Outlining Objects for Interactive Segmentation on Touch Devices

Introduction

There is a need for training datasets to support recent advances in machine learning for segmentation [1,2,7].

- Segmentation datasets are tedious to create with traditional interactions.
- We propose to use outlining on touch devices.

![Image](image1.png)

Figure 1: Different approaches for the task of interactive segmentation. Images are from the iCoseg dataset [3].

Experiments

- Twenty users (10 male / 10 female)
- Three tested interactions (bounding box, outline, scribbles)
- 11 images per interaction (from iCoseg dataset [3])
- Regular 8" android touch tablet
- Source code available at github.com/mpizenberg/otis
- Online demo at mm17-otis.mpizenberg.fr

<table>
<thead>
<tr>
<th>Method</th>
<th>Bounding box</th>
<th>Outline</th>
<th>Scribble</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease</td>
<td>2.1 ± 0.62</td>
<td>2.65 ± 0.74</td>
<td>2.1 ± 0.61</td>
</tr>
<tr>
<td>Time</td>
<td>2.35 ± 0.69</td>
<td>2.5 ± 0.67</td>
<td>2.6 ± 0.70</td>
</tr>
<tr>
<td>Rank</td>
<td>1.95 ± 0.43</td>
<td>1.90 ± 0.32</td>
<td>2.15 ± 0.37</td>
</tr>
</tbody>
</table>

Table 1: Results of the questionnaire with 95% confidence intervals. "Ease" and "Time" are measured on a scale from 1 (better) to 7.

![Image](image2.png)

Figure 2: Inferring an initial foreground using the Blum medial axis [5], refined thanks to mean-shift superpixels [6].

Conclusion

Outlining is a simple and natural interaction on touch devices.

Simplicity + swiftness + accuracy = good candidate for datasets creation.

![Image](image3.png)

Figure 5: Some segmentation results using bounding box and outline interactions.

References