XRF-Explorer 2.0

SEP 2023-2024 Q4

Group 6

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Agenda

- Context
- Problem
- Goals
- Architecture
  - Global
  - Front-end
  - Back-end
- Demo

Context

Museum analysts need to perform in-depth analysis of paintings

Paintings fade over time

Hidden work beneath the surface

Check for legitimacy

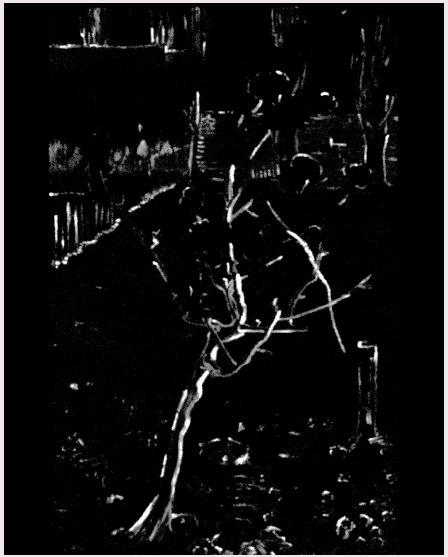
Context

X-Ray Fluorescence (XRF) scans of paintings

- Distribution of chemical elements
- Representation of pigments used by artist
- Non-invasive technique

Context

RGB Image



Bromine map showing faded red pigments

Zinc map showing different white paint used

Context

Macro X-Ray Fluorescence Mapping of Paintings

- Distribution of chemical elements
- Representation of pigments used by artist

Scans stored in large data cubes

- Hard to visualize and analyse
- Multiple sources (RGB, UV, X-Ray, etc.)

Context

XRF Explorer 1.0

- Proof of concept
- Unstable
- Lacks robustness
- Not easily accessible
- No further development possible

The Problem

No stable and accessible application for visualizing and exploring the XRF maps.

Create such a tool.

Goals

- Develop a stable and accessible application
- Allow importing data from various XRF scanning instruments
- New features and improvements
- Verify the application using unit tests and UI/UX tests
- Deliver a modular and documented application

