Interactive image annotation with scikit-image, plotly and Dash

Emmanuelle Gouillart

Saint-Gobain Research Paris, plotly and scikit-image

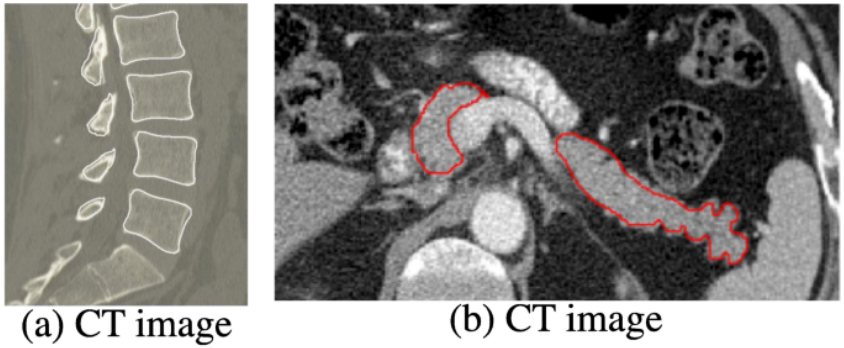
@EGouillart

Chan Zuckerberg Initiative

Essential Open Source Software for Science

Building training sets thanks to image annotations

From https://becominghuman.ai/what-is-the-use-and-purpose-of-image-annotation-in-object-detection-8b7873a14cd0

