

Segmenting and Tracking Visual Entities

DISSERTATION

ZUR ERLANGUNG DES MATHEMATISCH-NATURWISSENSCHAFTLICHEN DOKTORGRADES
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GÖTTINGEN, 2014

Segmenting and Tracking Visual Entities

A DISSERTATION PRESENTED BY

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Segmenting and Tracking Visual Entities

ABSTRACT

Abstract text.

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Introduction

THERE'S SOMETHING TO BE SAID for having a good opening line.

1.1 IMAGE SEGMENTATION

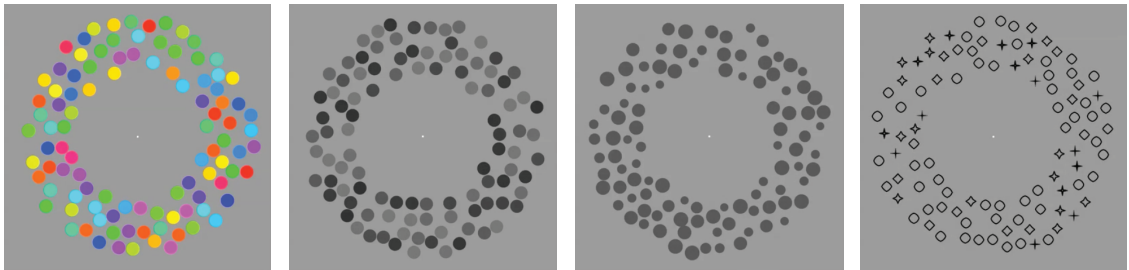
1.2 OBJECT TRACKING

1.3 VIDEO OBJECT SEGMENTATION

1.4 SUPERPIXELS

1.5 PERCEPTION AS ACCUMULATING A WORLD MODEL

A



B

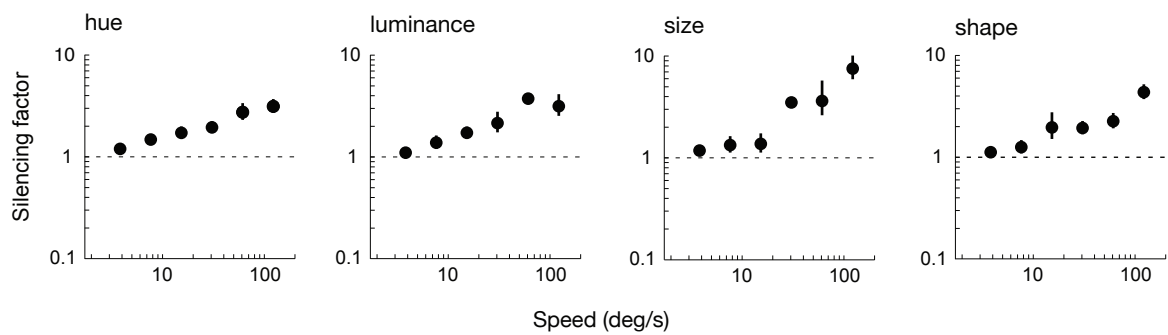


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2

Probabilistic Methods

2.1 BAYESIAN METHODS

2.2 SEQUENTIAL METHODS

2.3 PARTICLE FILTERS

SOME NEW THOUGHT

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3

Review of Existing Methods

3.1 IMAGE SEGMENTATION

3.2 OBJECT TRACKING

3.3 VIDEO SEGMENTATION

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4

Video Segmentation by Relaxation of Tracked Masks

THERE'S SOMETHING TO BE SAID for having a good opening line.

