

extractorAPI

Creating a tool to launch image annotation on a GPU
using a vision model

June 13th, 2023

Defining specifications

A module for EiDA

- Separate diagram detection from the app
- Independent element on a different server
- Reusable by other projects

Computational power for IA

- Accelerate detection by the ML model
- Avoid slowing down the entire app

Security & communication

- HTTP protocol
- Secure communication between servers

Overview: annotation workflow

Images import

A digitization is sent on the EiDA platform as a manifest URL, a PDF or image files.

Manifest creation

The EiDA IIIF manifest is generated by an algorithm. It contains the images and metadata.

API request

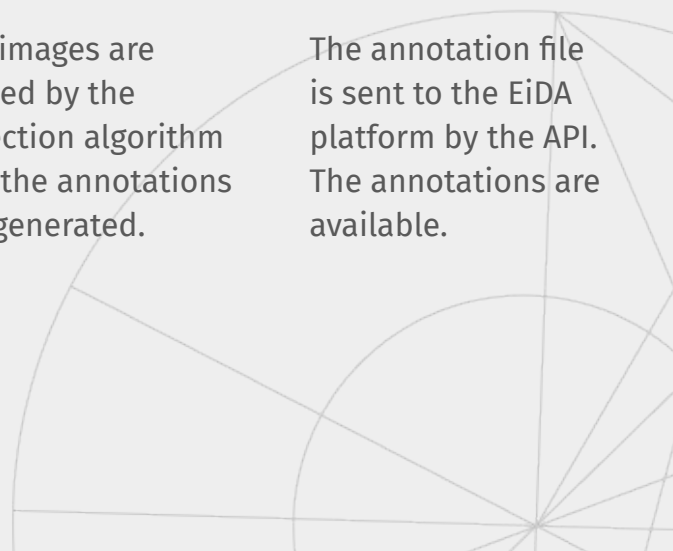
The IIIF manifest is sent on the GPU through a request to the API.

Diagram detection

The images are parsed by the detection algorithm and the annotations are generated.

Annotations return

The annotation file is sent to the EiDA platform by the API. The annotations are available.



IIIF

Make large images available on the Web with possibility to zoom quickly in high quality

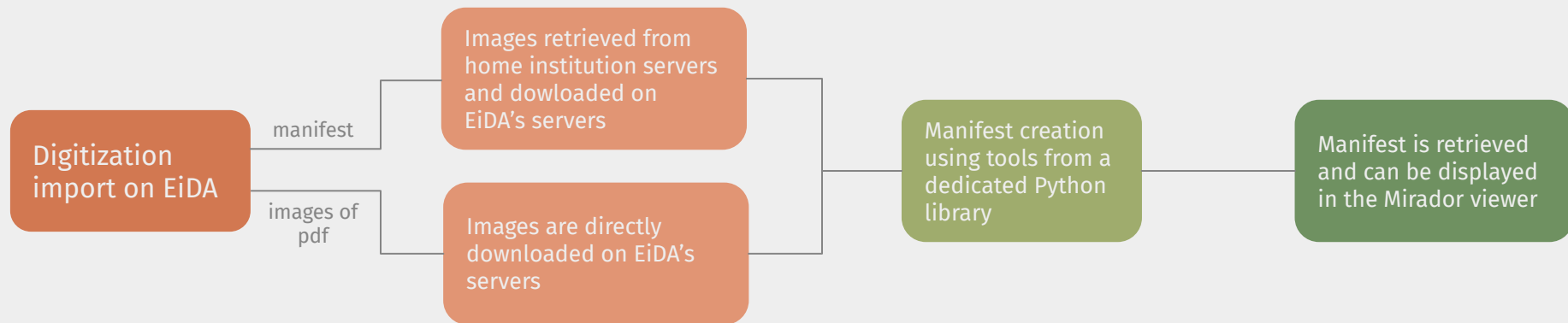
Standards provided to ensure the compatibility of the data shared by the institutions

International Image Interoperability Framework

Implemented in multiple countries to enable institutions to more easily share their collections

Any viewer can be used to view a manifest and images from various sources can be reunited

Generating a IIIF manifest



Anatomy of a IIIF manifest

```
"@context": "http://iiif.io/api/presentation/2/context.json",
"@id": "https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-48/manifest.json",
"@type": "sc:Manifest",
"label": "Paris, BnF | lat. 16709",
"metadata": [
  {"label": "Author", "value": "No author"},
  {"label": "Place of conservation", "value": "Paris, BnF"},
  {"label": "Reference number", "value": "lat. 16709"},
  {"label": "Sheet(s)", "value": "149"}, {"label": "Date", "value": "1201-1500"},
  {"label": "Place of origin", "value": "Paris"}],
"description": "Computer Vision and Historical Analysis of Scientific Illustration Circulation",
"attribution": "EIDA platform",
"viewingHint": "individuals",
```

