Day 4
What draws your attention in a picture?

Pennsylvania State University

How do you learn?

Here is a banana

What is this?

Banana!

How do you learn?

Here is an apple

What is this?

Apple!

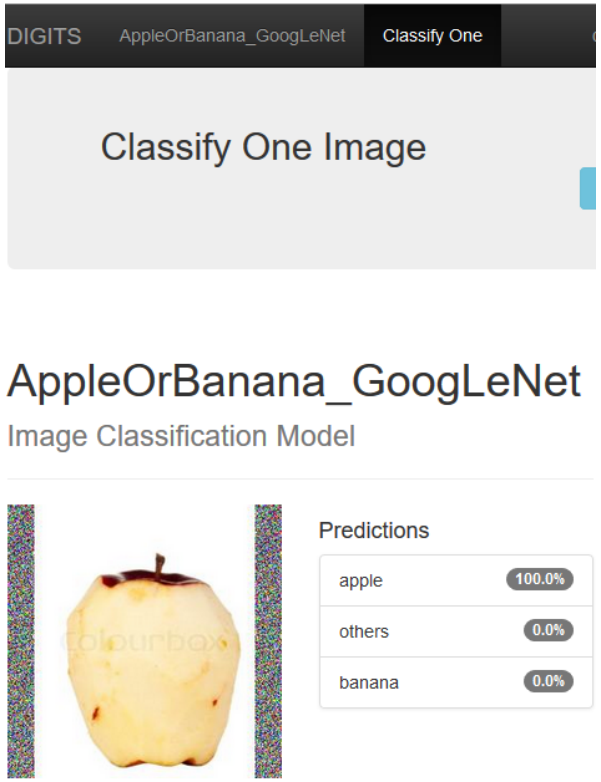
How do you learn?

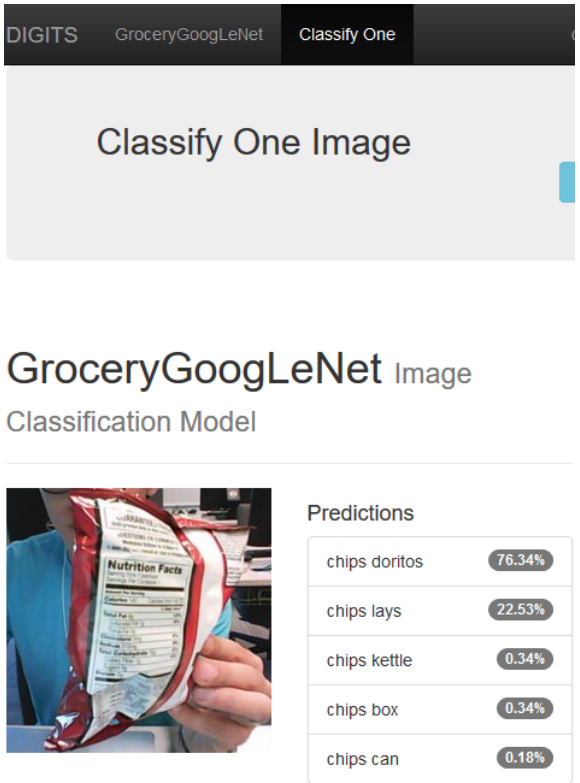
Then, what is this?

~~Um.. Apple? ☹~~ **Pomegranate!**

This is called **supervised learning**

Computers are only good at what they've learnt





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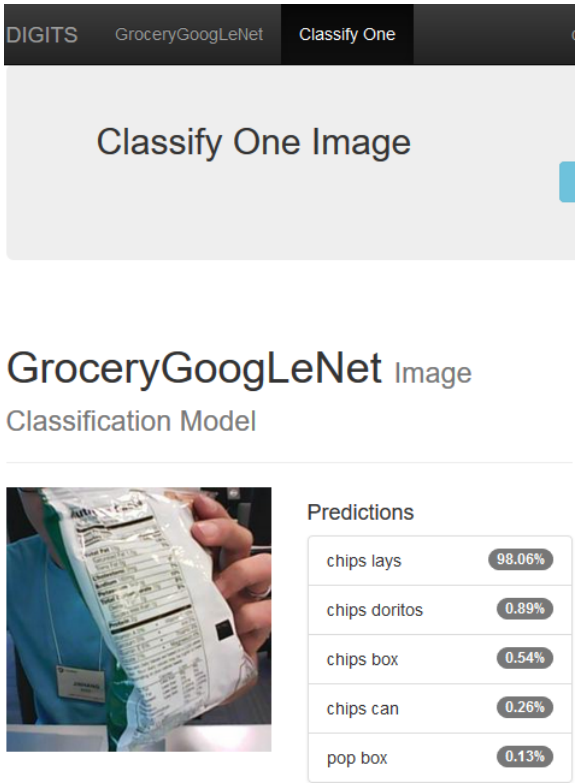