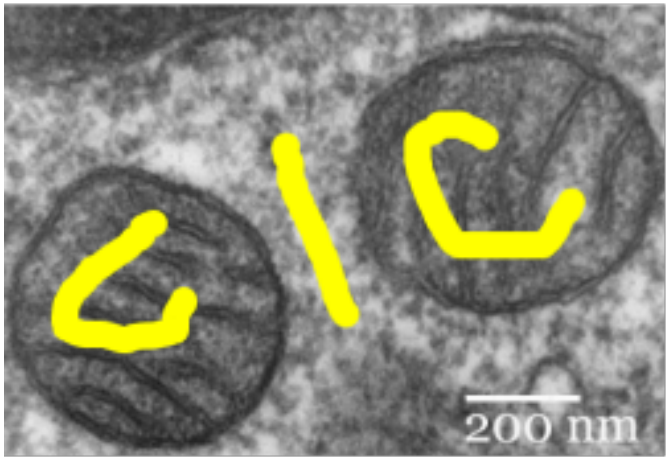


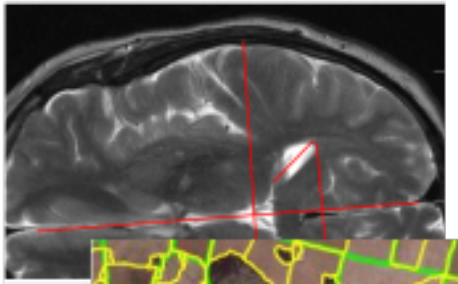
(a) CT image (b) CT image

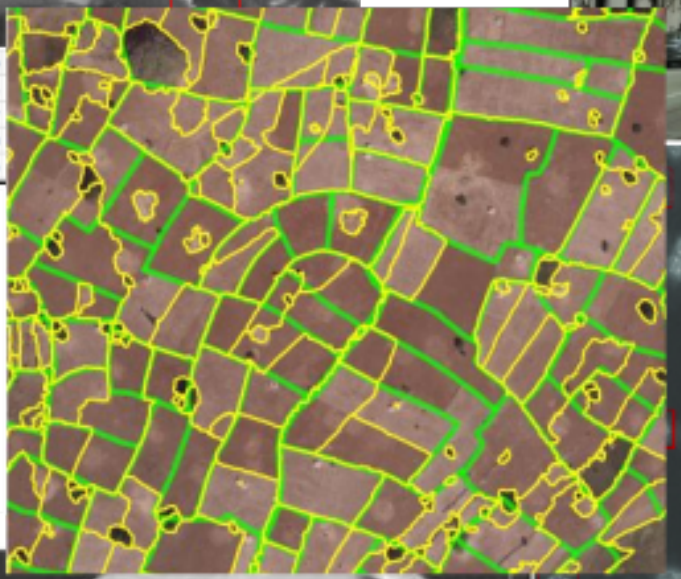
(d) CT image (c) X-ray image

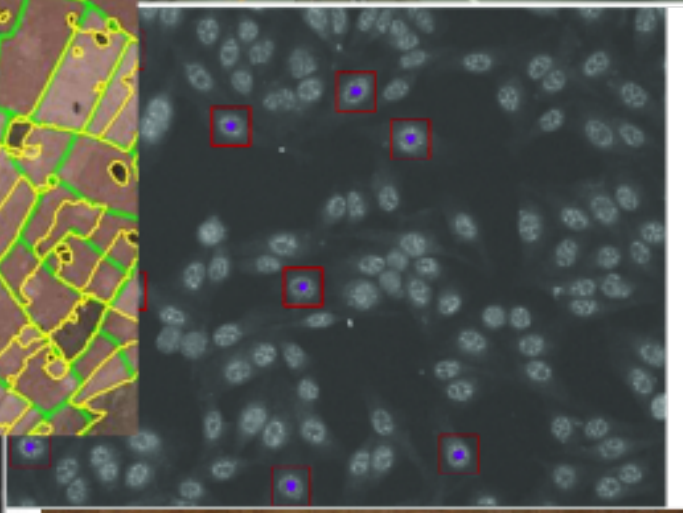
Aljabri, Manar, et al. "Towards a better understanding of annotation tools for medical imaging: a survey." 2022

