

# Computer Vision

Guest Lecturer: Dave

DS3  
7/10/2015

# Change Blindness



(1)

# Change Blindness



(1)

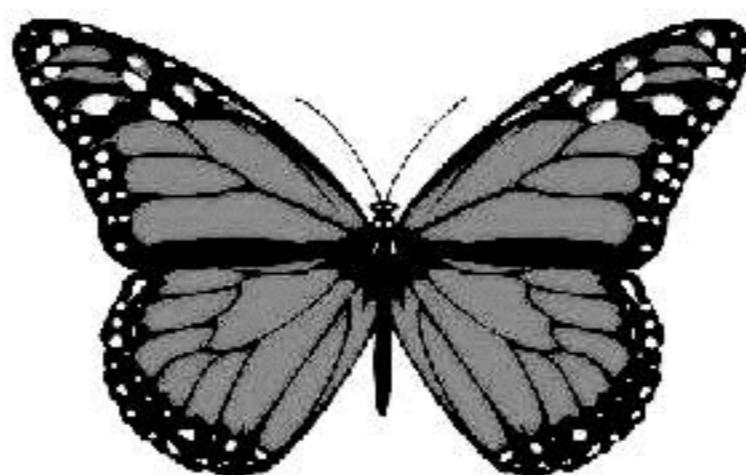
# Change Blindness



(1)

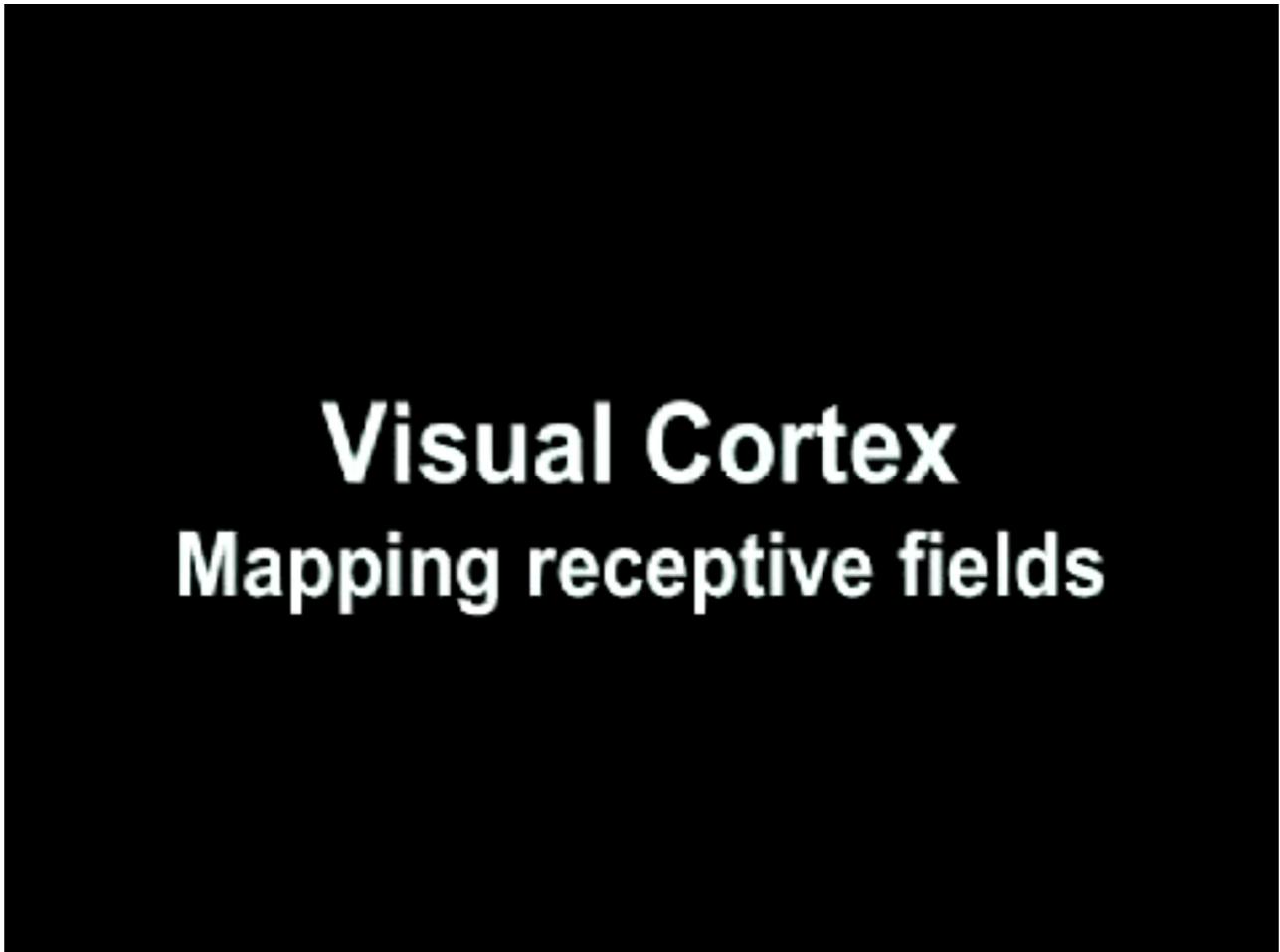
# What Are Images?

# What Are Images?



(2)