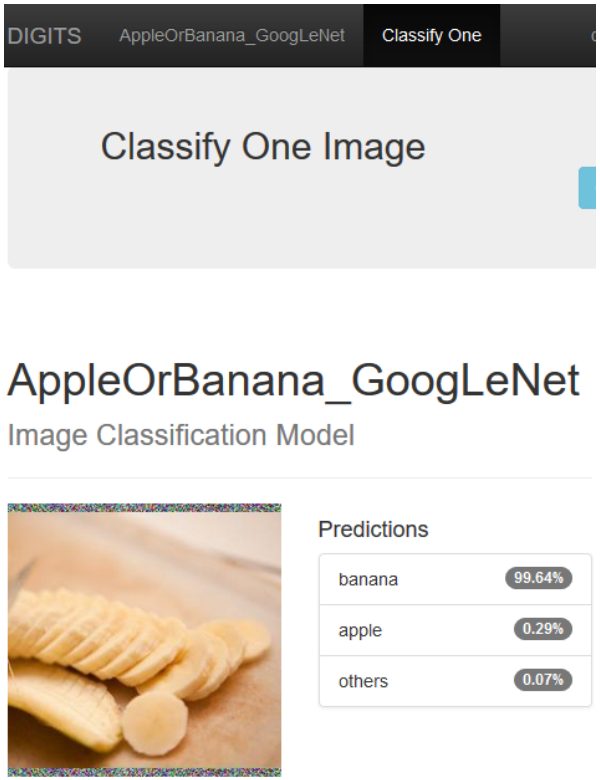

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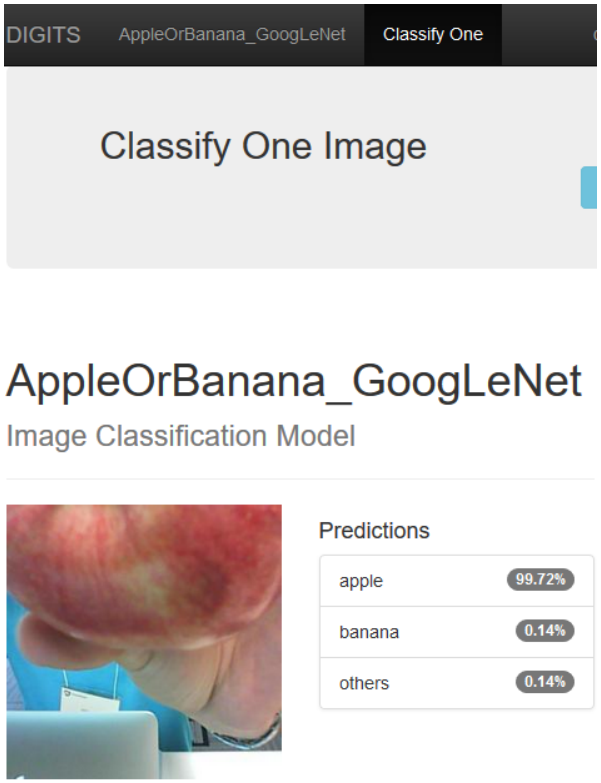

