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ECCV'20 ONLINE

Deep Vectorization of Technical Drawings

Vage Egiazarian[1*], Oleg Voynov[1*], Alexey Artemov[1],
Denis Volkhonskiy[1], Aleksandr Safin[1], Maria Taktasheva[1],
Denis Zorin[2,1], Evgeny Burnaev[1]

[1] Skolkovo Institute of Science and Technology, Russia
[2] New York University, USA

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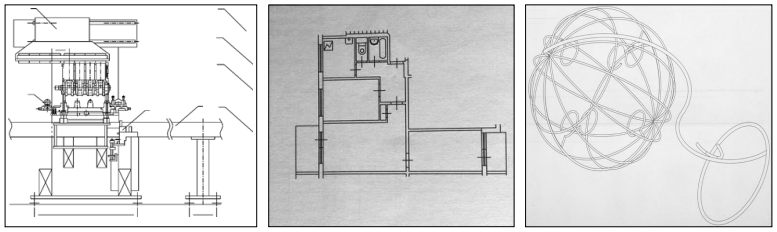
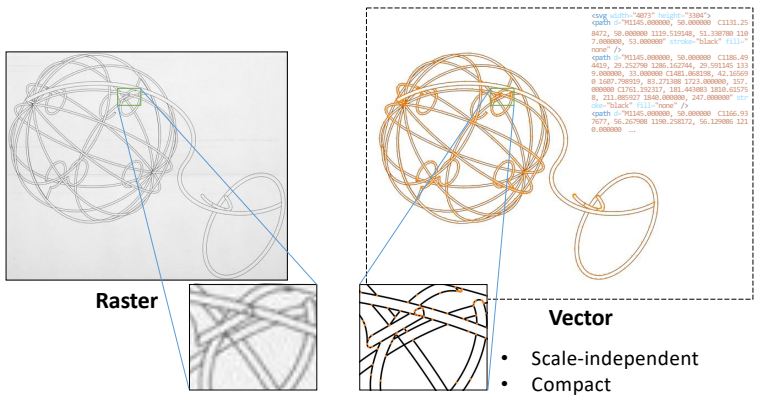
Intro:



3



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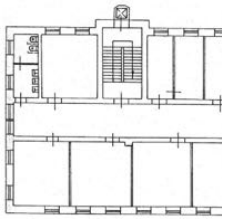
Requirements of technical vectorization



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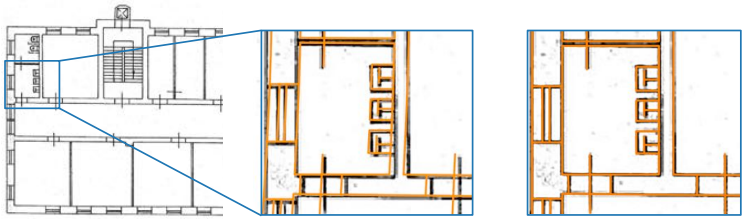
Requirements of technical vectorization



- Exact representation
- No noise in output
- Minimal number of primitives

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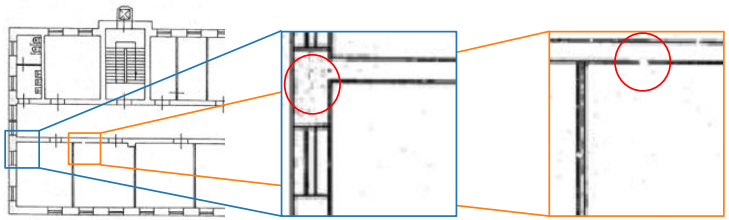
Requirements of technical vectorization



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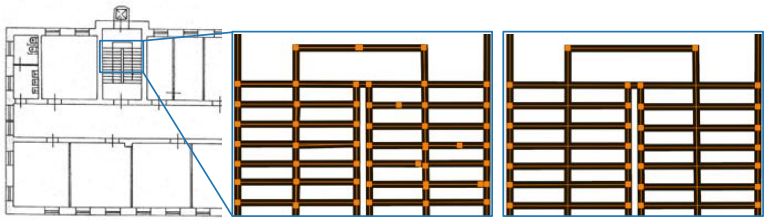
Requirements of technical vectorization