4.1 SEGMENTATION USING SUPERPARAMAGNETIC CLUSTERING

4.2 INDEPENDENT PARTICLE FILTERS

4.3 UPDATING THE PARTICLE SETS

4.4 EXTRACTING AN IMAGE LABELING

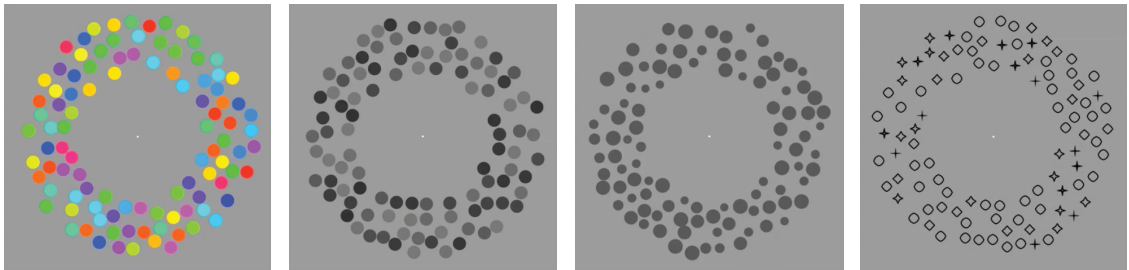
4.5 OCCLUSION HANDLING

4.5.1 COLOR DISTRIBUTION INTERACTIONS

4.5.2 DEPTH MASK REASONING

4.6 EXPERIMENTAL RESULTS

A



B

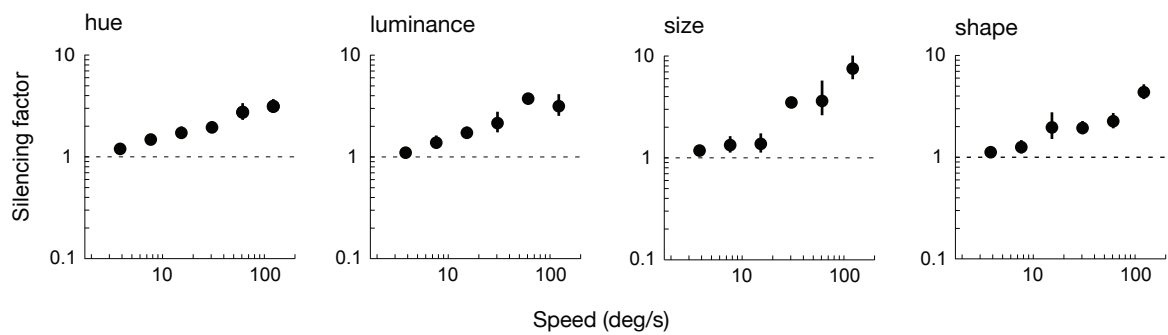


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Patch-based Perceptual World Model

