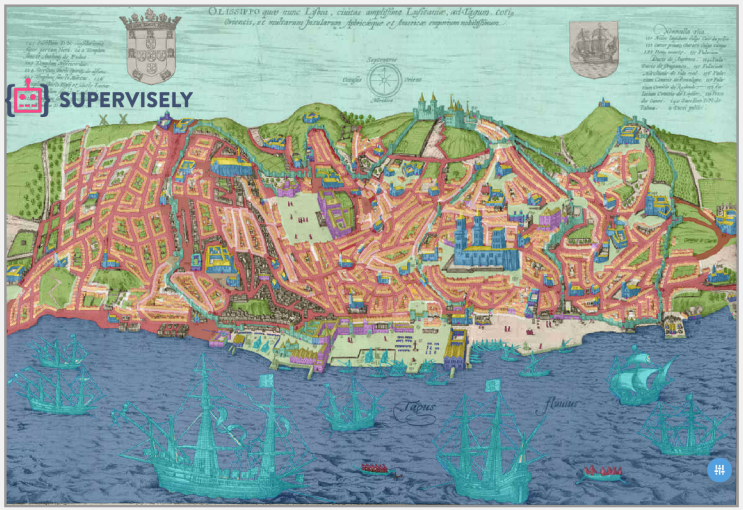
The Book of Fortresses

Basic Labeling of Cartographic Elements, ~500 present

1600 Braun Lisbon



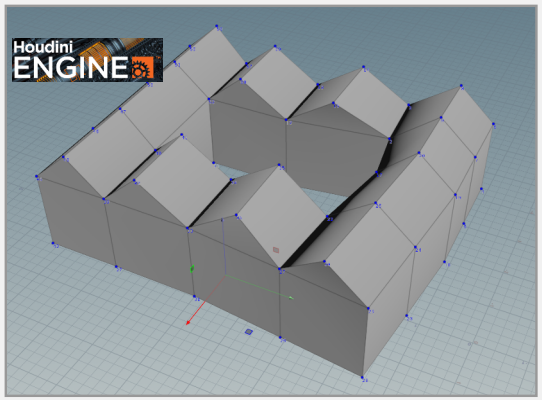
Increased Detail and Variety of Elements, ~4100 Present

Mapping History categorizes, labels, digitizes, and reconstrucsts 16th & 17th century maps & atlases of London and Lisbon

MAPPING HISTORY

Duke UNIVERSITY

Data+



3D representation with Houdini

Highly Specific Labeling of Cartographic Elements

```python
#method to check for image overlap
def match(big, small):
    #convert images to arrays
    #convert images to arrays
    arr_h = np.asarray(big) #forms pixel array of container
    arr_n = np.asarray(small) #forms pixel array of label
    #ckb9l8t9x13rh0yd1dluf8y5x.png ckb9mmzok16kp0yejgwly0tz5.png
    #ckb9l8t9x13rh0yd1dluf8y5x.png ckb9lafog00d90ycqarsxdvyh.png
    arr_hOnes = np.where(arr_h > 0, 1, arr_h) #set any values that are not 0 in container array to 1 for easy comparison
    arr_nOnes = np.where(arr_n > 0, 1, arr_n) #set any values that are not 0 in label array to 1 for easy comparison
    freq_h = np.count_nonzero(arr_hOnes == 1) #container pixels
    freq_n = np.count_nonzero(arr_nOnes == 1) #label pixels
    print(arr_hOnes)
    print(arr_nOnes)
    arr_and = arr_hOnes & arr_nOnes #find where overlap is
    freq_and = np.count_nonzero(arr_and == 1)
    print(freq_h, freq_n, freq_and) #pixels covered by container, label, overlap
```

1616 Visscher London

Categorizing an Extensive Range of Structures & Iconography