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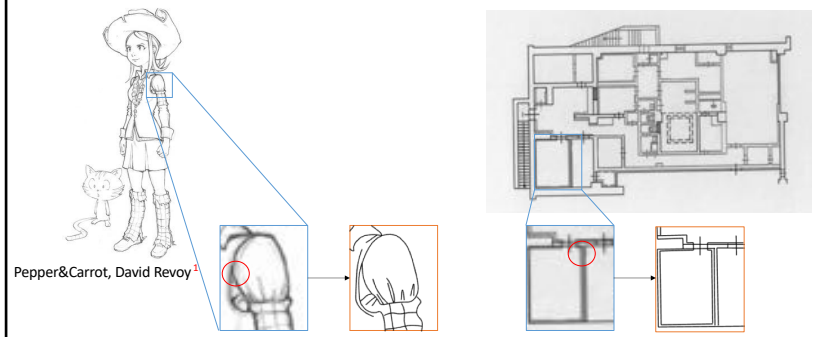
Intro3:



[1] www.peppercarrot.com

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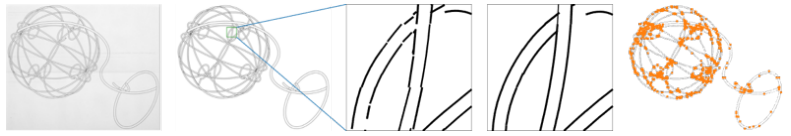
Overview



Input raster image | Noise removal, contrast adjustment, hole inpainting | Estimation of primitives | Refinement of primitives | Merging of patches

Requirements of technical vectorization

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Overview

Input raster image | Noise removal, contrast adjustment, hole inpainting | Estimation of primitives | Refinement of primitives | Merging of patches

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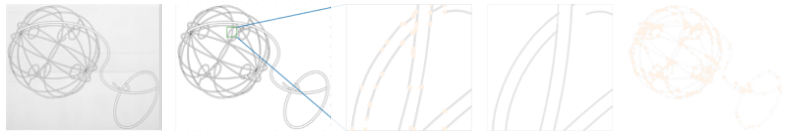
Overview



Input raster image | Noise removal, contrast adjustment, hole inpainting | Estimation of primitives | Refinement of primitives | Merging of patches

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- Minimal number of primitives

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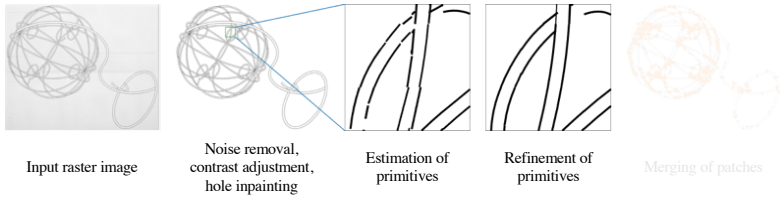
Overview



Requirements of technical vectorization

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- Minimal number of primitives

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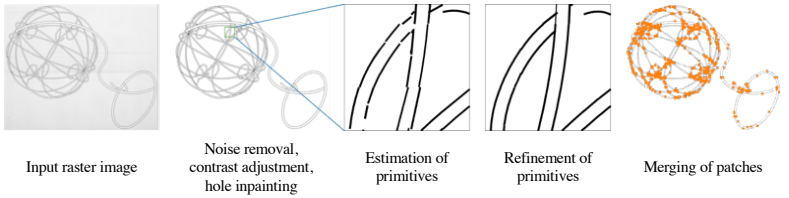
Overview



Requirements of technical vectorization

- Exact representation
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- Minimal number of primitives

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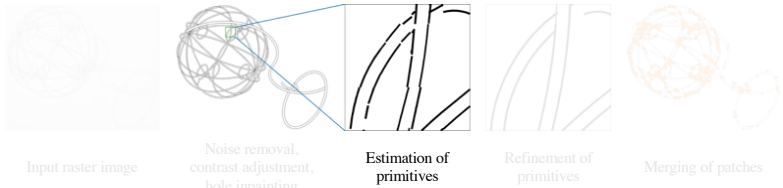
Overview