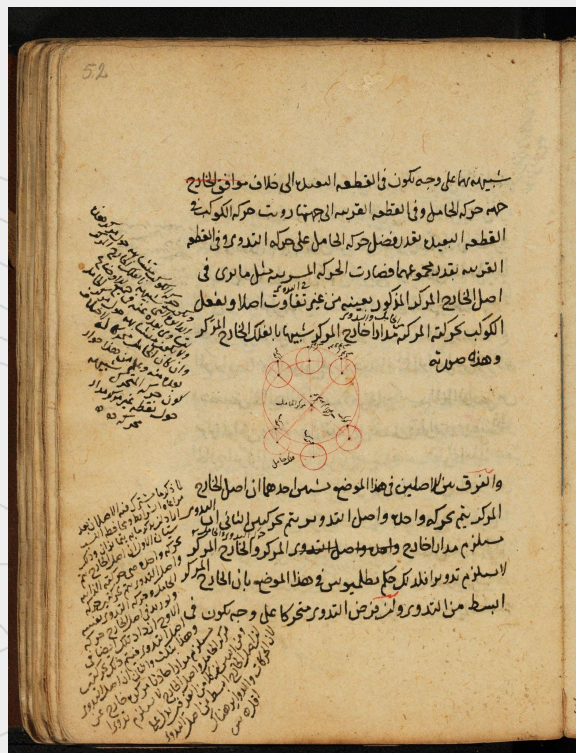
<https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-48/manifest.json>



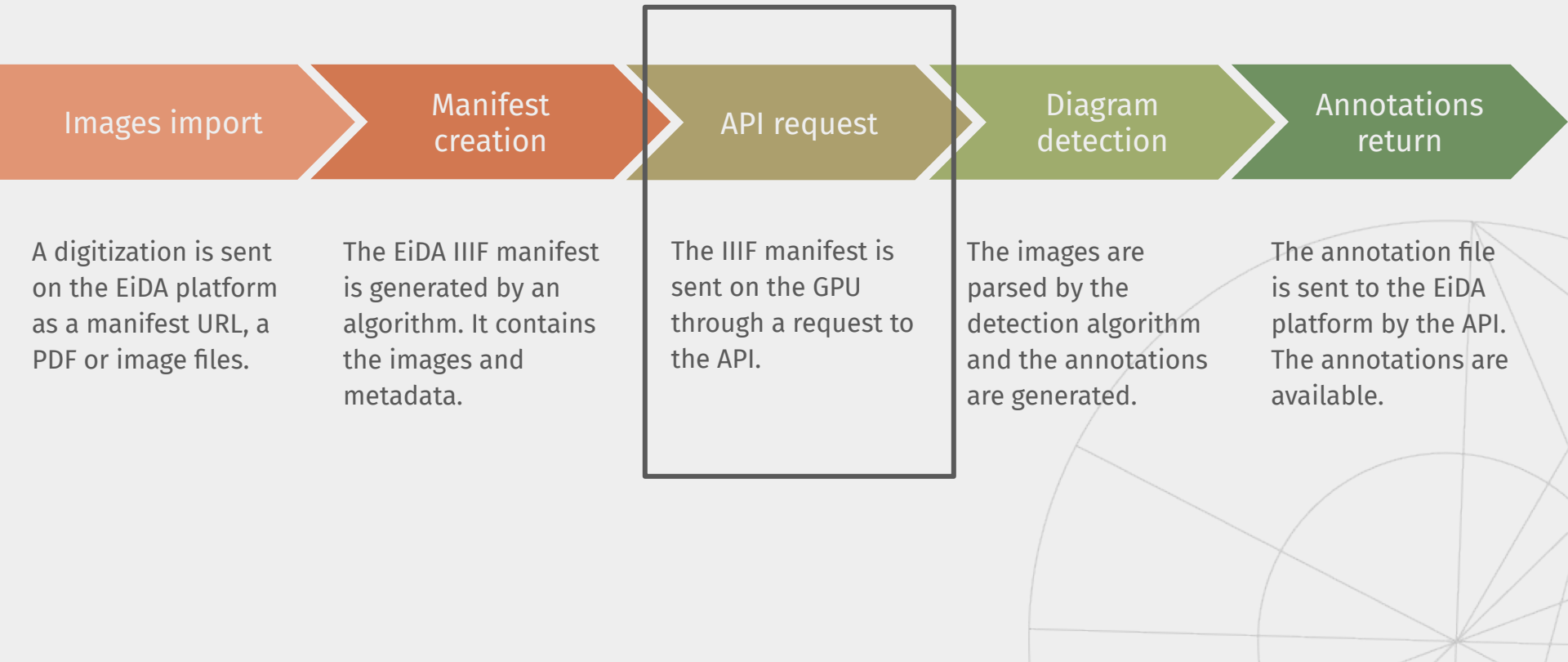
```
{
  "@context": "http://iiif.io/api/presentation/2/context.json",
  "@id": "https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-48/manifest.json",
  "@type": "sc:Manifest",
  "label": "Paris, BnF | lat. 16709",
  "metadata": [
    {
      "label": "Author",
      "value": "No author"
    },
    {
      "label": "Place of conservation",
      "value": "Paris, BnF"
    },
    {
      "label": "Reference number",
      "value": "lat. 16709"
    },
    {
      "label": "Sheet(s)",
      "value": "149"
    },
    {
      "label": "Date",
      "value": "1201-1500"
    },
    {
      "label": "Place of origin",
      "value": "Paris"
    }
  ],
  "description": "Computer Vision and Historical Analysis of Scientific Illustration Circulation",
  "attribution": "EIDA platform",
  "viewingHint": "individuals",
  "sequences": [
    {
      "@id": "https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-48/sequence/normal.json",
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      "label": "Normal Order",
      "canvases": [
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          "label": "Page 1",
          "height": 1074,
          "width": 1500,
          "images": [
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              "@type": "oa:Annotation",
              "motivation": "sc:painting",
              "resource": [
                {
                  "@id": "https://eida.obspm.fr/iiif/2/ms48_0001.jpg/full/full/0/default.jpg",
                  "@type": "dctypes:Image",
                  "format": "image/jpeg",
                  "height": 1074,
                  "width": 1500,
                  "service": [
                    {
                      "@id": "https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-48/canvas/c1.json",
                      "@type": "sc:Canvas"
                    }
                  ]
                }
              ]
            }
          ]
        }
      ]
    }
  ]
}
```

