3.1. COMPUTATIONAL IMAGE COMPLEXITY ANALYSIS (CICA)

Export 3D models as fbx

FACADE MODELING

VIRTUAL SITE
Building and terrain

PATTERNS MODULE
| P1 | P2 | P3 |

10 FACADE VARIATIONS
| P1 | P2 | P3 |

Render images as PNG

FACADE VARIATION FOLDERS
Organize in Folders

Render Image of facade labeled by variation number and pattern

FACADE VAR.

HISTORY ANALYSIS

ARCHITECTURAL STYLES
Images of buildings by architecural style.
- ID by year, name
- Organize per Style

ARCH. STYLES FOLDERS
Organize in Folders

Building's Image with year and per style

ARCH. STYLES

CICA process

CALCULATE COMPLEXITY

Input Images
- Asign folder name for identification

Process Images
- Convert to grayscale
- Apply Gaussian Blur to reduce noise

Metrics
- Calculate Edge density
- Calculate contour count

Complexity Score f1(x)
- Normalize metrics
- sum of the product of the metrics times a weight value

OUTPUT
- Complexity score based on edge density and contour count
- ID per name and folder

Were all images processed?

? — Yes
? — Yes

No
No

Ranked facades (1 to 10) per pattern
| P1 |
| P2 |
| P3 |

VR INTEGRATION
- Import 3D models and ranking data.
- Unity compile and Build

Buildings per arch style
ID = score_year_style

Complexity across STYLES
Graph and trendline on complexity score across the years