Requirements of technical vectorization

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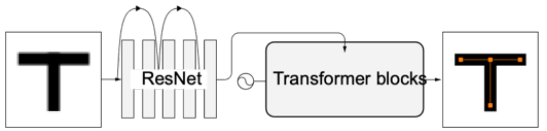
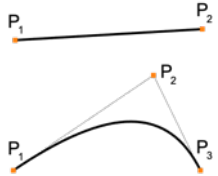
Estimation of primitives




```
Primitive {
    control_point_1_x;
    control_point_1_y;
    ...
    control_point_k_y;
    width;
    confidence;
}
```

- Operation on patches for increased efficiency and robustness
- Learning for automatic optimal representation
- Attention to leverage sparsity of line drawings



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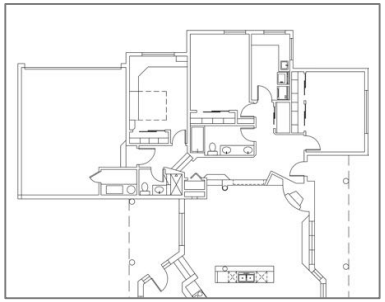
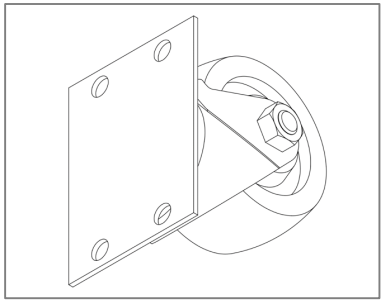
Datasets:



1.5k real-world floorplans [1]



10k mechanical drawings

[1] http://precisionfloorplan.com

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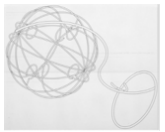
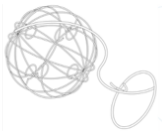


Input raster image



Noise removal, contrast adjustment, hole inpainting

Estimation of primitives

Refinement of primitives

Merging of patches

Requirements of technical vectorization

- Exact representation
- No noise in output
- Minimal number of primitives

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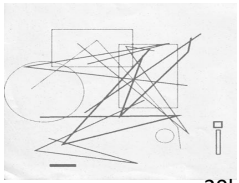
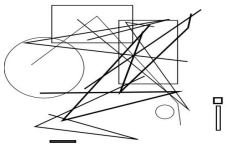
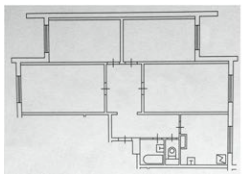
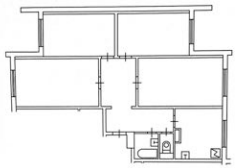
Cleaning:





20k synthetic images





66 real-world floorplans

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Input raster

Model output

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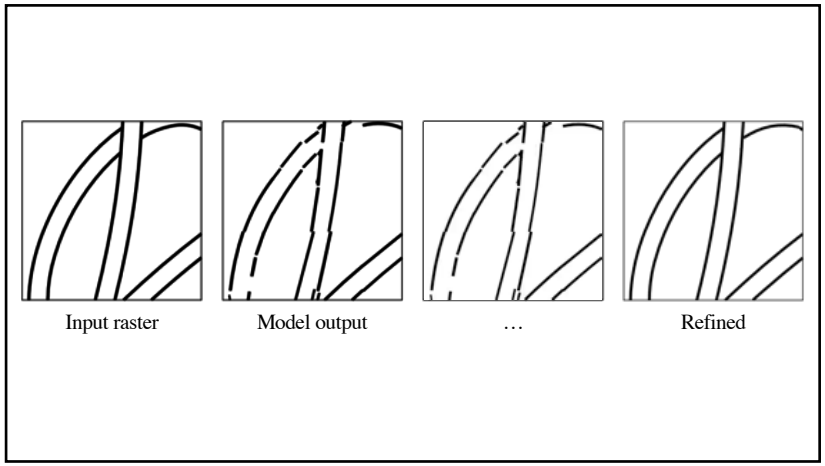
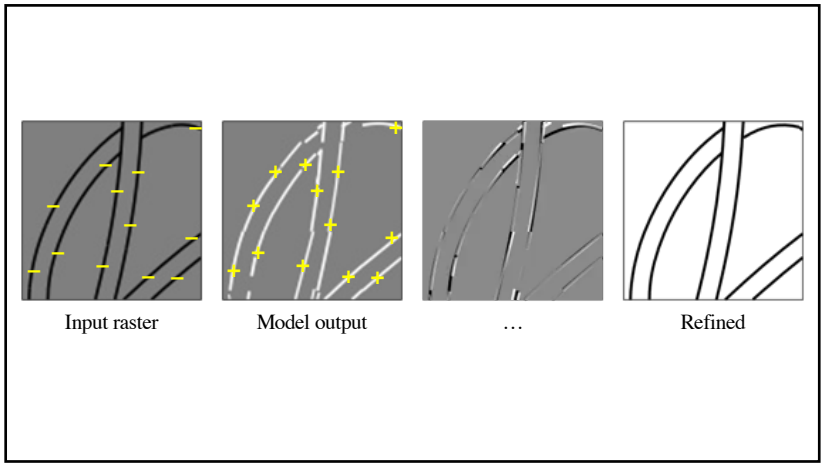


