2 3.1.2 COMPUTATIONAL IMAGE COMPLEXITY ANALYSIS (CICA)

INPUT

(a) FACADE MODELING

VIRTUAL SITE
Building and terrain

PATTERNS MODULE
P1 P2 P3

10 FACADE VARIATIONS
P1 P2 P3

Render images as PNG

Export 3D models as fbx

FACADE VARIATION FOLDERS
Organize in Folders
Render Image of facade labeled by variation number and pattern

(b) 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

CICA PROCESS

CALCULATE COMPLEXITY

Input Imag: Asign folder name for identification

Process Images
(1) Convert to grayscale, apply Gaussian Blur to reduce noise

Metrics: Calculate
(2) Edge density
(3) Contour count

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

No

OUTPUT

CICA SCORE

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

Were all images processed?

No

Yes

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

Yes

Buildings per arch style
ID = score_year_style

Complexity Graph across STYLES:
based on CICA score

3 3.1.3 VR

VR INTEGRATION

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

c) 3D Virtual Exterior

d) 3D Virtual Interior

c) 3D Virtual Exterior

d) 3D Virtual Interior

CICA PROCESS