Video Completion

Object removal

*Input video*
*(green indicates the object to be removed)*

*Object-removed video*
Video Completion

Stationary mask inpainting

*Input video*
*Inpainted video*

*(green indicates the occluded region)*
Frame Completion

*Input frame* (green indicates the occluded region)

*Inpainted frame*
Frame Completion

Input video
(green indicates the object to be removed)

Object-removed video
(inpaint frame by frame)
Method
Overview

Flow completion

Color completion

(a) Input

(b) Edge-guided flow completion (3.2)

(c) Temporal neighbor generation (3.3)

(d) Fusion and hallucination (3.4, 3.5)

(e) Output

Input for (c) in next iter.
Flow Completion

Frame \(I_i\) → FlowNet2 → Frame \(I_j\)
Flow Completion
Flow Completion
Flow Completion
Color Completion

Find known temporal neighbor for each missing pixel
Color Completion

Find known temporal neighbor for each missing pixel
Color Completion

Find known temporal neighbor for each missing pixel
Non-local Flow Neighbors

Without non-local neighbors

With non-local neighbors
Color Completion

Input video
(green indicates missing region)

Color domain

Completed video
Color Completion

Obtain local and non-local temporal neighbors as candidates
Color Completion

Fuse candidates in the gradient domain using confidence-weighted average
Color Completion

Reconstruct images by Poisson reconstruction
Color Completion

Pick a frame with most missing pixels and fill with spatial inpainting

Candidates → Gradient → Fusion → Poisson reconstruction → Key frame single-image inpainting → Video I

Validity

Mask M
Color Completion

Pass the results into the next iteration until there is no missing pixel
Video Completion

Input video
(green indicates missing region)

Color domain

Completed video

Gradient domain
Results
Input video
(green indicates missing region)

Completed video
Input video
(green indicates missing region)

Completed video
Input video
(green indicates the object to be removed)

Completed video
## Quantitative evaluation

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<th></th>
<th>Stationary masks</th>
<th>Object masks</th>
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<tbody>
<tr>
<td></td>
<td>PSNR ↑</td>
<td>SSIM ↑</td>
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<tr>
<td>Kim et al.</td>
<td>25.19</td>
<td>0.8229</td>
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<tr>
<td>Newson et al.</td>
<td>27.50</td>
<td>0.9070</td>
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<tr>
<td>Xu et al.</td>
<td>27.69</td>
<td>0.9264</td>
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<td>Lee et al.</td>
<td>28.47</td>
<td>0.9170</td>
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<td>Huang et al.</td>
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<tr>
<td>Oh et al.</td>
<td><strong>30.28</strong></td>
<td><strong>0.9279</strong></td>
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<tr>
<td>Ours</td>
<td><strong>31.38</strong></td>
<td><strong>0.9592</strong></td>
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Flow-edge Guided Video Completion

Piecewise-smooth flow completion
Non-local flow neighbors
Seamless blending

Project page: http://chengao.vision/FGVC