAME: The name of this classification object
@TARGET_ID: A reference to IContainerGroup (Segmentation, AnnotationLayer,
    ScreenshotGroup) this classification object can be found in
```

2.10 Element:VOCABULARY and VOCABULARY_WORD

```
<VOCABULARY CATEGORY="Lighting" ID="9296687589" INFO_URL="" NAME="Shadows">
      <VOCABULARY_WORD ID="1154796472" INFO_URL="" NAME="body_shadow"/>
      <VOCABULARY_WORD ID="8894958800" INFO_URL="" NAME="cast_shadows"/>
      <VOCABULARY_WORD ID="9365131971" INFO_URL="" NAME="colored"/>
      <VOCABULARY_WORD ID="1864858843" INFO_URL="" NAME="cookie"/>
</VOCABULARY>

## VOCABULARY
@CATEGORY: The topic this vocabulary should belong to
@ID: The unique id of this Vocabulary
@INFO_URL: A optional url to more information about this vocabulary

#VOCABULARY_WORD
@ID: The unique id of this VocabularyWord
@INFO_URL:  A optional url to more information about this vocabulary
@NAME: The name of this word
```

2.11 Element: KEYWORDS

```
<KEYWORDS>
  <KEYWORD CLASSIFICATION_OBJECT_ID="6353598060" ID="4400252826" WORD_ID="5741784264"/>
  <KEYWORD CLASSIFICATION_OBJECT_ID="6353598060" ID="8650499482" WORD_ID="2534552219"/>
  <KEYWORD CLASSIFICATION_OBJECT_ID="6353598060" ID="1149034722" WORD_ID="9103031091"/>
  <KEYWORD CLASSIFICATION_OBJECT_ID="6353598060" ID="9690251691" WORD_ID="3412950183"/>
  <KEYWORD CLASSIFICATION_OBJECT_ID="6353598060" ID="2806440146" WORD_ID="8178481154"/>
</KEYWORDS>

@CLASSIFICATION_OBJECT_ID: The unique ID of the classification object this keyword
    target.
@ID: The unique ID of this keyword
@WORD_ID: The unique ID of the VocabularyWord this keyword targets.
```

2.12 Element: CLASSIFICATION

The classification represents the mapping of tags their targets. (screenshots, segments, visual annotations)

```
<CLASSIFICATION>
  <KEYWORD KEYWORD_ID="2016330087" TARGET_ID="1166372514"/>
  <KEYWORD KEYWORD_ID="3935737480" TARGET_ID="1166372514"/>
  ...
</CLASSIFICATION>

@KEYWORD_ID: The unique ID of the keyword
@TARGET_ID: The unique ID of the IClassifyable
```

2.13 Element: EXTERNAL_MEDIA_OBJECT

```
<EXTERNAL_MEDIA_OBJECTS>
  <EXTERNAL_MEDIA ID="1741505363" PATH="01_DOF_Explanation.png" TARGET_ID="1166372514"/>
</EXTERNAL_MEDIA_OBJECTS>

@ID: The unique id of this external media object
@PATH: The relative path to the external media object in the export directory
@TARGET_ID: The unique ID of the container this media objects is attached to
```

2.14 Element: ANALYSES

```
<ANALYSES>
  <COLORIMETRY_ANALSIS ID="8908799312" NAME="Colorimetry" PATH="8908799312.npz"/>
  <JOB_ANALYSIS CLASSIFICATION_OBJECT_REF="-1" ID="1522242163" NAME="
      SemanticSegmentationAnalysis" PATH="No Export" TYPE="MASKS"/>
</ANALYSES>

## COLORIMETRY_ANALSIS
@ID: The unique id of this analysis object
@NAME: Constant = "Colorimetry"
@PATH: The path to the numpy numeric serialized data

## JOB_ANALYSIS
@ID: The unique id of this analysis object
@NAME: The name of the JobAnalysis Class (can be used in an python::eval() statement)
@PATH: The path to the numpy numeric serialized data or "No Export" if data export has
    been turned off
@CLASSIFICATION_OBJECT_REF: The unique id of the classification object this analysis has
     been performed of or -1 if None
```

3 Json Schema

Since the VIAN json file has not been intended to be read by other applications, the XML export may be the better way to enforce interoperability with other applications. But for the sake of completeness, a documented JSON is shown in the rest of this document.