IIIF images

https://eida.obspm.fr/iiif/2/ms90_0029.jpg/full/full/0/default.jpg



Sending a request to the API



Application programming interface

A software interface

- No user interface
- A tool for computer programs to communicate

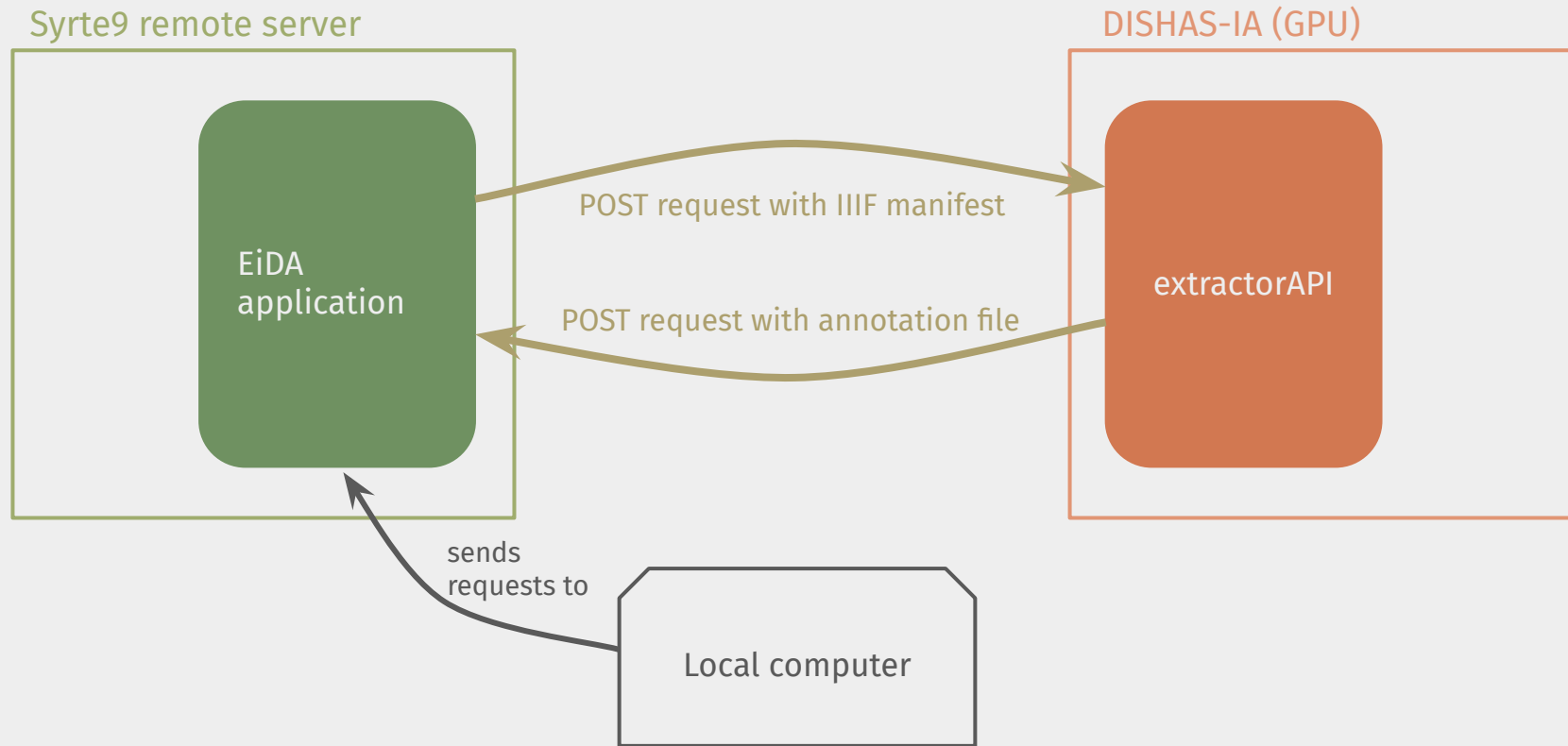
Requests and responses

- HTTP methods: POST requests
- API endpoint

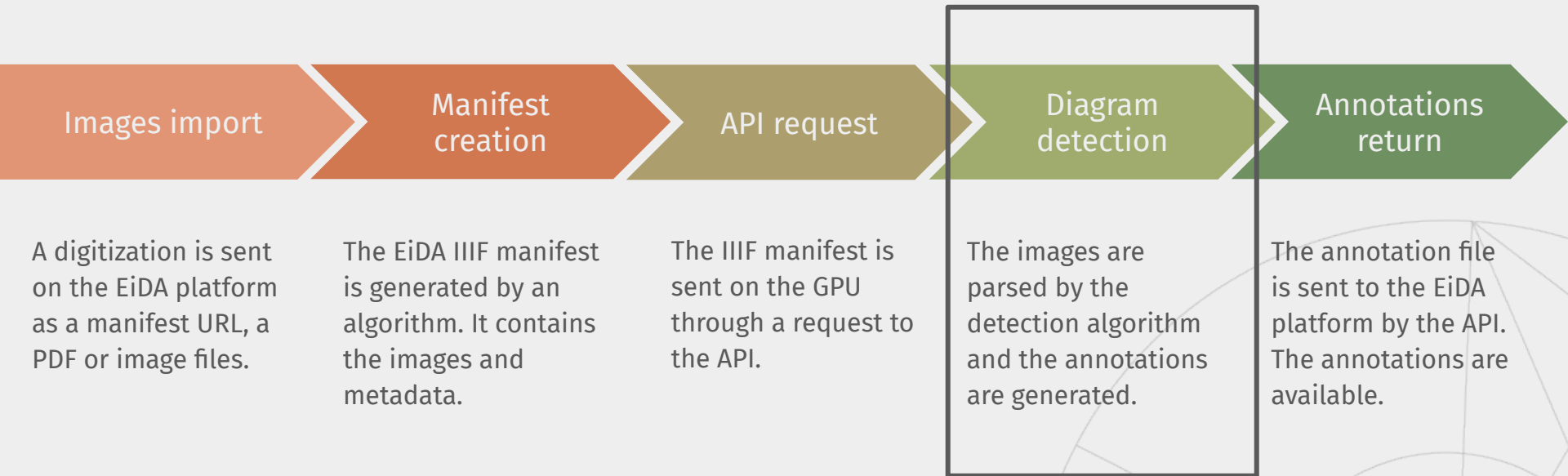
Data exchange

- IIIF manifest is sent through a request
- Annotation file is sent as a response