21



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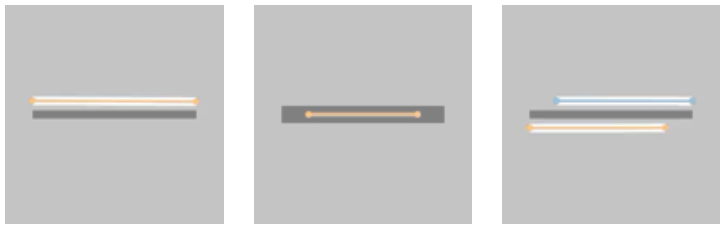
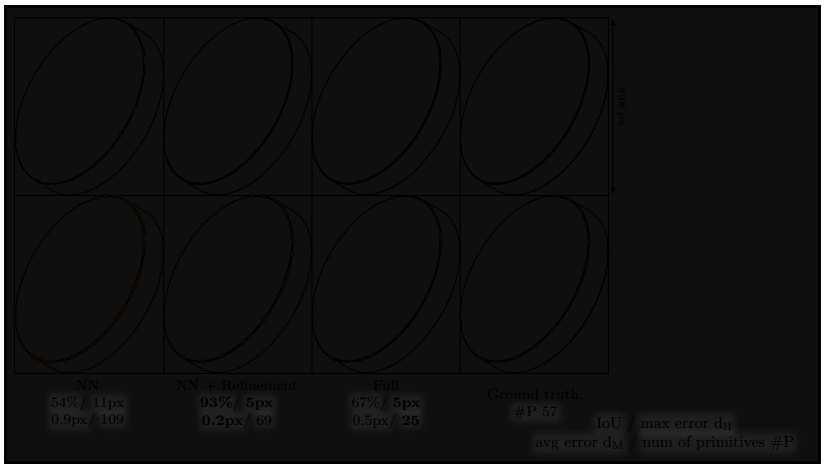
Refinement of primitives

$$E\,(\text{estimated primitives}, \text{input raster}) \longrightarrow \min$$



23



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Comparisons

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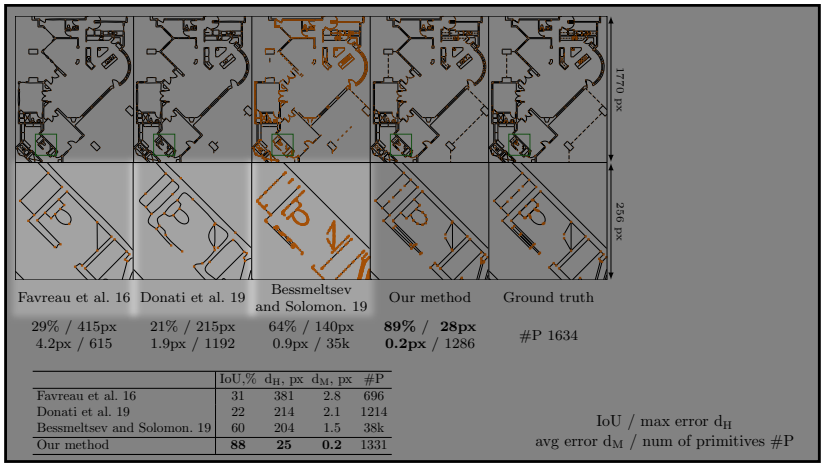