```
{

  "name": "3774_1_1_Blade_Runner_1900_DVD",
  "path": "C://****/****/documents/VIAN/3774_1_1_Blade_Runner_1900_DVD/3774
      _1_1_Blade_Runner_1900_DVD.eext", // The abs path to the project
  "version": "0.6.4",
  "corpus_id": -1,
  "main_segmentation_index": 0, // THe Index of the Main Segmentation (Which is used for
       sorting screenshots)
  "notes": "", // Additional information that can be set in the Inspector

  /*Project Directories */
  "data_dir": "C://****/****/documents/VIAN/3774_1_1_Blade_Runner_1900_DVD/data",
  "shots_dir": "C://****/****/documents/VIAN/3774_1_1_Blade_Runner_1900_DVD/shots",
  "export_dir": "C://****/****/documents/VIAN/3774_1_1_Blade_Runner_1900_DVD/export",
  "results_dir": "C://****/****/documents/VIAN/3774_1_1_Blade_Runner_1900_DVD/results",

  /* SEGMENTATIONS*/
  "segmentation": [ /* A List of serialized Segmentations */
    {
      "segments": [ /* A List of serialized Segments */
        {
          "name": "1", // The Name of the Segment
          "end": 107607, // MS of the End
          "notes": "", // Additional Notes
          "start": 0, // MS of the Start
          "media_objects": [ // A List of serialized Media Objects
            {
              "dtype": 2, // What type the media object is (External, Data,)
              "file_path": "C:\\*******/documents/VIAN//3774_1_1_Blade_Runner_1900_DVD//
                  data/01_DOF_Explanation.png", // An absolute  path to the File, this
                  is regenerated when loading the project
              "name": "DOF_Explanation.png", // The name of the file in the data_dir
                  directory
              "unique_id": 1741505363
            }
          ],
          "scene_id": 1, // The index of this segment in the Segmentation (starting with
               1)
          "unique_id": 1166372514,
          "annotation_body": "Intertitle explains the already passed plot", // The text
              annotation
          "locked": false, // If the segment is locked in the timelnie
          "duration": null // @obsolete
        }
        /* ... more Segments ...*/
      ],
      "notes": "", // Additional information that can be set in the Inspector
      "unique_id": 1049798528,
      "locked": false, // If the segmentation is locked in the Timeline
      "name": "Auto Segmentation" // The name of the segmentation
    }
    /*... more Segmentation ...*/
  ],

  /* ANNOTATION LAYERS */
```

```
  "annotation_layers": [
    {
      "name": "New Layer",
      "locked": false, // If it is locked in the Timeline
      "is_visible": true, // If it should be displayed
      "unique_id": 2927829419,
      "notes": "", // Additional information that can be set in the Inspector
      "annotations": [ // A list of Annotation serializations
        {
          "free_hand_paths": [], // A list of FreeHand Paths if this is a FreeHand
              annotation
          "name": "New Rectangle",
          "notes": "", // Additional information that can be set in the Inspector
          "t_end": 82300, // When the visibility should be turned off
          "is_automated": false, // if this annotation is driven by another containers
              value
          "line_w": 5, // the line width of the frame if it has one
          "orig_position": [ 178, 6 ], // The position in MovieSpace
          "color": [ 230, 83, 162 ], // The color of the frame if it has one
          "automate_property": null, // The value this is driven by if it is automated
          "automated_source": -1, // The unique id of the object that contains the value
               above if it has any
          "curr_size": [ 1512.5951940850277, 421.8022181146026 ], // The size of this
              annotation in MovieSpace
          "t_start": 53900, // The MS start when the annotation should start beeing
              visible
          "unique_id": 1432985272,
          "font_size": 6, // The Font-Size if it has text
          "resource_path": "", // The Image path it is an Image Annotation
          "text": "", // The Text if it is a Text Annotation
          "size": [ 1512.5951940850277, 421.8022181146026 ], // The current size (no
              need to be serialized) in PlayerSpace
          "media_objects": [], // Attached media objects if there are any
          "a_type": 0, // The AnnotationType Enum Value
          "font": "Agency FB", // The Font Family
          "tracking": "Static", // If this annotation should track something
          "keys": [], // A list of Position Tuples if this annotation is animated
          "widget": null // The displaying Widget
        }
        /* ... more Annotations .. */
      ],
      "is_current_layer": false // If this is the current top layer
    }
  ],

  /* NODE SCRIPTS*/
  "scripts": [
    {
      "notes": "", // Additional information that can be set in the Inspector
      "connections": [
        {
          "output_node": 6264180387,
          "input_pin_id": 2,
          "output_pin_id": 0,
          "input_node": 8803892119
        }
        /*... more Connections ...*/
      ],
      "name": "New Script", // The Name of the Script
      "nodes": [
        {
          "name": "Read Frame Movie",
```