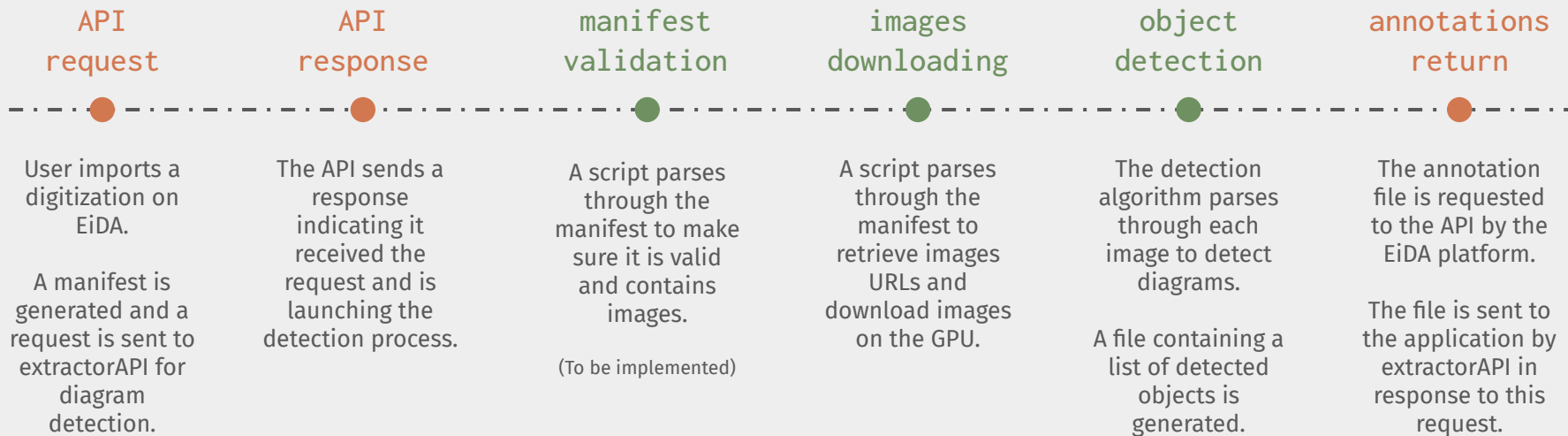
extractorAPI and the GPU



Launching annotation 🚀



From EiDA to extractorAPI (to EiDA)



Annotating a manuscript

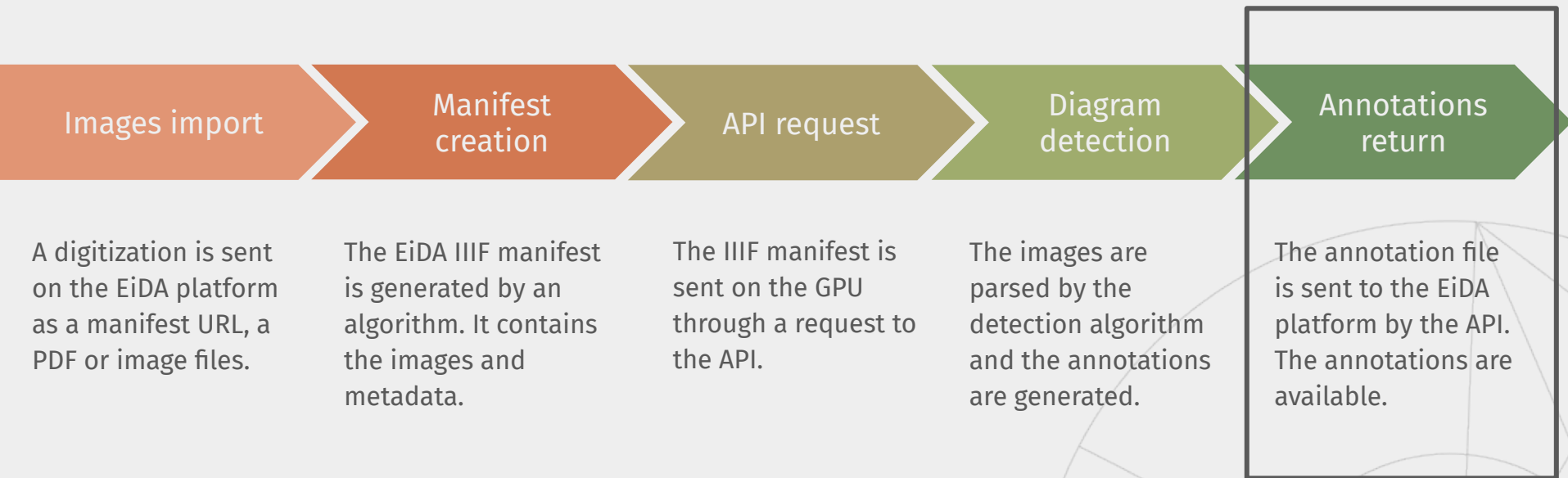
A request is sent to the API with some data

The data sent to the API is the URL of a IIIF manifest

```
curl -X POST -F manifest_url='https://eida.obspm.fr/eida/iiif/auto/manuscript/ms-32/manifest.json'  
http://127.0.0.1:5000/run_detect
```