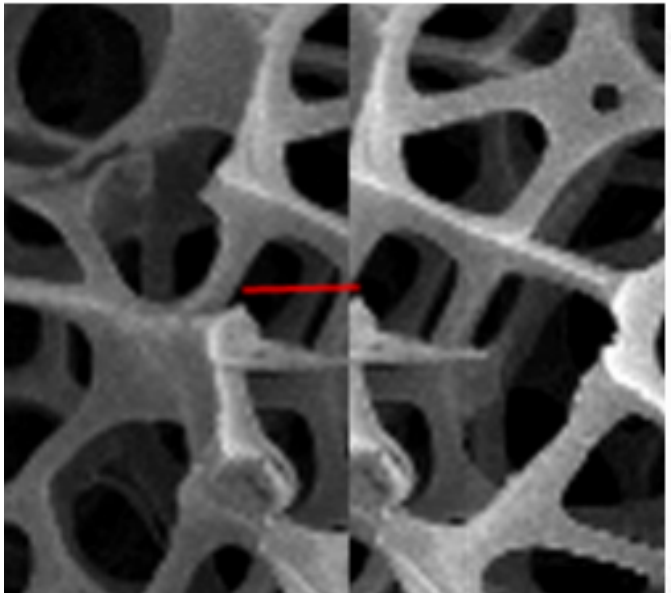
Interaction with images: annotations

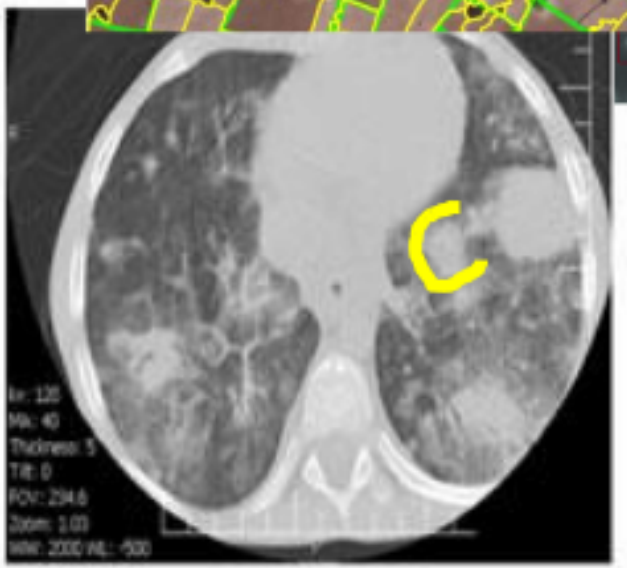




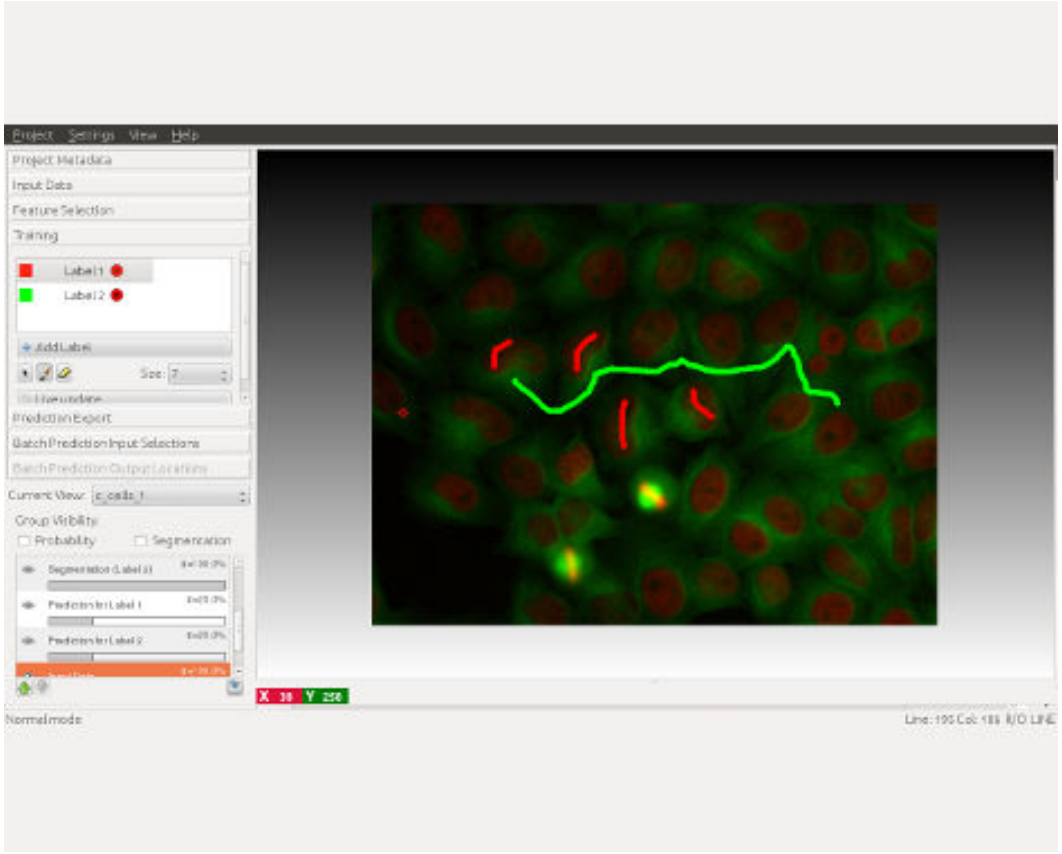




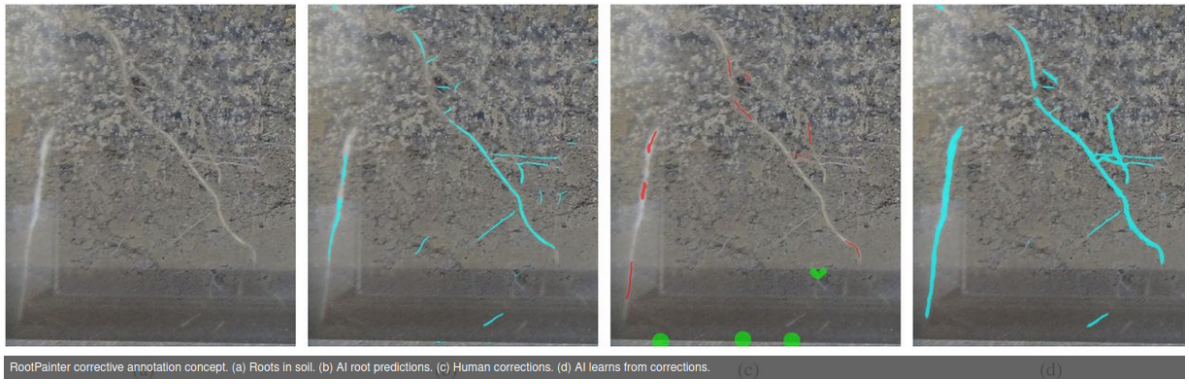




Some existing tools



ilastik



RootPainter

Building modular annotation tools in web apps

- Modular tools to serve different applications
- Python tools
- Web apps vs. desktop applications or client-side execution