# Representation!

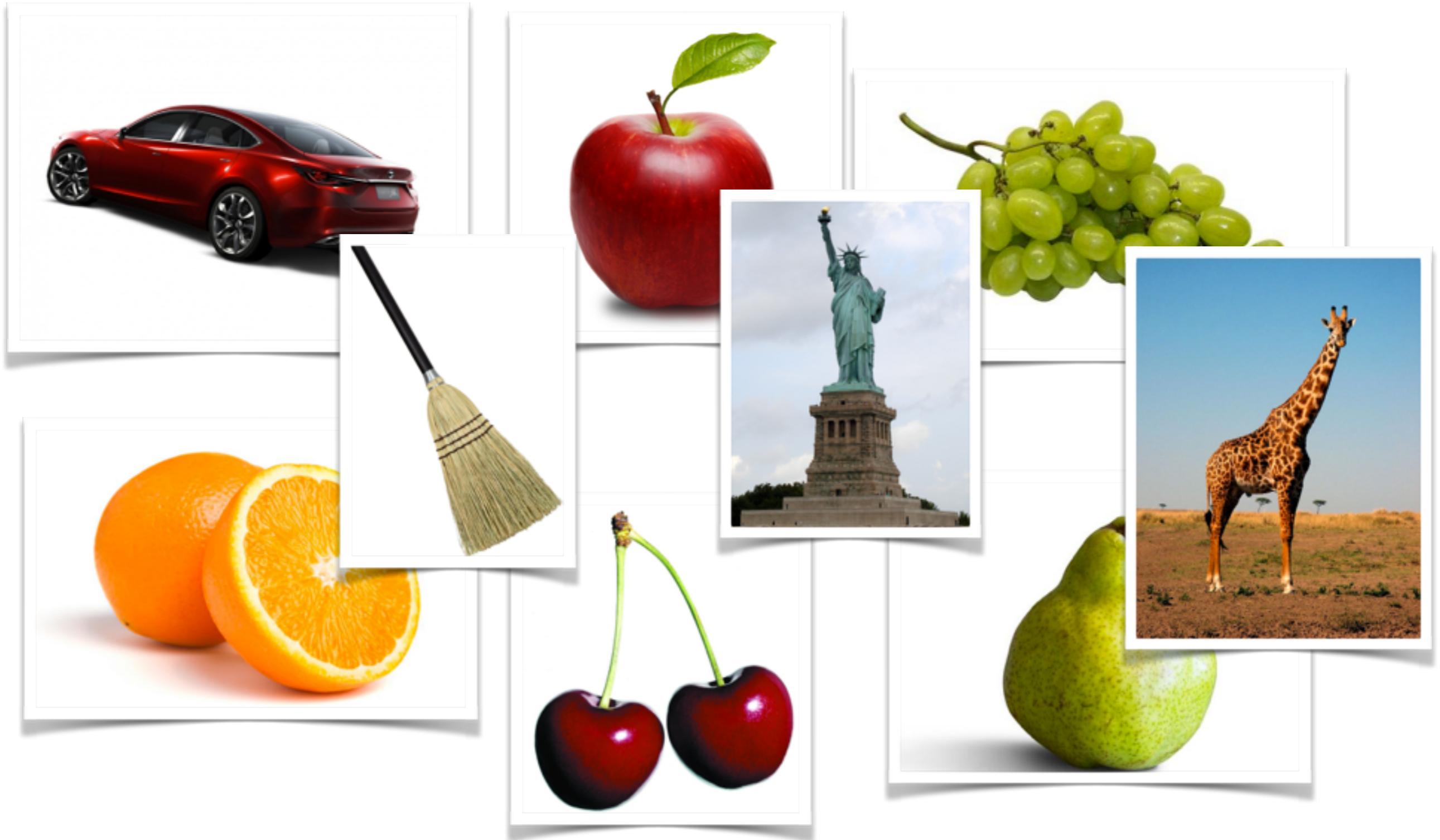


**Visual Cortex**  
**Mapping receptive fields**

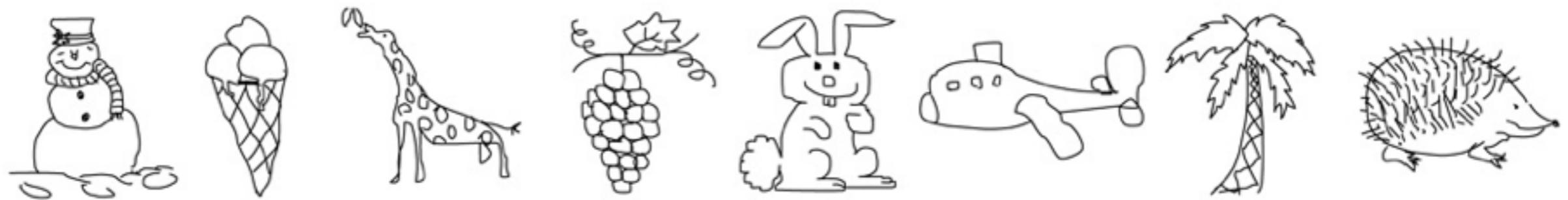
# Ideas for Features?



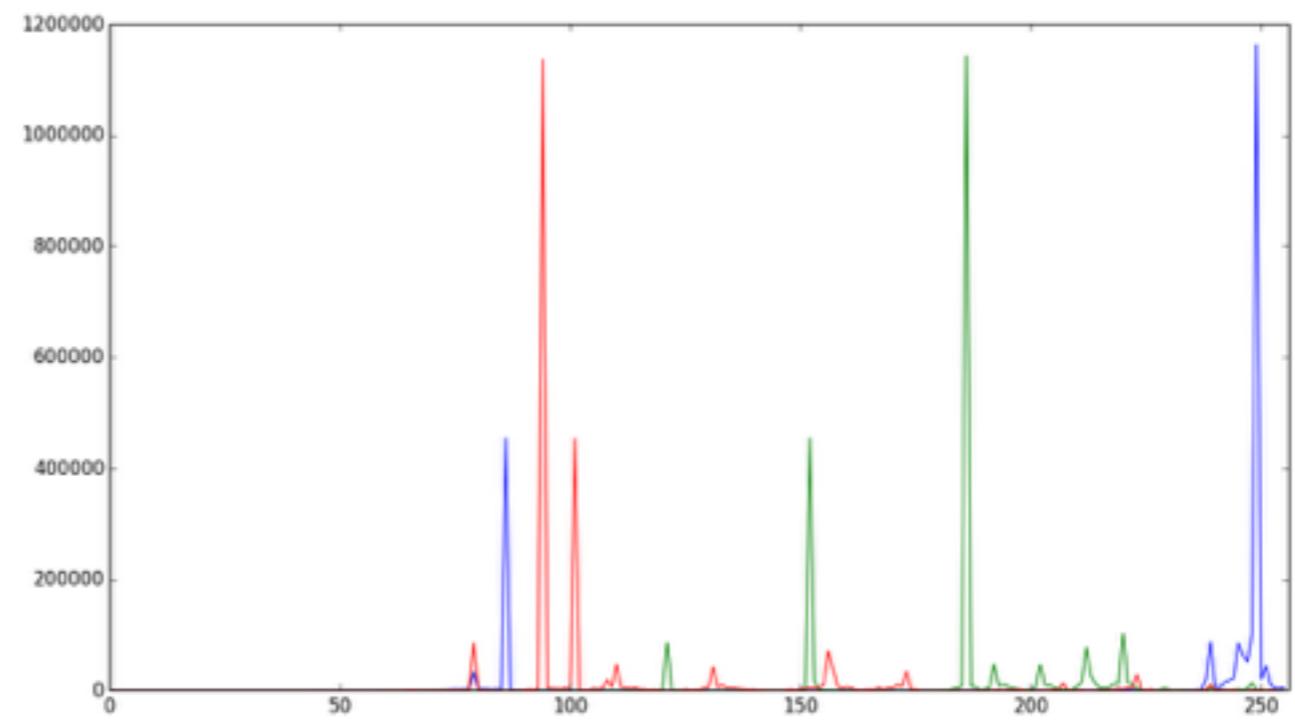
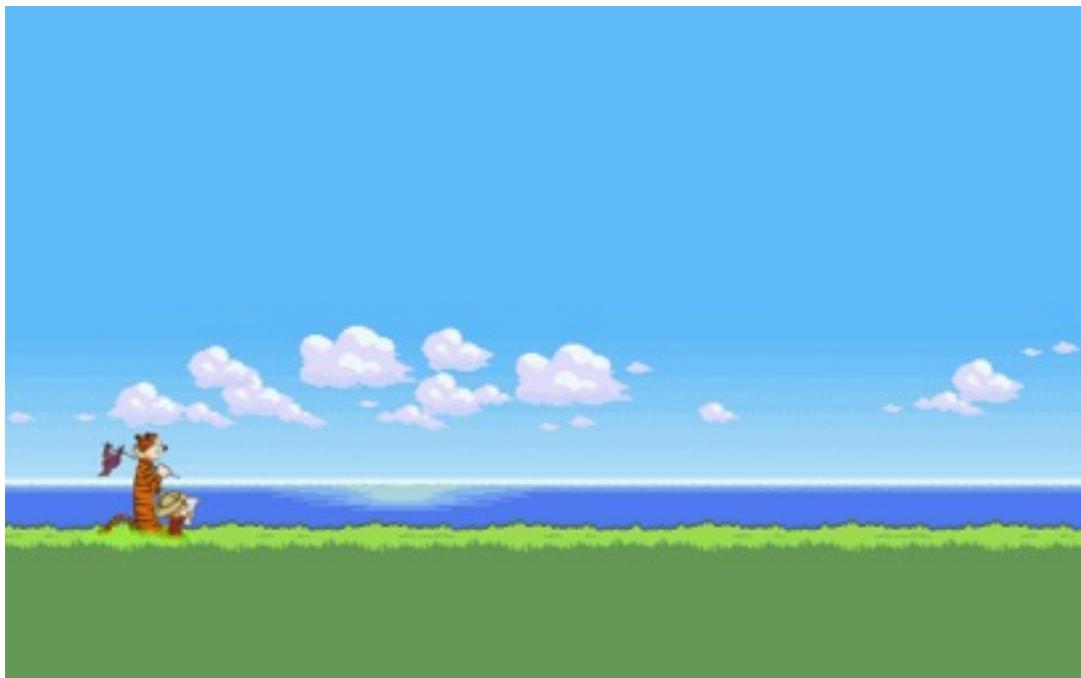
# Ideas for Features?