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5.1 OCTREE ADJACENCY GRAPH

5.2 SPATIAL CLUSTER SEEDING

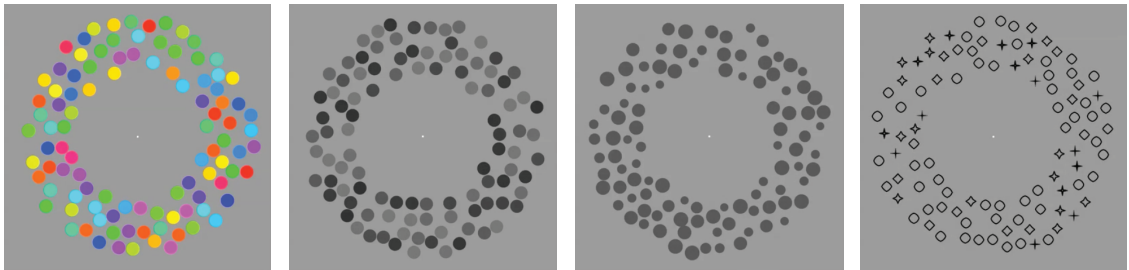
5.3 CLUSTER FEATURES AND DISTANCE

5.4 FLOW CONSTRAINED REGION GROWING

5.5 SPHERICAL DEPTH ADAPTIVE GRID

5.6 EXPERIMENTAL RESULTS

A



B

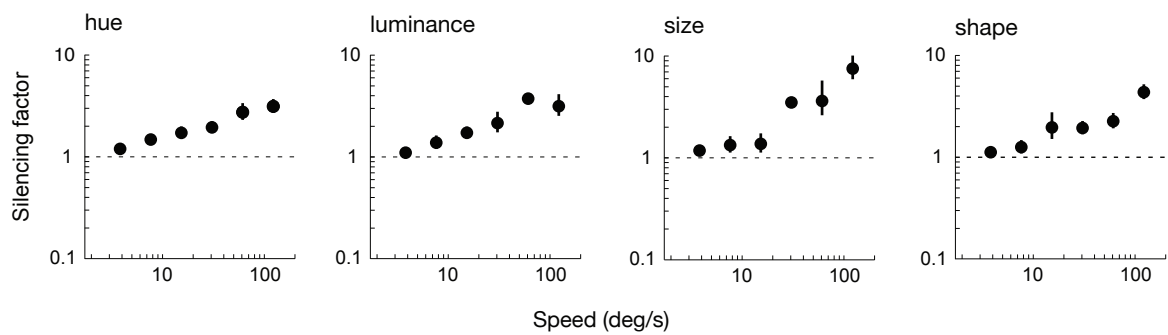


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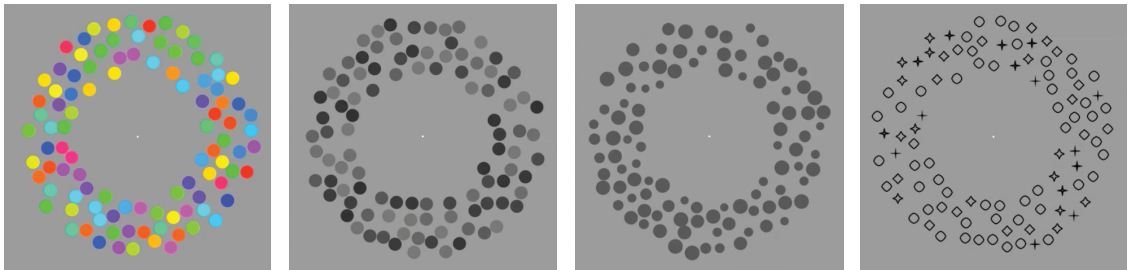
6

Model-Based Point Cloud Video Segmentation

THERE'S SOMETHING TO BE SAID for having a good opening line.

- 6.1 SEQUENTIAL UPDATE OF PERCEPTUAL MODEL
- 6.2 TRACKED MODEL REPRESENTATION
- 6.3 SUPERVOXEL-BASED PARTICLE FILTERS
- 6.4 ASSOCIATION BY JOINT ENERGY MINIMIZATION
- 6.5 ALIGNMENT AND UPDATE OF MODELS
- 6.6 OCCLUSION HANDLING
- 6.7 EXPERIMENTAL RESULTS

A



B

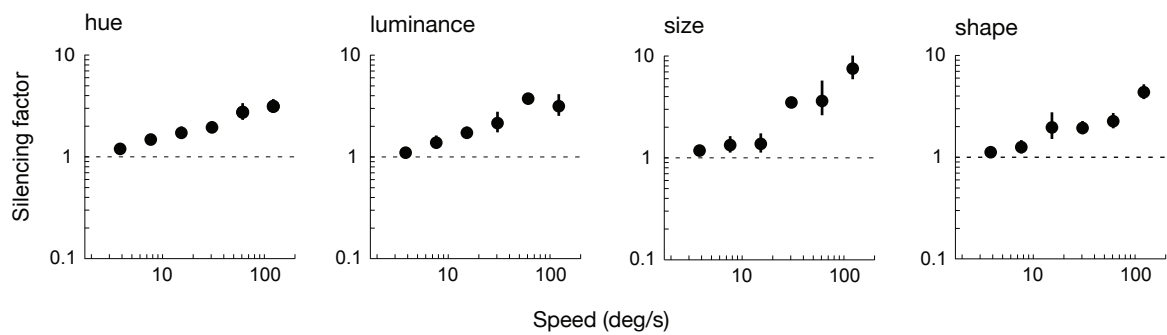


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Hierarchical Pointcloud Video Segmentation

THERE'S SOMETHING TO BE SAID for having a good opening line.

