Photographic Image Synthesis with Cascaded Refinement Networks

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Photographic Image Synthesis

Input semantic layouts

Synthesized images
Motivation

Computer graphics
• Alternative route to photorealism
• Capture photographic appearance
• Fast image synthesis

CARLA
Dosovitskiy et al., CoRL 2017
Motivation

Artificial intelligence
• Imagination
• Mental imagery
Our approach

- Cascaded Refinement Network (CRN)
- Perceptual loss
- Diversity
Cascaded Refinement Network

$L$

$F^{i-1}$

$[\downarrow L, \uparrow F^{i-1}]$

$F^i$
Perceptual Loss

Match activations in a pretrained visual perception network.

\[ \mathcal{L}_{I,L}(\theta) = \sum_{l} \lambda_l \| \Phi_l(I) - \Phi_l(g(L; \theta)) \|_1 \]
Perceptual Loss

Match activations in a pretrained visual perception network.

\[
\mathcal{L}_{I,L}(\theta) = \sum_{l} \lambda_l \| \Phi_l(I) - \Phi_l(g(L; \theta)) \|_1
\]

Gatys et al., CVPR 2016
Johnson et al., ECCV 2016
Bruna et al., ICLR 2016
Dosovitskiy and Brox, NIPS 2016
Nguyen et al., NIPS 2016

Simonyan and Zisserman, ICLR 2015
Cityscapes dataset, Cordts et al., CVPR 2016
NYU dataset, Silberman et al., ECCV 2012
<table>
<thead>
<tr>
<th></th>
<th>Image-space loss</th>
<th>GAN+SemSeg</th>
<th>Isola et al. [16]</th>
<th>Encoder-decoder</th>
<th>Full-resolution network</th>
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<td>99.7%</td>
<td>98.5%</td>
<td>96.9%</td>
<td>78.3%</td>
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<tr>
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<td>71.2%</td>
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- **25 commits**
- **1 branch**
- **0 releases**
- **1 contributor**

### Branch: master

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Thank you