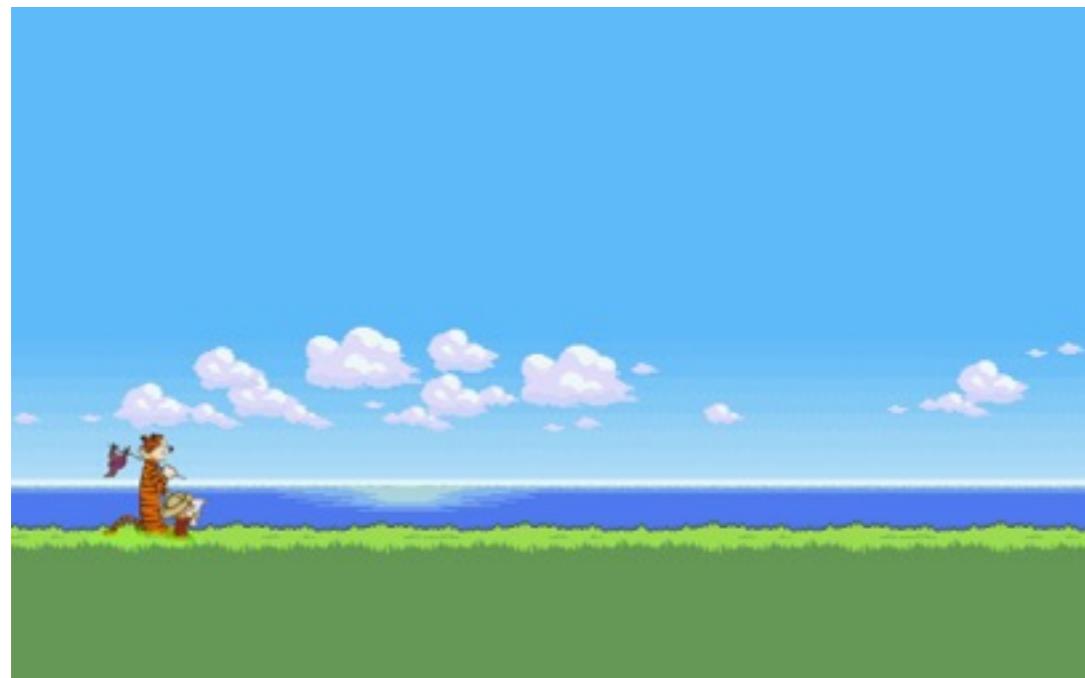
# Ideas for Features?