Sent to an API endpoint that will call the detection function

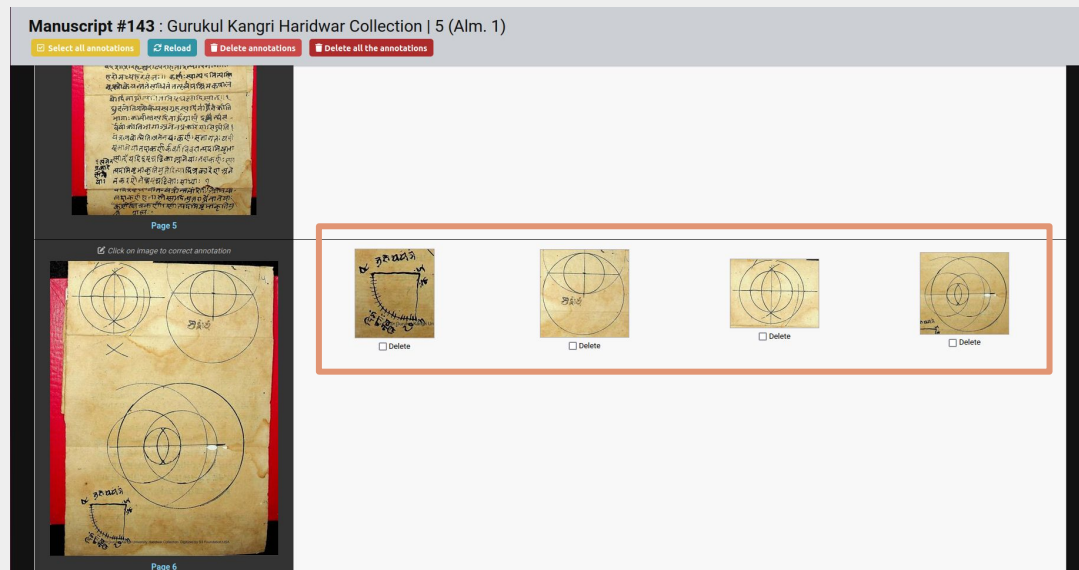
Final step?



The annotation file

143.txt

1 ms143_0001.jpg
0 1073 1937 870
0 33 1937 1017
2 ms143_0002.jpg
312 1945 1341 284
671 1803 142 138
3 ms143_0003.jpg
4 ms143_0004.jpg
74 92 1628 1840
5 ms143_0005.jpg
6 ms143_0006.jpg
243 1852 464 549
168 7 763 618
440 951 1174 1130
919 47 851 826
7 ms143_0007.jpg
155 99 1576 1112
8 ms143_0008.jpg
4 36 1937 817
0 0 1941 1937