	IoU,%	d_H, px	d_M, px	#P
Favreau et al. 16	31	381	2.8	696
Donati et al. 19	22	214	2.1	1214
Bessmeltsev and Solomon. 19	60	204	1.5	38k
Our method	**88**	**25**	**0.2**	1331

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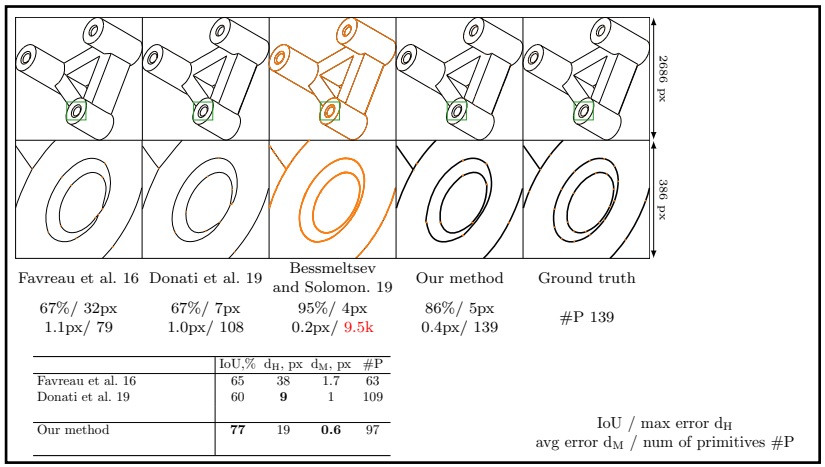

	IoU,%	d_H, px	d_M, px	#P
Favreau et al. 16	65	38	1.7	63
Donati et al. 19	60	**9**	1	109
Our method	**77**	19	**0.6**	97

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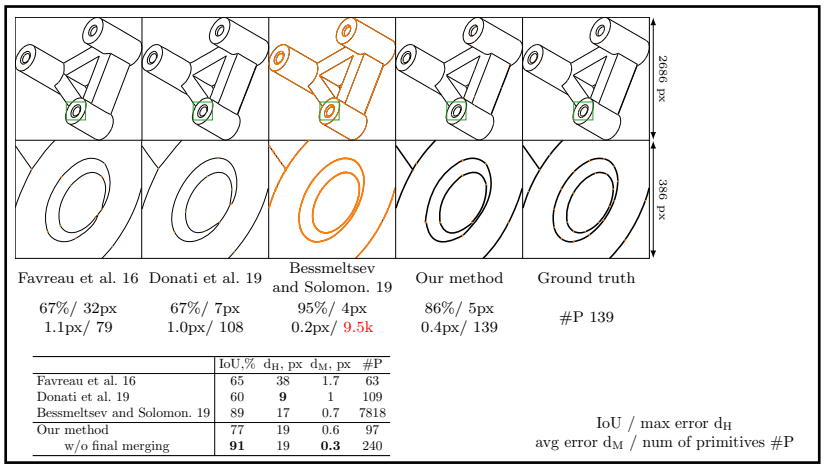

	IoU,%	d_H, px	d_M, px	#P
Favreau et al. 16	65	38	1.7	63
Donati et al. 19	60	**9**	1	109
Bessmeltsev and Solomon. 19	89	17	0.7	7818
Our method w/o final merging	77 **91**	19 19	0.6 **0.3**	97 240

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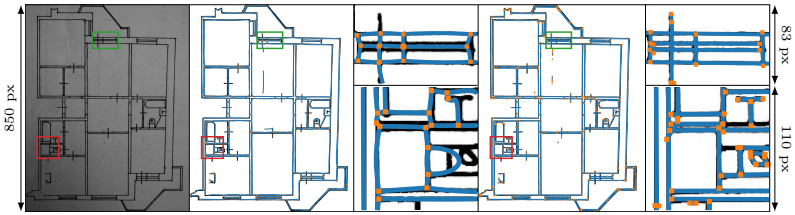

Input image Donati et al. 19, 52% / 349 Our method, **78%** / 368

	IoU,%	#P
Donati et al. 19	47	329
Our method	**82**	452

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