Visual Polymath

Amir R. Zamir
Towards a Human-like Comprehensive Perception

Amir R. Zamir
Intelligence as Efficiency

- Yielding higher value for less resources.

Intelligence as Efficiency

- Yielding higher value for less resources.

Practice: Prediction on a Budget

- **Time**
  - 65 mph

- **Resources**
  - 1 second
  - 40 meters
Practice: Prediction on a Budget

Time

Resources

A tradeoff game

65 mph
Feedback networks

Amir Zamir*, Te-Lin Wu*, Lin Sun, William Shen, Bertram Shi,
Jitendra Malik, Silvio Savarese
CVPR 2017

http://feedbacknet.stanford.edu
Feedforward model.
Feedforward model.
Feedforward model.
Feedforward model.

Feedback model.

an alternative with several advantages
Feedback model unrolled.
Feedback enables making early predictions of the output

**Advantage 1: Early Prediction**
Advantage II: Taxonomic Prediction
Feedback predictions naturally conform to a taxonomy (even when trained without a taxonomy)

Advantage II: Taxonomic Prediction
Experimental Results
Qualitative results on CIFAR100 test set
Intelligence as Efficiency

• Yielding **higher value** with **less resources**.

An Exciting Time!

Fully Supervised Learning
Fully Supervised Learning

Isolation ~ “Idiot Savant”

Task Interplay
Task Interplay

Colorization $\rightarrow$ Object Detection

Zhang et al., Colorful Image Colorization, 2016.
<table>
<thead>
<tr>
<th>Images</th>
<th>Input</th>
<th>Multi-Task ConvNet</th>
<th>Supervised Foundational Tasks</th>
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<tbody>
<tr>
<td></td>
<td>Patch 1</td>
<td></td>
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<tr>
<td></td>
<td>Patch 2</td>
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</tbody>
</table>

**Generic 3D Representation Learning**

**Generic 3D Representation via Pose Estimation and Matching.**

Amir Zamir, Tilman Wekel, Pulkit Agrawal, Colin Wei, Jitendra Malik, Silvio Savarese.

ECCV 2016.
Generic 3D Representation Learning

Generic 3D Representation via Pose Estimation and Matching.
Amir Zamir, Tilman Wekel, Pulkit Agrawal, Colin Wei, Jitendra Malik, Silvio Savarese.
ECCV 2016.
Airship (n02692877)
Demo

http://3drepresentation.stanford.edu/
Task Interplay
Task Interplay
Thank you!

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