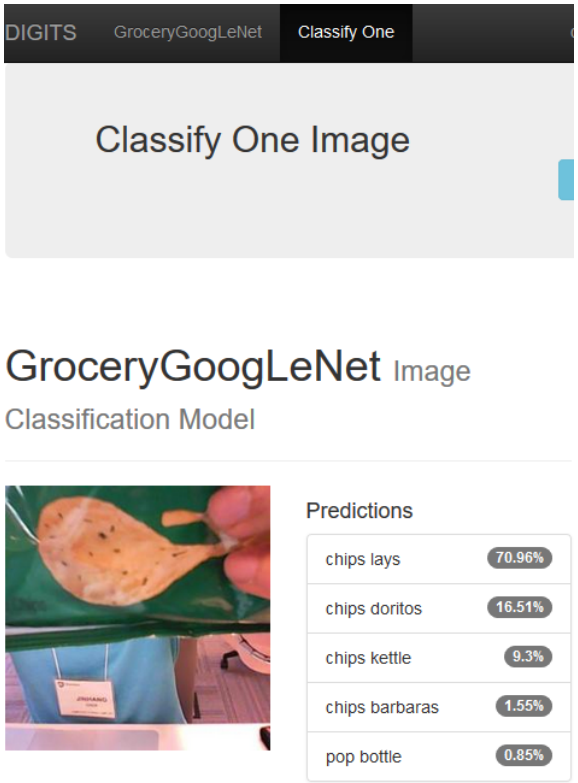

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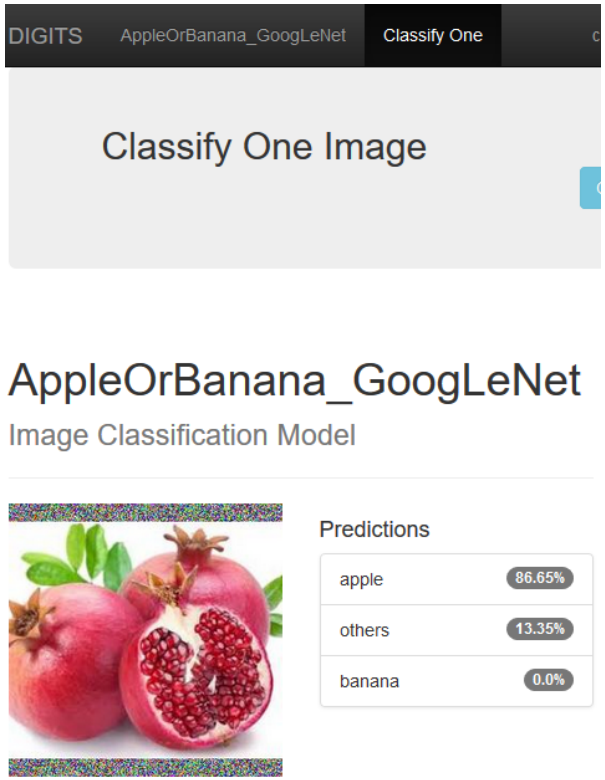
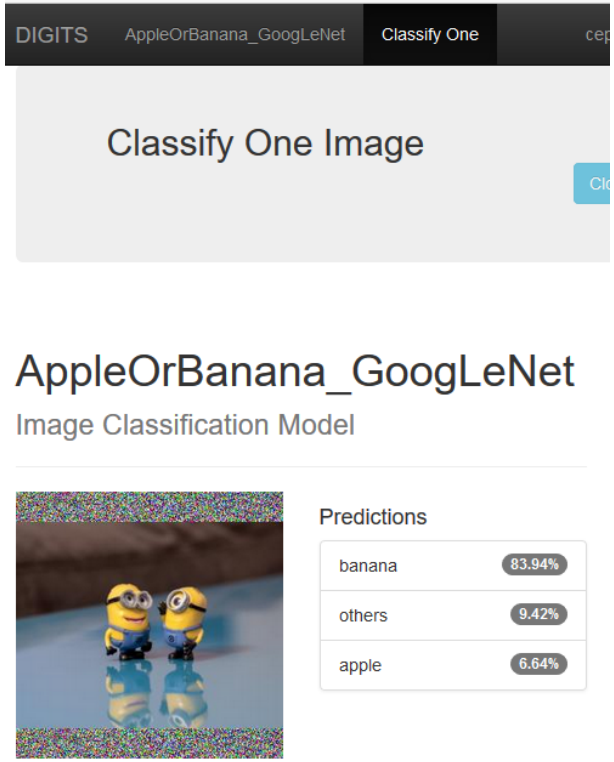
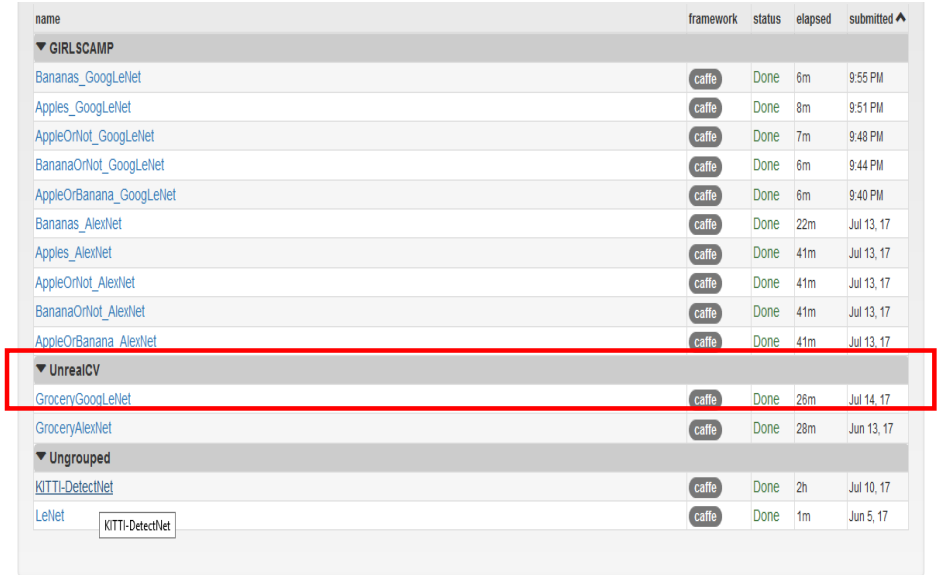