Plotly graphing libraries

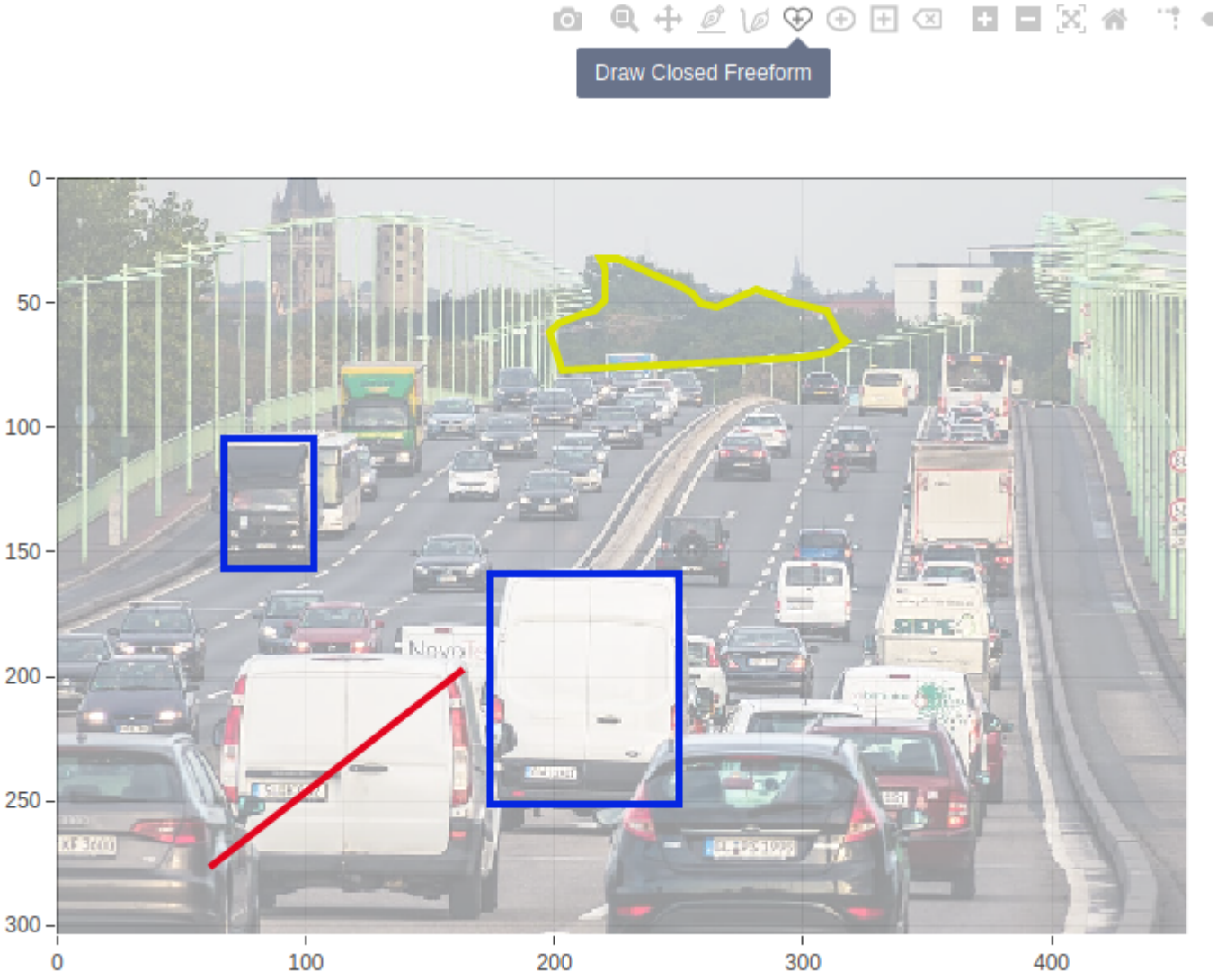
Javascript interactive library with Python (R, Julia) API

Large variety of traces and layout options

High-level API `plotly.express` and low-level API `plotly.graph_objects`

`https://plotly.com/python/`

Drawing and annotation tools in plotly graphing libraries



Introduced in `plotly` 4.7: 5 new dragmodes for drawing shapes
`relayoutData` events for Dash apps $\rightarrow$ geometry of annotations

Credits: Mojtaba Samimi

plotly

Dash

Dash lets you build beautiful web-based analytic interfaces on top of Python or R code.