The annotation file

4th image

Corresponding
image file name

4 ms143_0004.jpg

74 92 1628 1840

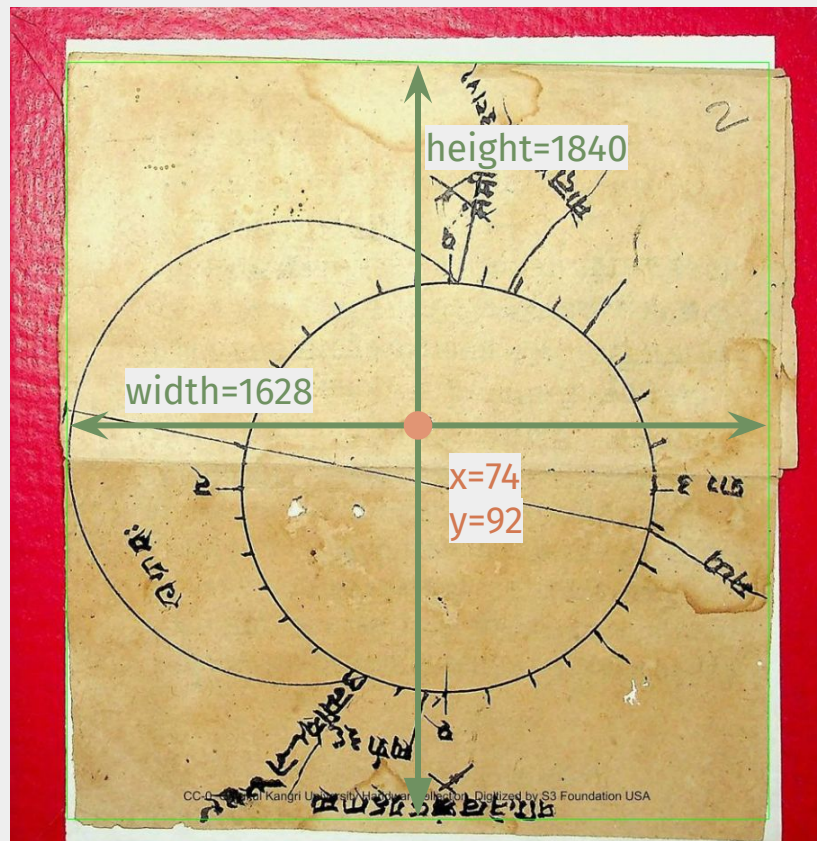
x

y

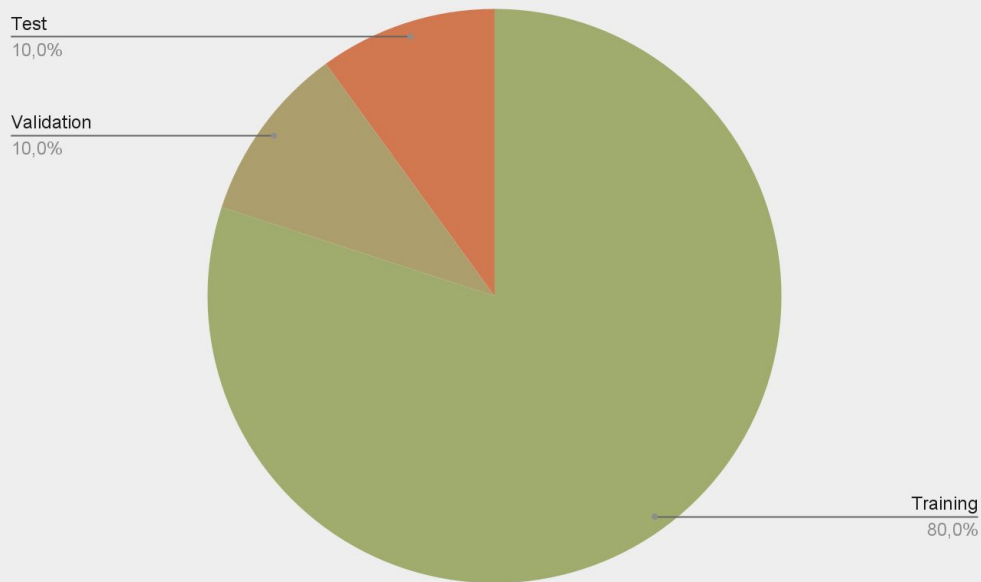
width

height

The annotation file



Building a ground truth



A dataset of images and their annotation files, separated in three groups:

Test: 10%