Dataset is required to train a CNN model

Let’s see details of training dataset

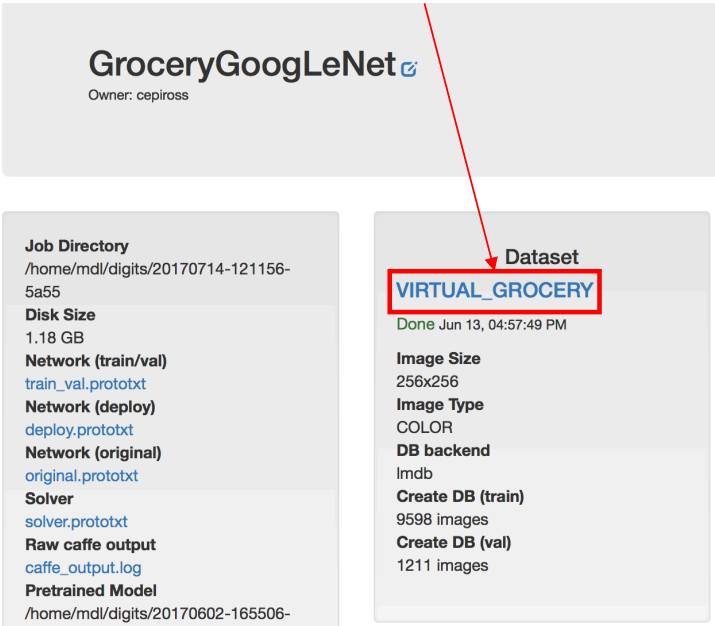


name	framework	status	elapsed	submitted
▼ GIRLSCAMP				
Bananas_GoogLeNet	caffe	Done	6m	9:55 PM
Apples_GoogLeNet	caffe	Done	8m	9:51 PM
AppleOrNot_GoogLeNet	caffe	Done	7m	9:48 PM
BananaOrNot_GoogLeNet	caffe	Done	6m	9:44 PM
AppleOrBanana_GoogLeNet	caffe	Done	6m	9:40 PM
Bananas_AlexNet	caffe	Done	22m	Jul 13, 17
Apples_AlexNet	caffe	Done	41m	Jul 13, 17
AppleOrNot_AlexNet	caffe	Done	41m	Jul 13, 17
BananaOrNot_AlexNet	caffe	Done	41m	Jul 13, 17
AppleOrBanana_AlexNet	caffe	Done	41m	Jul 13, 17
▼ UnrealCV				
GroceryGoogLeNet	caffe	Done	26m	Jul 14, 17
GroceryAlexNet	caffe	Done	28m	Jun 13, 17
▼ Ungrouped				
KITTI-DetectNet	caffe	Done	2h	Jul 10, 17
LeNet	caffe	Done	1m	Jun 5, 17