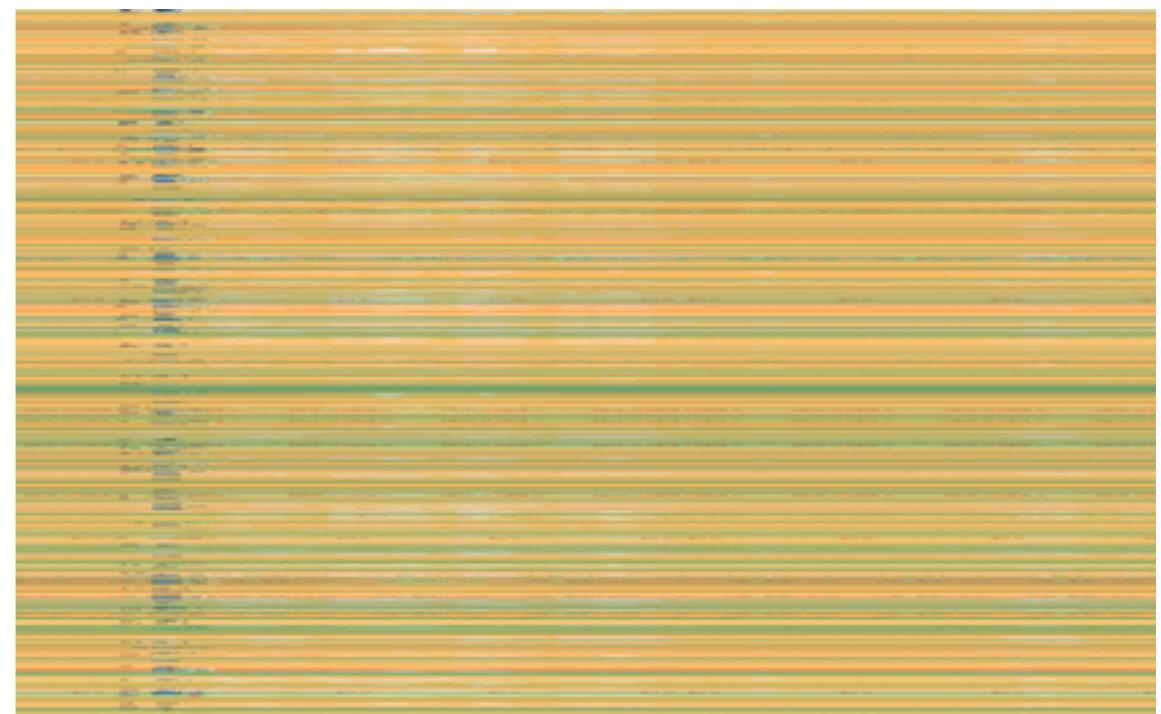
# Color Histograms



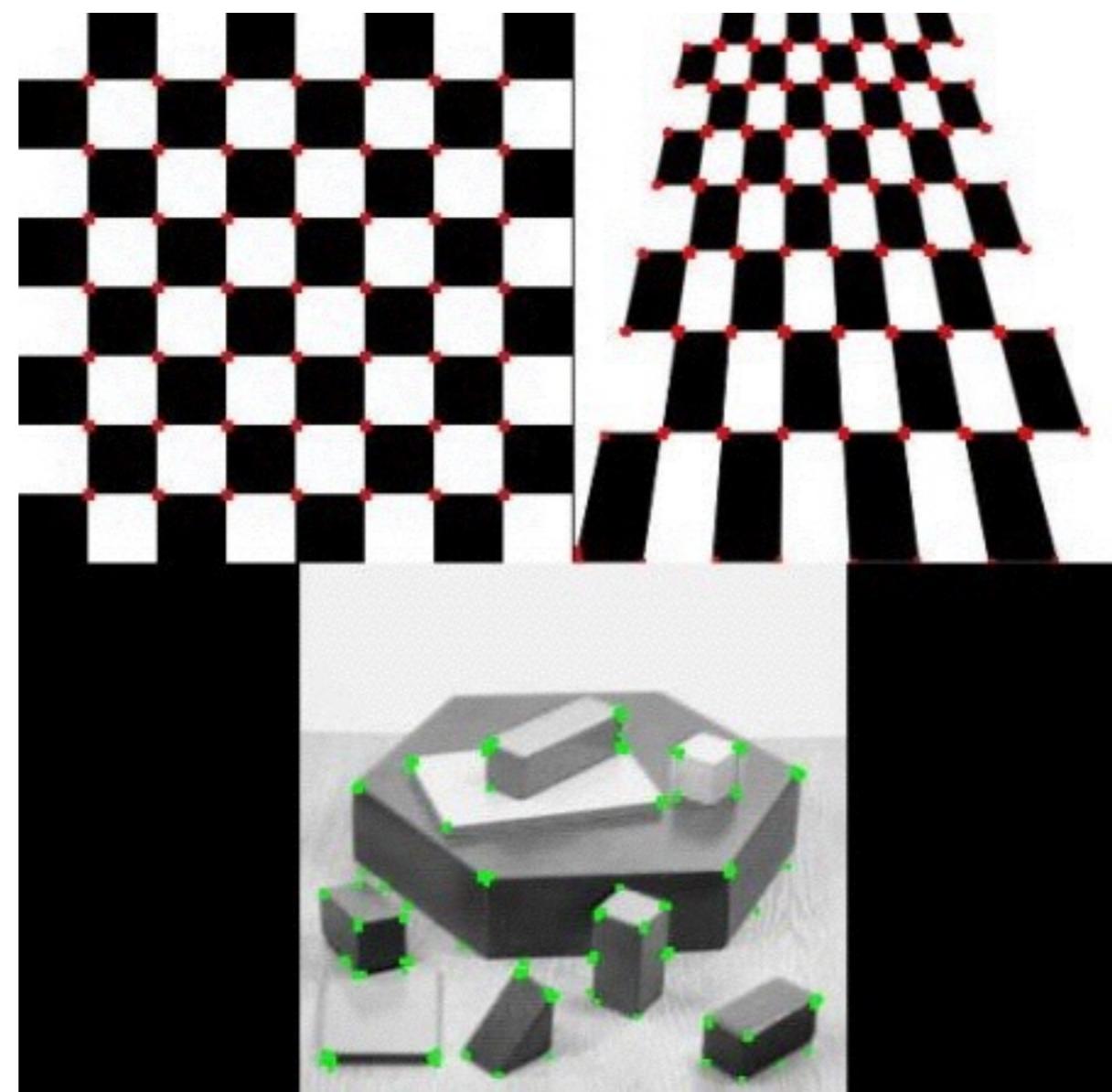
# Color Histograms: Problem



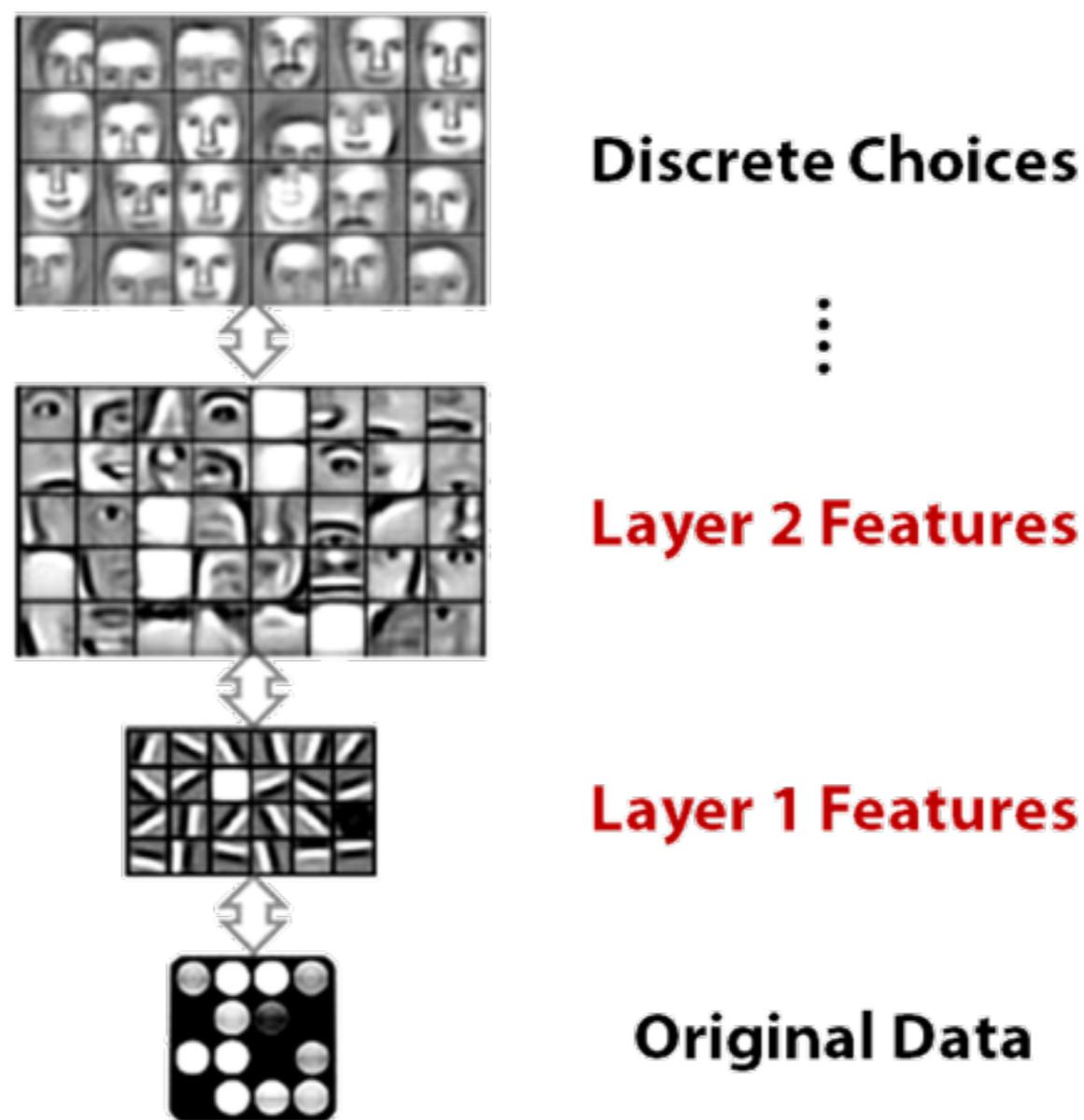
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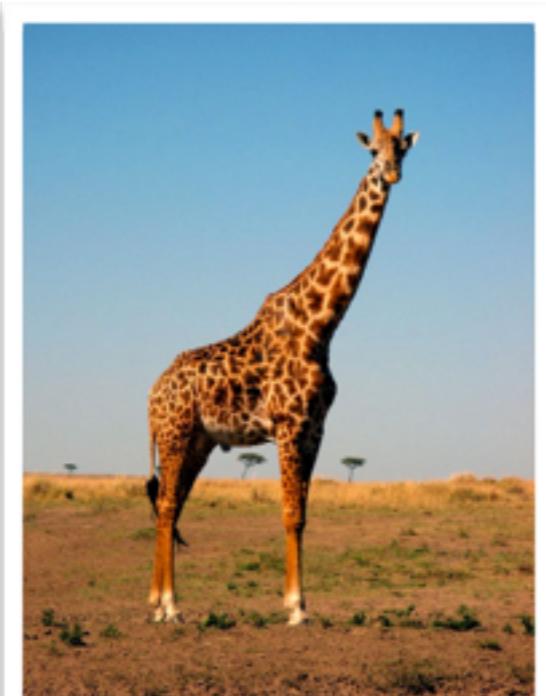
# Edges, Corners



# Feature Hierarchy



# Object Recognition



Apple?