7.1 LOCAL CONVEX PATCHES

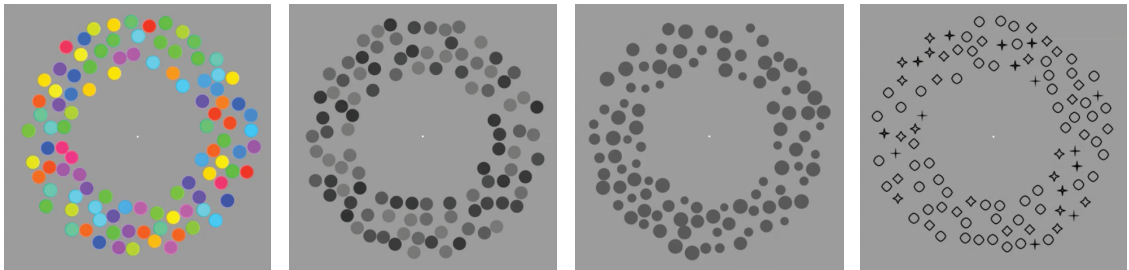
7.2 HIERARCHY OF TEMPORAL HYPOTHESES

7.3 HYPOTHESIS PRUNING

7.4 EXTRACTING A REALIZATION OF PERCEPTUAL MODEL

7.5 EXPERIMENTAL RESULTS

A



B

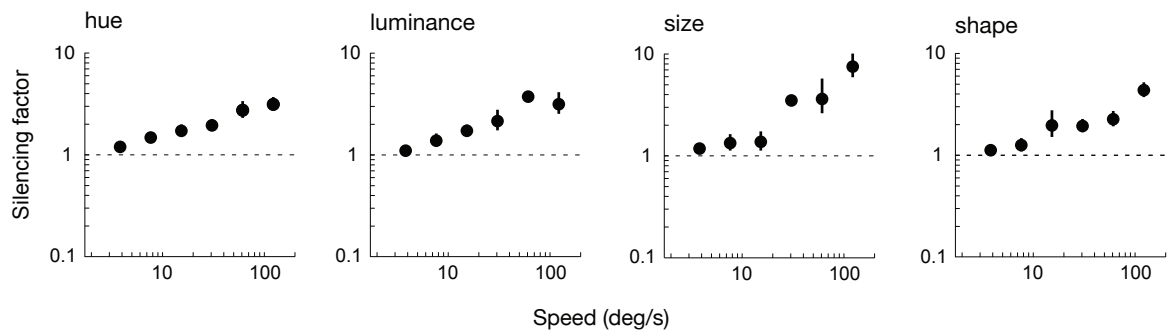


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Conclusions

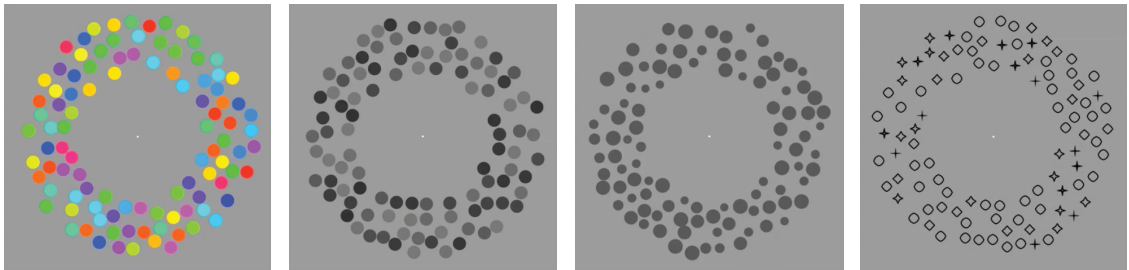
THERE'S SOMETHING TO BE SAID for having a good opening line.

8.1 SUMMARY AND CONTRIBUTIONS

8.2 DIRECTIONS FOR FUTURE WORK

8.3 DISCUSSION OF LIMITATIONS OF BENCHMARKS

A



B

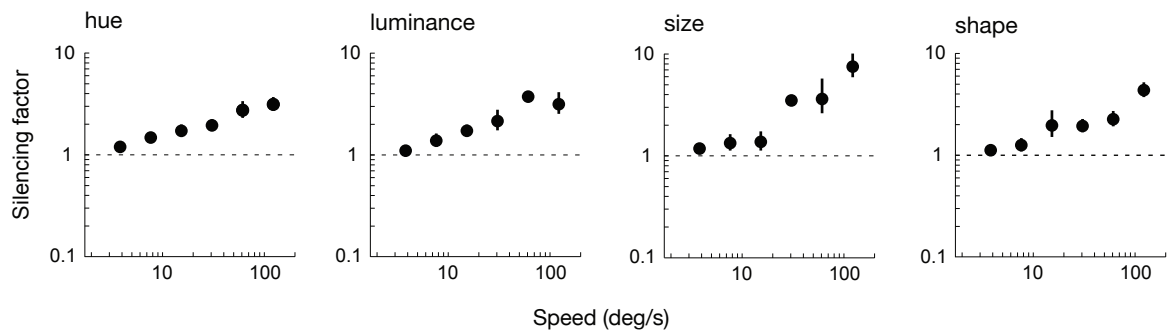


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Bibliography

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Appendices

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The Oculus Vision System