KITTI-DetectNet

1. Open Firefox browser
2. Go to PennState MDL Nvidia DIGITS server
3. Click on **GroceryGoogLeNet**

4. You can check details of its training dataset by clicking on Dataset



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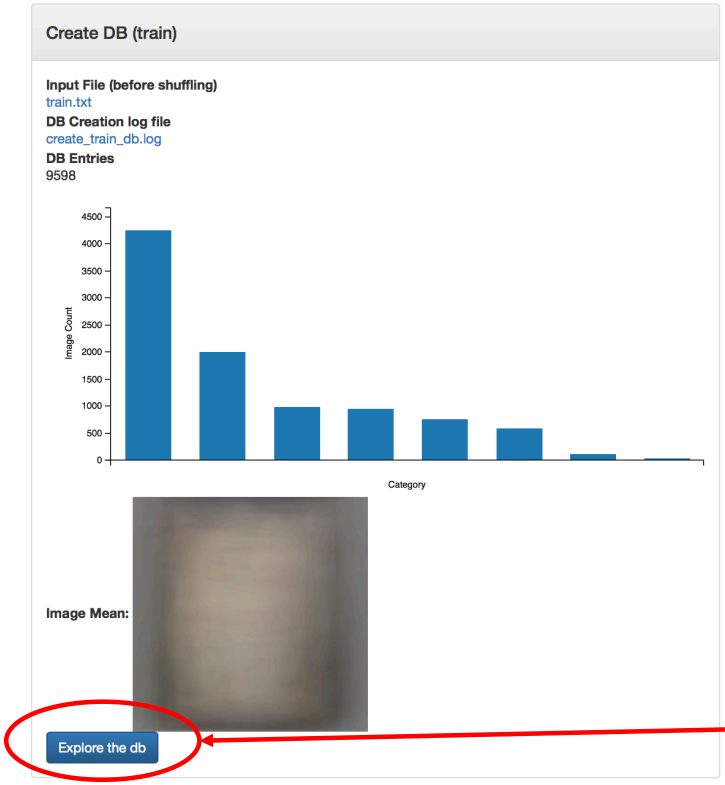

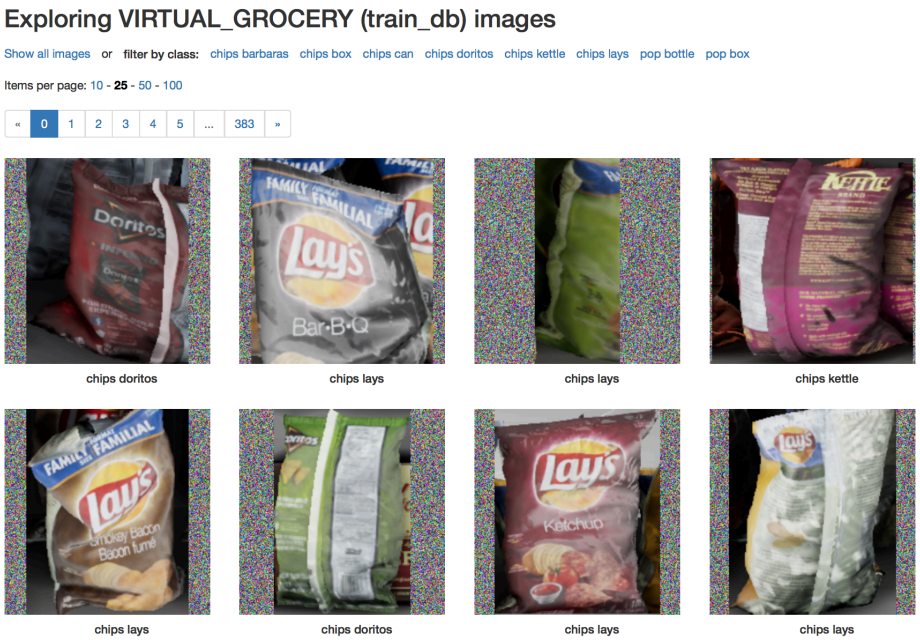

5. Click on **Explore the db**
6. You can check each sample image

Which factors do we need to consider? - Recap

Variants of Object

- Color
- Intensity
- Light (Shade)
- Geometric shape
- Texture

Geometric changes of Object

- Perspective
- Orientation
- Occlusion
- Deformation

Computers can classify items accurately now. But..