Broom?

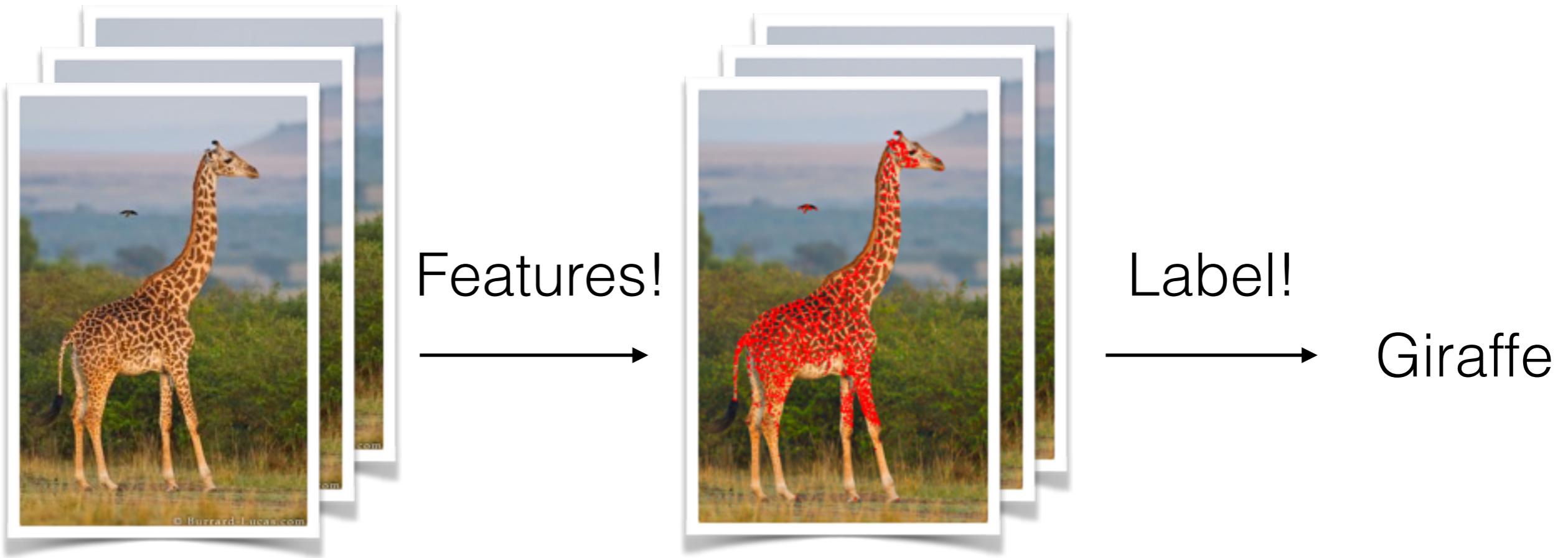
=? =

Bird?

Table?

House?

# Machine Learning



# The Hardest Object to Classify...

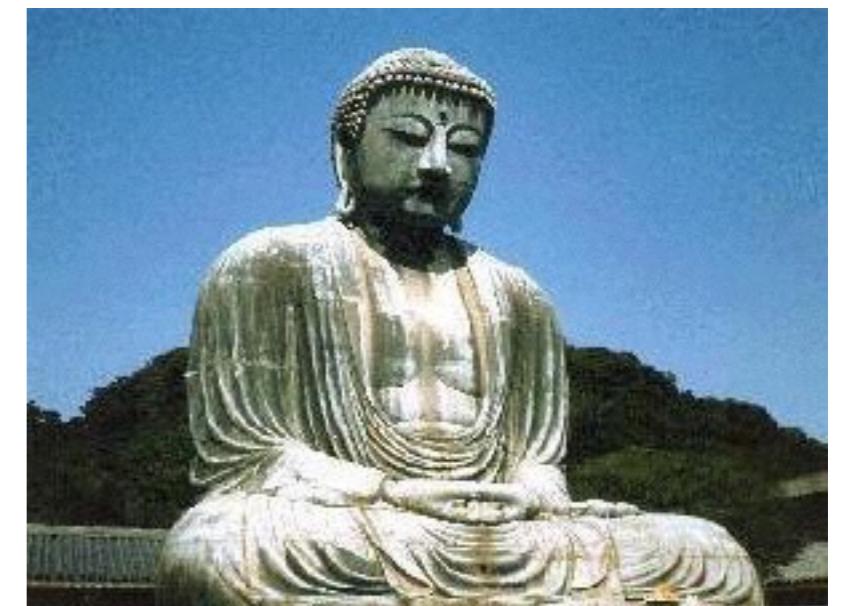
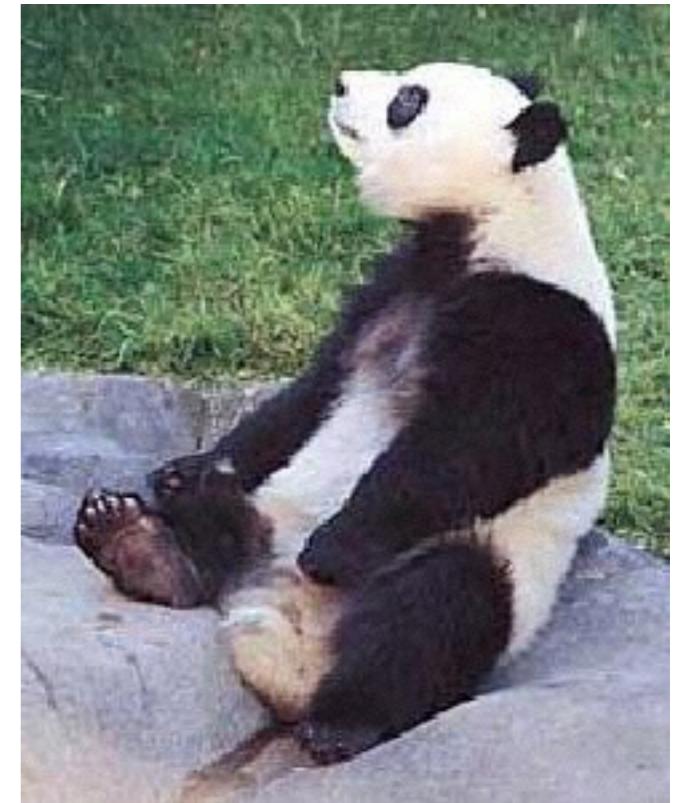
# The Hardest Object to Classify...