```
106           "default_values": [ "test.mp4", 3000 ], // The Default Values of the input
                  pins
107           "node_pos": [ 107, 94 ], // The position of the node in the Editor
108           "unique_id": 8803892119,
109           "notes": "", // Additional information that can be set in the Inspector
110           "operation": "OperationFrameReader", // The associated OperationClass Name.
111           "node_size": [ 200, 200 ] // The size of the Node in the editor
112         }
113         /*... more Nodes ...*/
114       ],
115       "unique_id": 1284084303
116     }
117     /*... more Scripts ...*/
118   ],
119
120   /* VOCABULARIES */
121   "vocabularies": [
122     {
123       "name": "Scene Locations",
124       "category": "default",  // The topic category it belongs to
125       "unique_id": 1095049086,
126       "words": [
127         {
128           "parent": 1095049086,
129           "name": "House",
130           "unique_id": 3390127240,
131           "children": [] // Child words if any
132         }
133         //....
134       ]
135     }
136     // ....
137   ],
138   "screenshot_groups": [
139     {
140       "unique_id": 1404536708,
141       "name": "All Shots",
142       "shots": [ 1651945337, 7522186061, 8671808241 /*...*/ ] // A list of associated
                  shots as unique id
143     }
144   ],
145
146   /* EXPERIMENTS */
147   "experiments": [
148     {
149       "name": "ERC Advanced Grant FilmColors",
150       "analyses": [], // A list Analysis classes to perform
151       "unique_id": 4846731777,
152       "classification_objects": [
153         {
154           "parent": 4846731777,
155           "target_container": [ 1049798528 ], // A list of IClassifyable that contain
                  this classification object
156           "name": "Global",
157           "children": [], // Child Classification objects if any
158           "classification_vocabularies": [ 7835076715, 3427161829 /*...*/ ], // The
                  Vocabularies associated with this classification object
159           "unique_id": 6353598060,
160           "unique_keywords": [ // These are essentially the tags consisting of VocWord,
                  ClassificationObject and Vocabulary
161             {
162               "voc_obj": 7835076715,
163               "external_id": 8,
```

```
164                 "word_obj": 5741784264,
165                 "unique_id": 4400252826,
166                 "class_obj": 6353598060
167               }
168               /*...*/
169             ]
170           }
171       ],
172       "classification_results": [  // A List of Mappings: (Target.unique_id, UKeyqord.
              unique_id)
173         [ 1166372514, 2016330087 ],
174         [ 1166372514, 3935737480 ],
175         [ 1166372514, 3145357142 ],
176         [ 1166372514, 3663305810 ]
177         /*...*/
178       ]
179     }
180   ],
181
182   /* SCREENSHOTS */
183   "screenshots": [
184     {
185       "shot_id_global": 1, // The index of the screenshot in all screenshots sorted by
              time
186       "notes": "", // Additional notes from the inspector
187       "title": "Auto_Scr_0",
188       "creation_timestamp": "2018-06-27 10:28:14.640474",
189       "movie_timestamp": 42, // Time in MS
190       "frame_pos": 1, // Frame IDX of this shot
191       "shot_id_segm": 1, // The Index of this Shot within the segment of the main
              segmentation (Starting with one)
192       "scene_id": 1, // The idx of the segment in the main segmentation it is associated
               with (Starting with one)
193       "unique_id": 1651945337,
194       "annotation_item_ids": null // Annotations that should be rendered ontop of this
              Screenshot
195     }
196     /*...*/
197   ],
198
199   /* ANALYSES */
200   "analyzes": [
201     {
202       "has_finished": true, // If the Colorimetry is completely finished
203       "unique_id": 8908799312,
204       "notes": "",
205       "name": "Colormetry",
206       "analysis_container_class": "ColormetryAnalysis"
207     },
208     {
209       "parameters": { "resolution": 100 },
210       "name": "Color-Palette",
211       "analysis_job_class": "ColorPaletteAnalysis",
212       "notes": "",
213       "unique_id": 1105697457,
214       "container": 3778593545,
215       "analysis_container_class": "IAnalysisJobAnalysis"
216     }
217   ],
218
219   /* MOVIE DESCRIPTOR */
220   "movie_descriptor": {
221     "is_relative": false, // If the movie is located in the project directory
```

```
222     "movie_name": "Blade Runner",
223     "movie_id": "3774_1_1", // A ID related to the ERC FilmColors Project
224     "notes": "",
225     "year": 2017, // The Production Year
226     "source": "DVD", // The Source of the Movie
227     "movie_path": "//****/Filme/spaete_Filme/3774_Blade_Runner_2049/3774
            _1_1_Blade_Runner_2049_DVD.m4v", // Abs or rel path depending on the location of
             the movie
228     "unique_id": 5420540984,
229     "duration": 9807872 // Duration in MS
230   }
231
232 }
```