- Evaluate the performances of different models to select the more efficient one

Training: 80%

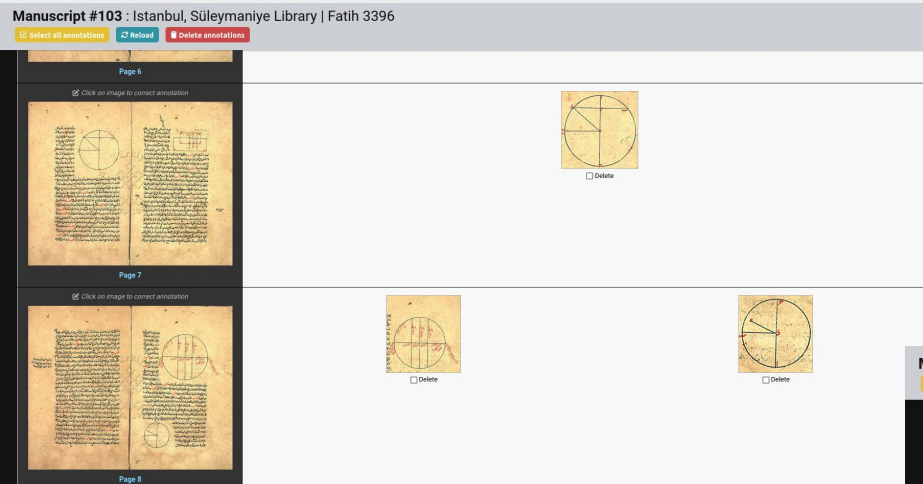
- Models currently trained on other datasets (VHS)
- Choose a representative dataset to improve the performances of the model

Validation: 10%

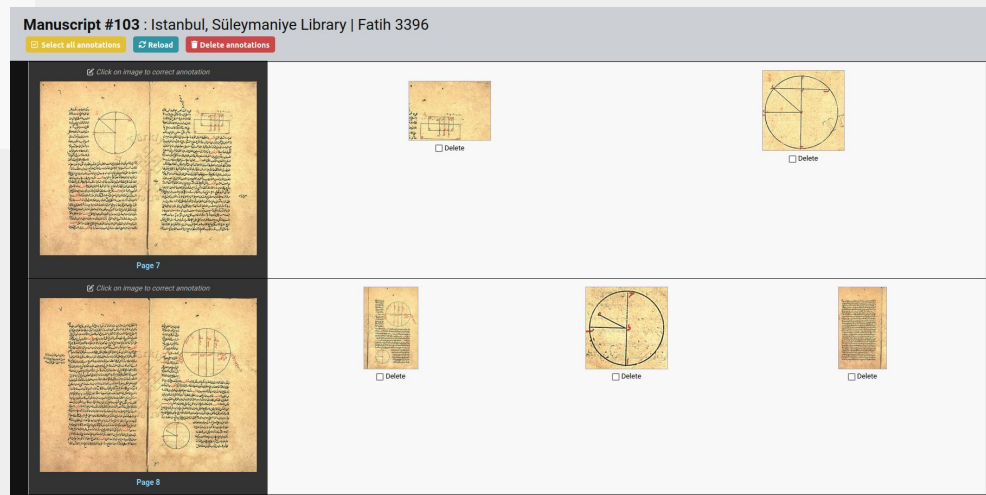
- Validate training by comparing performances with initial test results