# The Hardest Object to Classify...



# Caltech 101

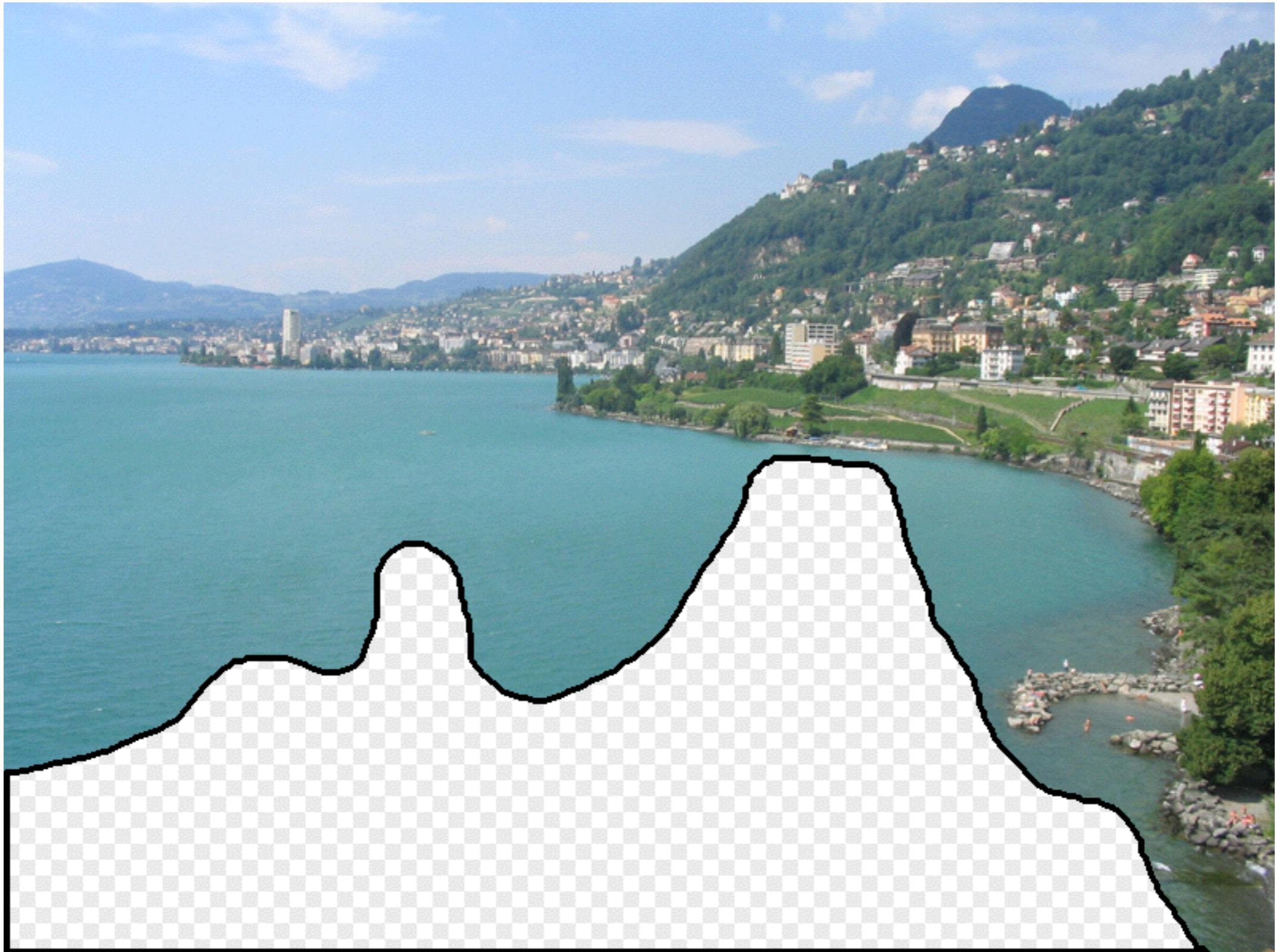


# Cool Data-Driven Applications!

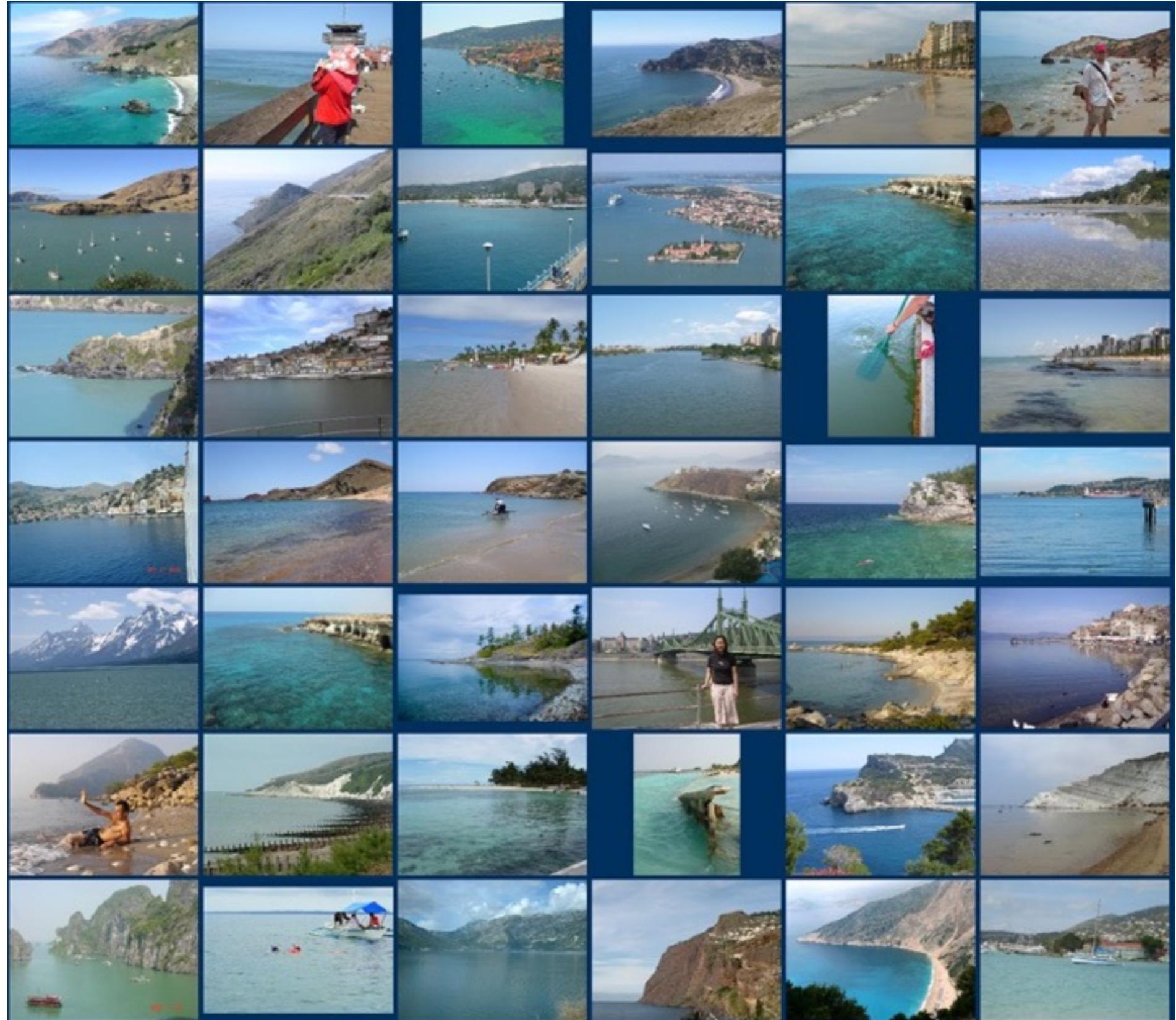
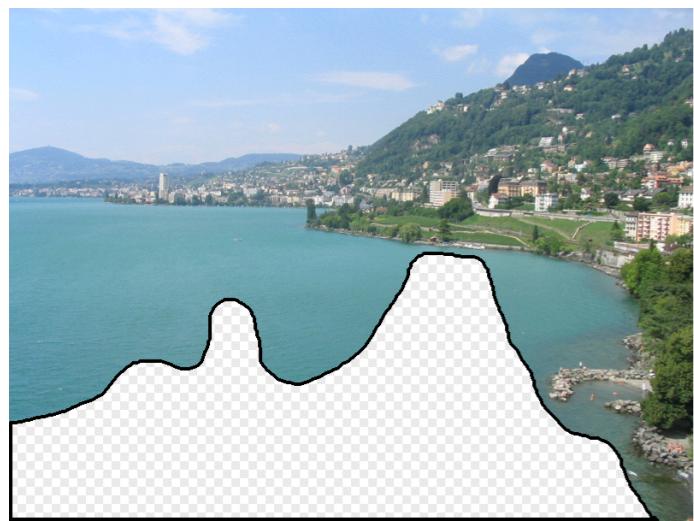
Sketch2Photo