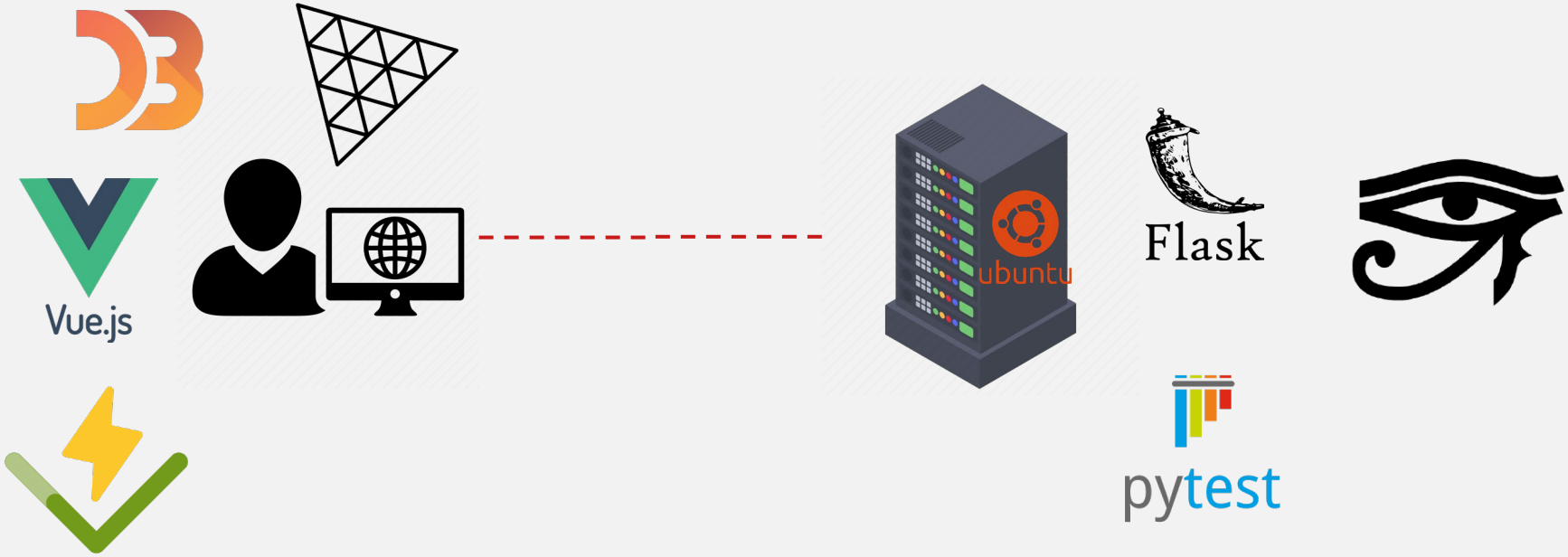
Front-end

- SSR vs. CSR
- Vite vs. Webpack
- TypeScript
- WebGL

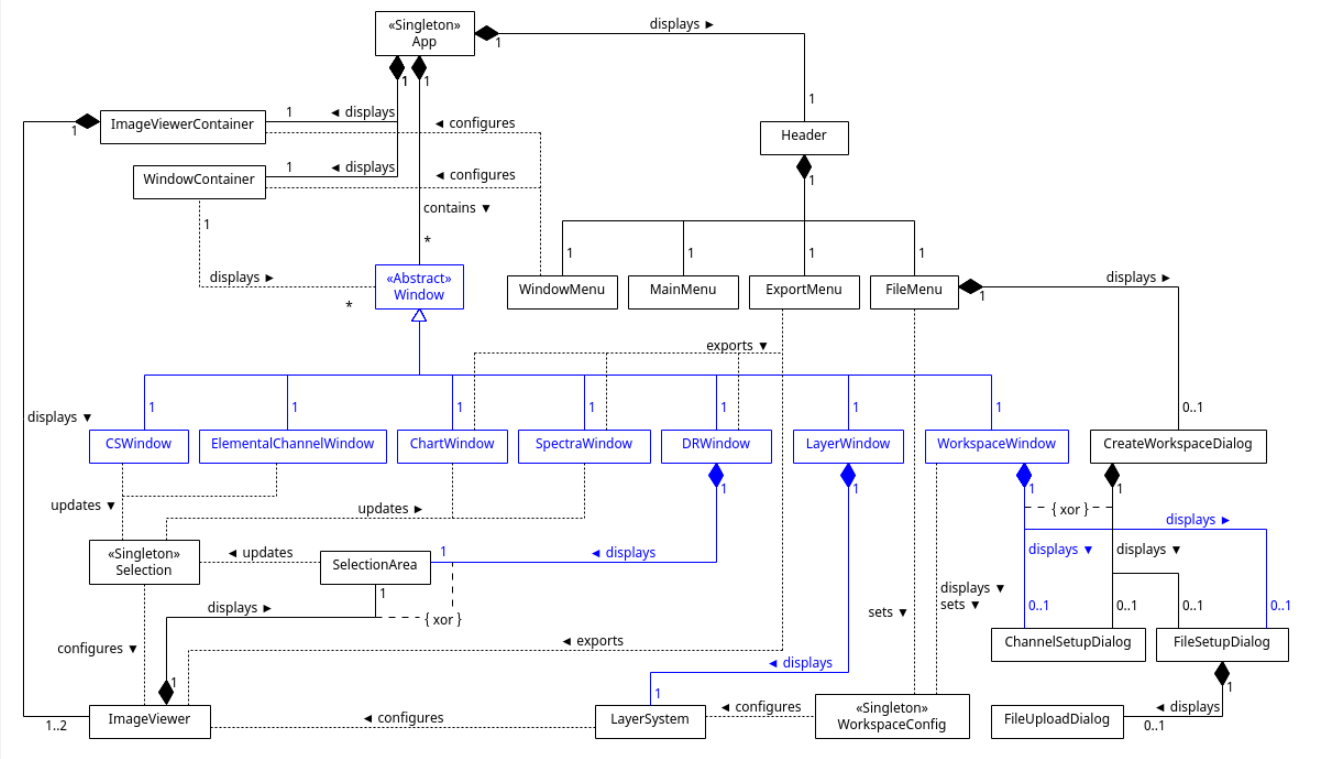
Back-end

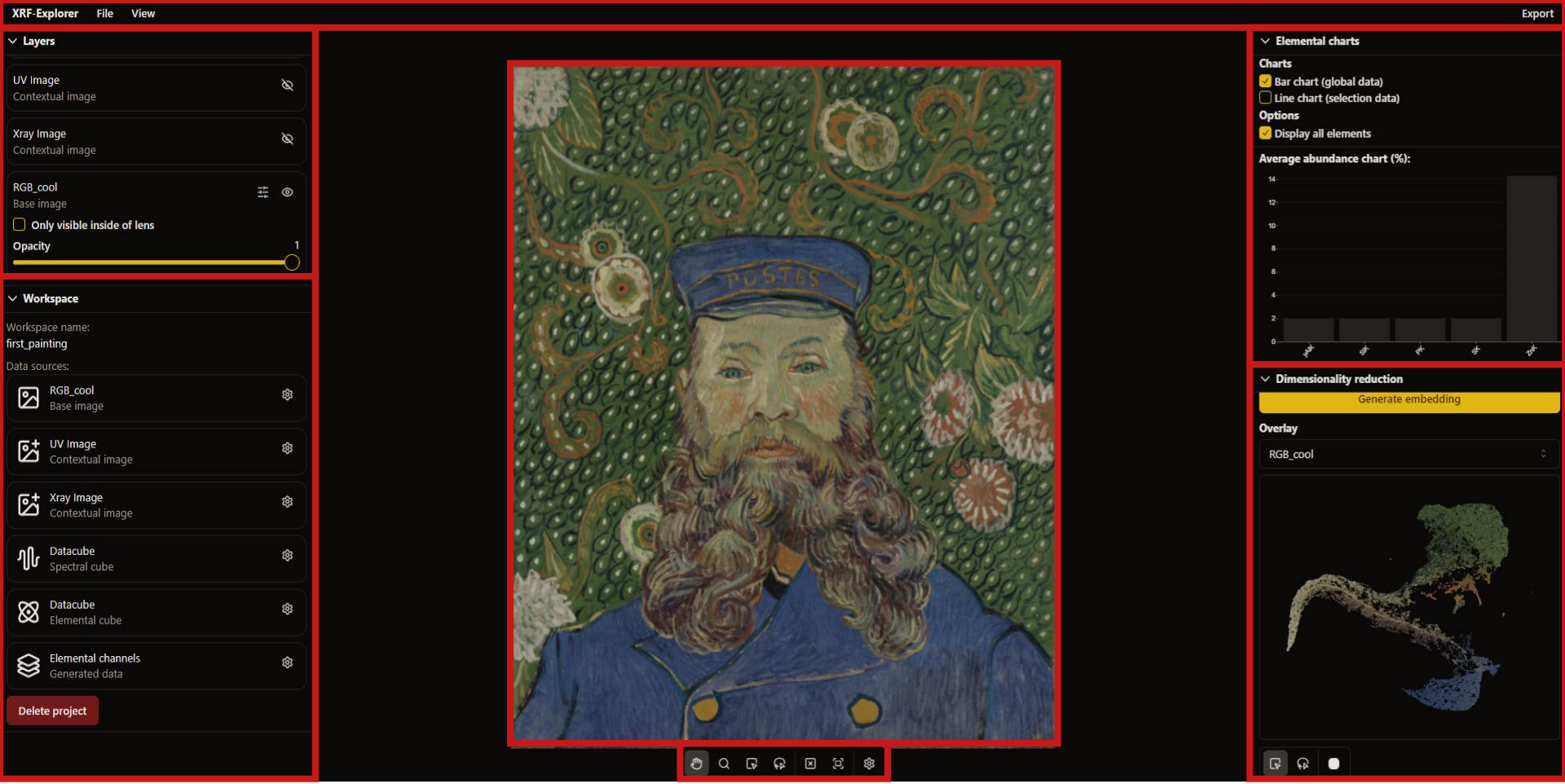
- Python
- Flask vs Django
- Pytest

Global architecture

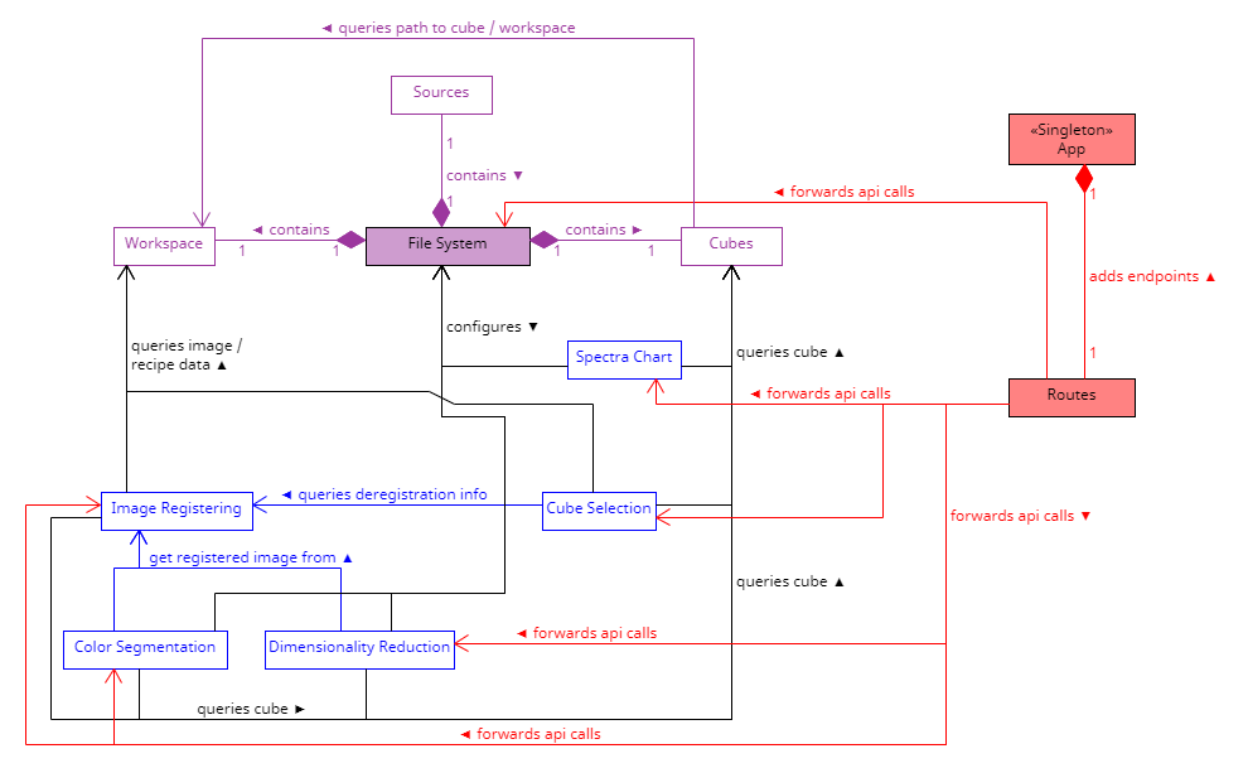


Front-end architecture




XRF-Explorer
File
View
Export
Layers
UV Image
Contextual image
Xray Image
Contextual image
RGB_cool
Base image
Only visible inside of lens
Opacity
1
Workspace
Workspace name:
first_painting
Data sources:
RGB_cool
Base image
UV Image
Contextual image
Xray Image
Contextual image
Datacube
Spectral cube
Datacube
Elemental cube
Elemental channels
Generated data
Delete project
POSTES
Elemental charts
Charts
Bar chart (global data)
Line chart (selection data)
Options
Display all elements
Average abundance chart (%):
14
12
10
8
6
4
2
0
Dimensionality reduction
Generate embedding
Overlay
RGB_cool

Back-end architecture



Demo!

Acknowledgements

A special thank you to

- Ana Martins, Marco Roling (Van Gogh Museum)
- Lars Maxfield (ASML)
- Konstantinos Chanioglou, Antreas Efsthatiou (Project Managers)
- Professor Roel Bloo (Supervisor)

Data & Images provided by Abed Haddad (Museum of Modern Art NYC)