Training a model

YOLOv5



docExtractor



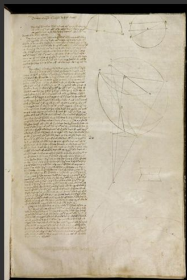
Training a model

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Select all annotations Reload Delete annotations

Page 4

Click on image to correct annotation



Page 5



Delete



Delete



Delete



Delete



Delete

docExtractor

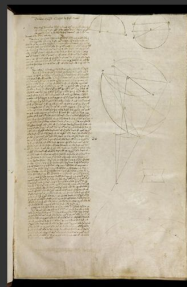
YOLOv5

Manuscript #41 : Melbourne, State Library of Victoria | RARES 091 P95A

Select all annotations Reload Delete annotations

Page 4

Click on image to correct annotation



Page 5



Delete

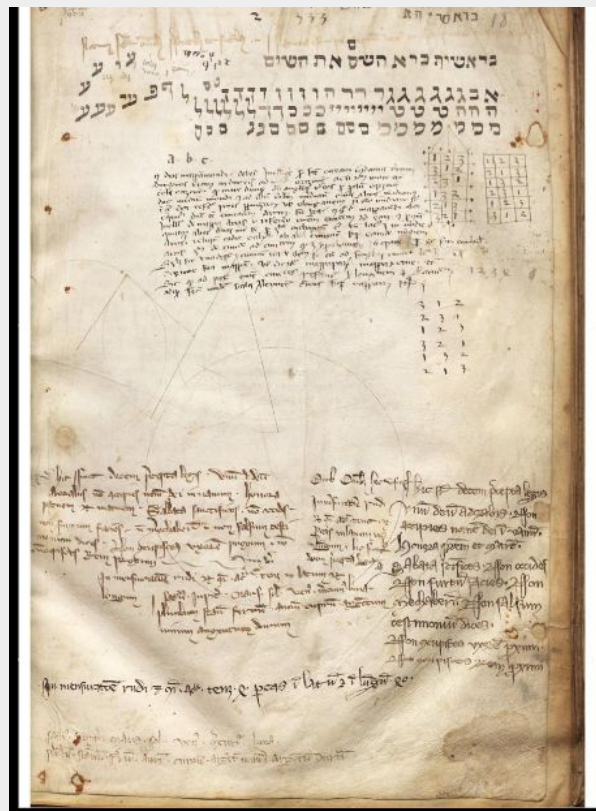
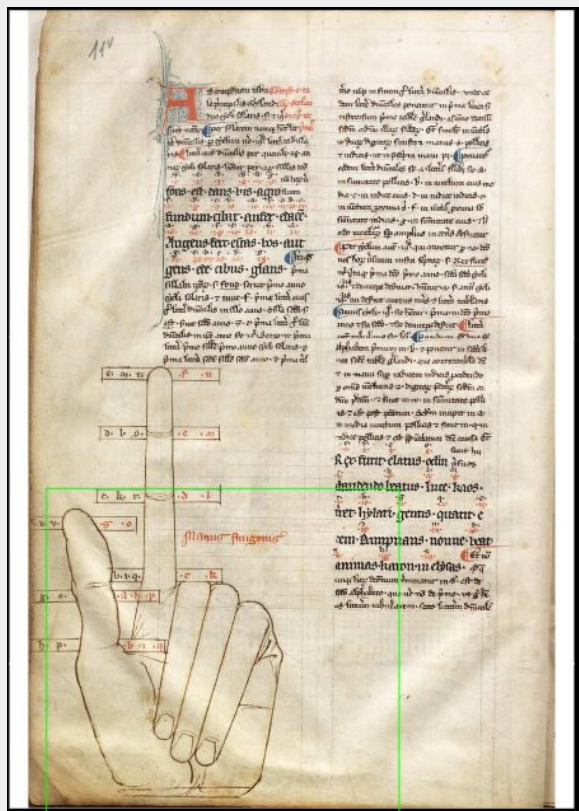


Delete



Delete

Defining annotation specifications





Thank you!