# Scene Completion

(3)





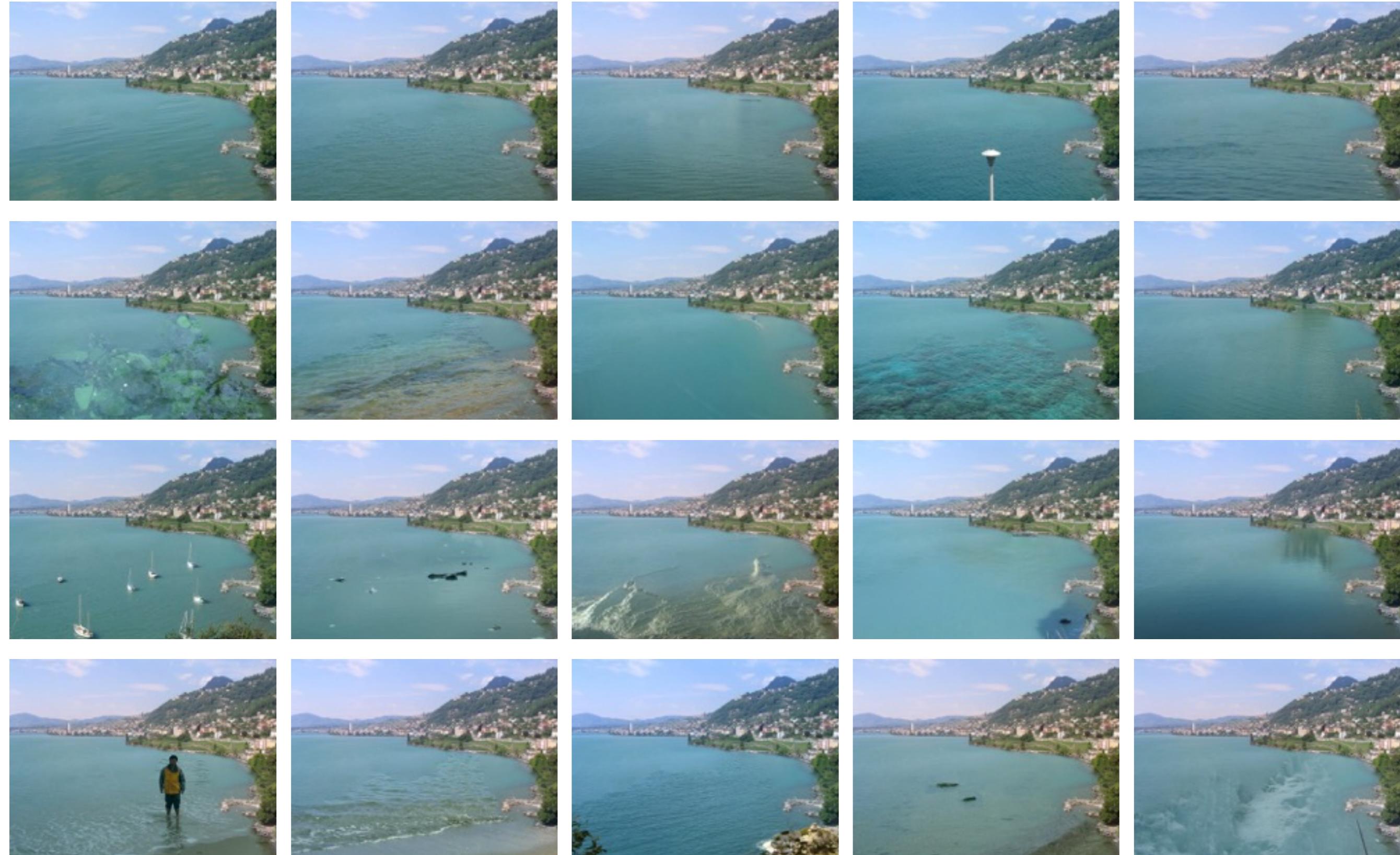




Graph cut + Poisson blending

Hays and Efros, SIGGRAPH 2007

# Top 20 Results





Hays and Efros, SIGGRAPH 2007

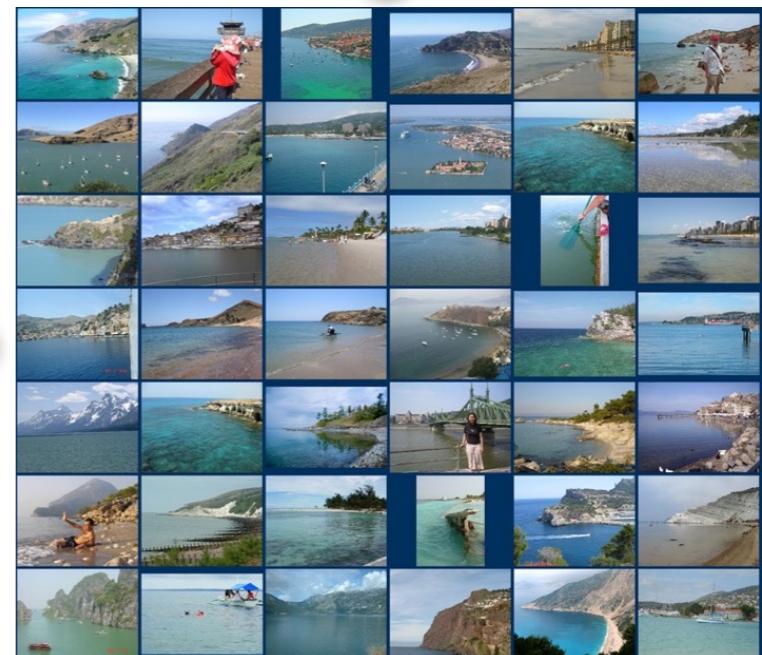
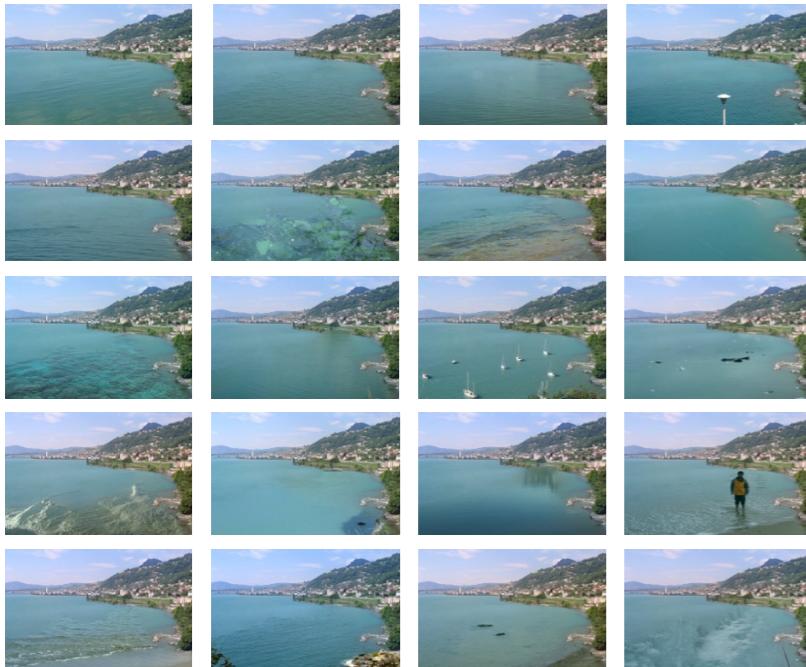
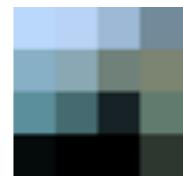
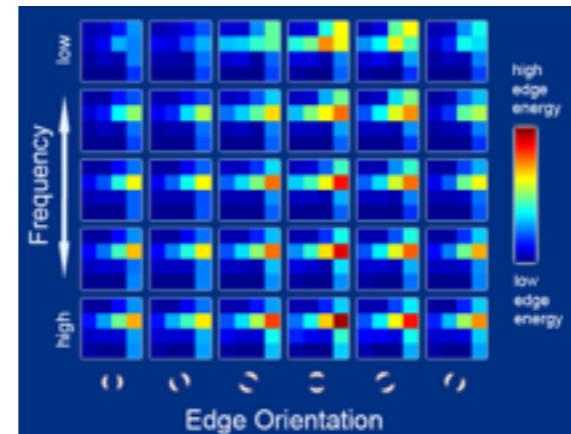
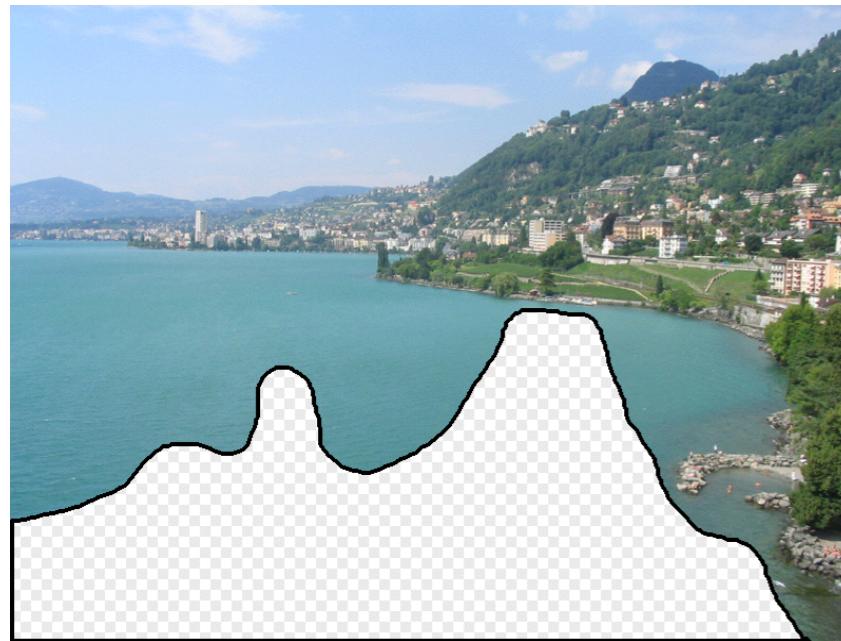


Hays and Efros, SIGGRAPH 2007



Hays and Efros, SIGGRAPH 2007

# Full Pipeline

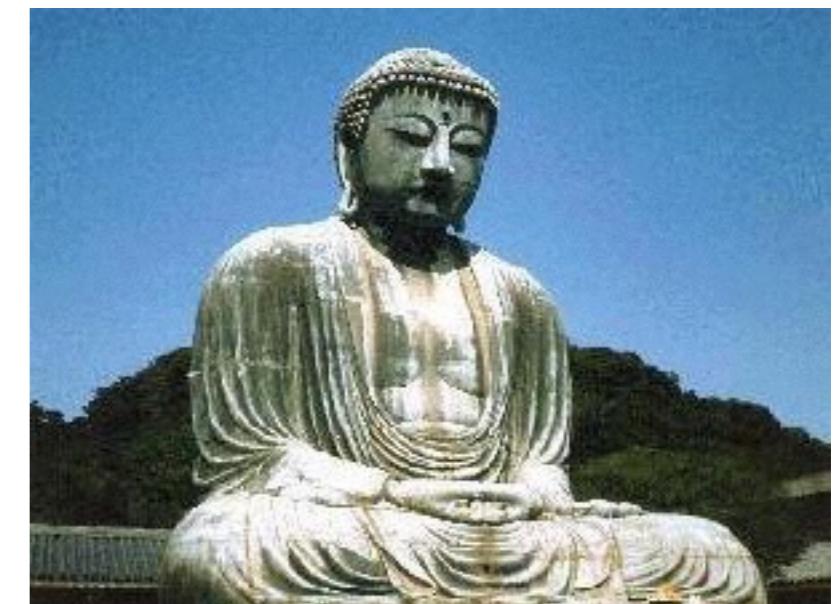






# Transient Attributes for Images

# Back to Caltech 101



- (1) [http://www.cse.iitk.ac.in/users/se367/10/presentation\\_local/Change%20Blindness.html](http://www.cse.iitk.ac.in/users/se367/10/presentation_local/Change%20Blindness.html)
- (2) L. Fei-Fei, R. Fergus and P. Perona. Learning generative visual models from few training examples: an incremental Bayesian approach tested on 101 object categories. IEEE. CVPR 2004, Workshop on Generative-Model Based Vision. 2004
- (3) James Hays, Alexei A. Efros. Scene Completion Using Millions of Photographs. ACM Transactions on Graphics (SIGGRAPH 2007). August 2007, vol. 26, No. 3.
- (4) [http://opencv-python-tutorials.readthedocs.org/en/latest/py\\_tutorials/py\\_feature2d/py\\_features\\_harris/py\\_features\\_harris.html#harris-corners](http://opencv-python-tutorials.readthedocs.org/en/latest/py_tutorials/py_feature2d/py_features_harris/py_features_harris.html#harris-corners)
- (5) <http://ode.engin.umich.edu/presentations/idetc2014/>