Which factors do make them special (or a difference)?

Variants of Object

- Color
- Intensity
- Light (Shade)
- Geometric shape
- Texture

Geometric changes of Object

- Perspective
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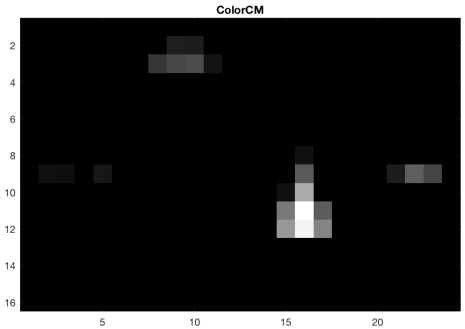
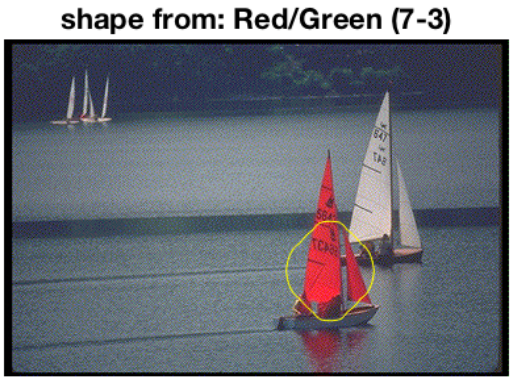
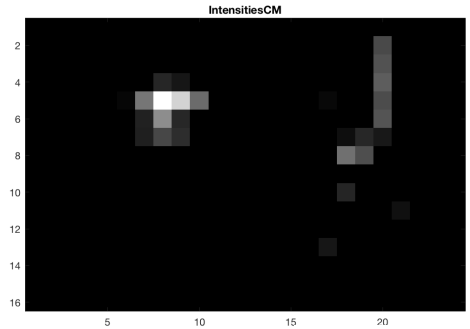
Visual saliency in a picture: **Color**





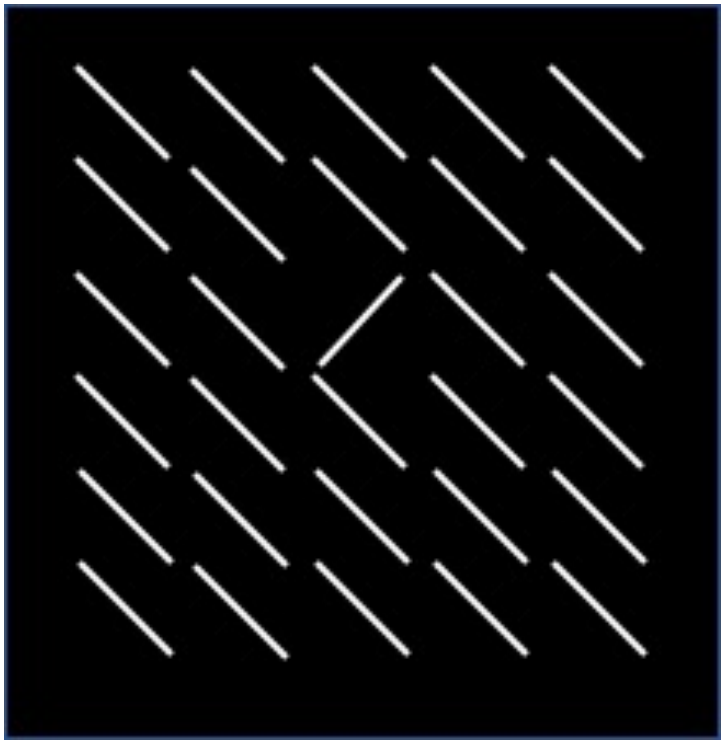
Dirk Walther and Christof Koch (2006), Modeling attention to salient proto-objects.
Saliency Toolbox 2.3, http://saliencytoolbox.net/