- Interactive, web-based visualization
- Core libraries: dash, dash-core-components, dash-html-components
- Specialized libraries: dash-daq, dash-bio
- MIT licensed and open-source

`https://dash.plotly.com/`

`pip install dash`

Python only, no Javascript required

plotly

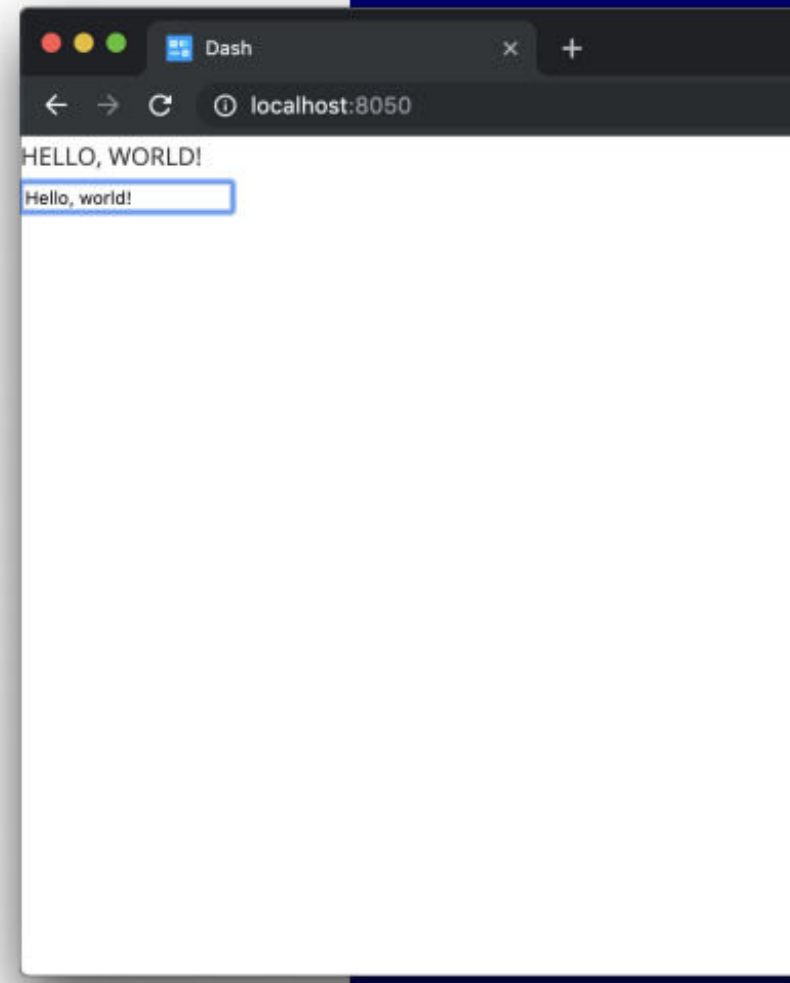
Creating a Dash App

```
import dash
import dash_html_components as html
import dash_core_components as dcc

app = dash.Dash()
app.layout = html.Div(children=[
  html.Div(id='output-div'),
  dcc.Input(id='text-input')
])

@app.callback(
  dash.dependencies.Output(
    'output-div', 'children'
  ),
  [dash.dependencies.Input(
    'text-input', 'value'
  )]
)
def capitalize_user_input(text):
  return text.upper()

app.run_server()
```



Beautiful, highly customizable apps

plotly

https://dash-gallery.plotly.host/Portal/

Beautiful, highly customizable apps

Python, R (and now Julia)

`https://medium.com/plotly/dash-is-react-for-python-r-and-julia-c75822d1cc24`