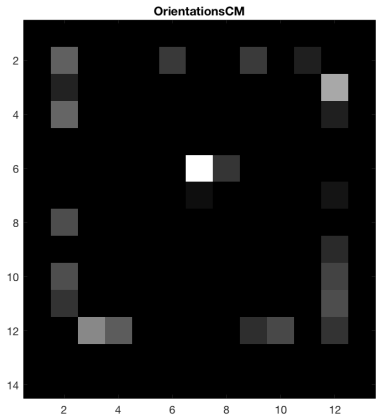
Visual saliency in a picture: **Intensity**

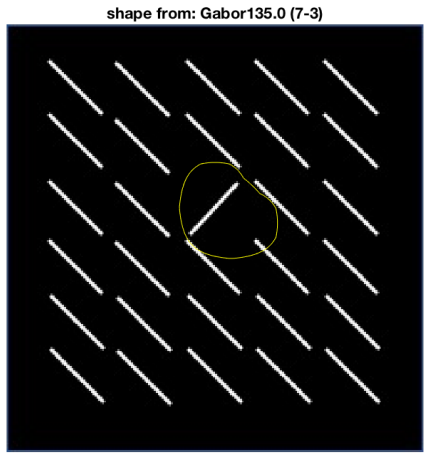


Dirk Walther and Christof Koch (2006), Modeling attention to salient proto-objects.
Saliency Toolbox 2.3, http://saliencytoolbox.net/

Visual saliency in a picture: **Orientation**







Dirk Walther and Christof Koch (2006), Modeling attention to salient proto-objects.
Saliency Toolbox 2.3, http://saliencytoolbox.net/

Which factors do make them special (or a difference)?

Variants of Object

- **Color**
- **Intensity**
- Light (Shade)
- Geometric shape
- Texture

Geometric changes of Object

- Perspective
- **Orientation**
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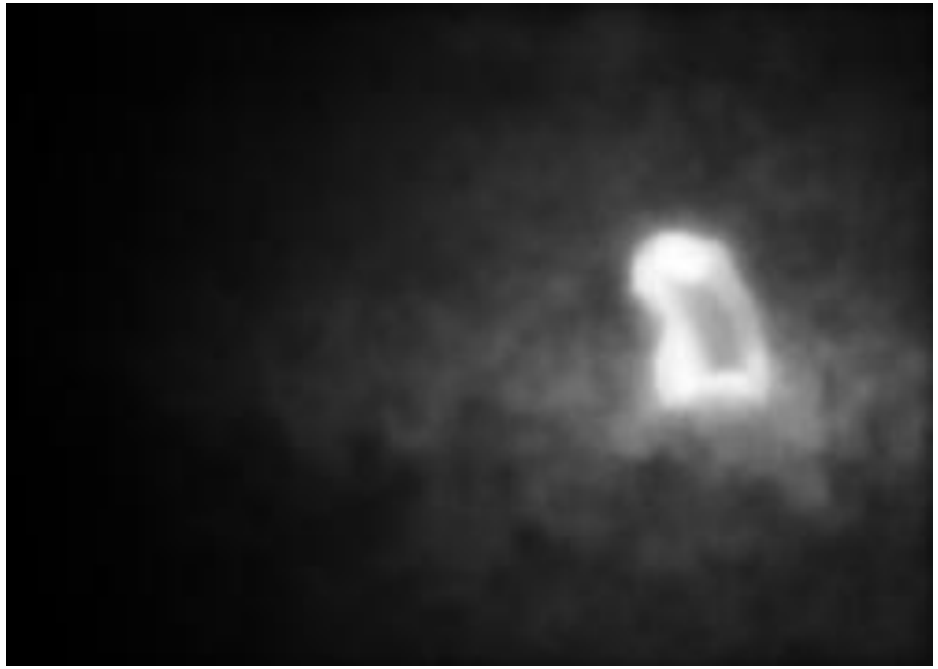
- Deformation

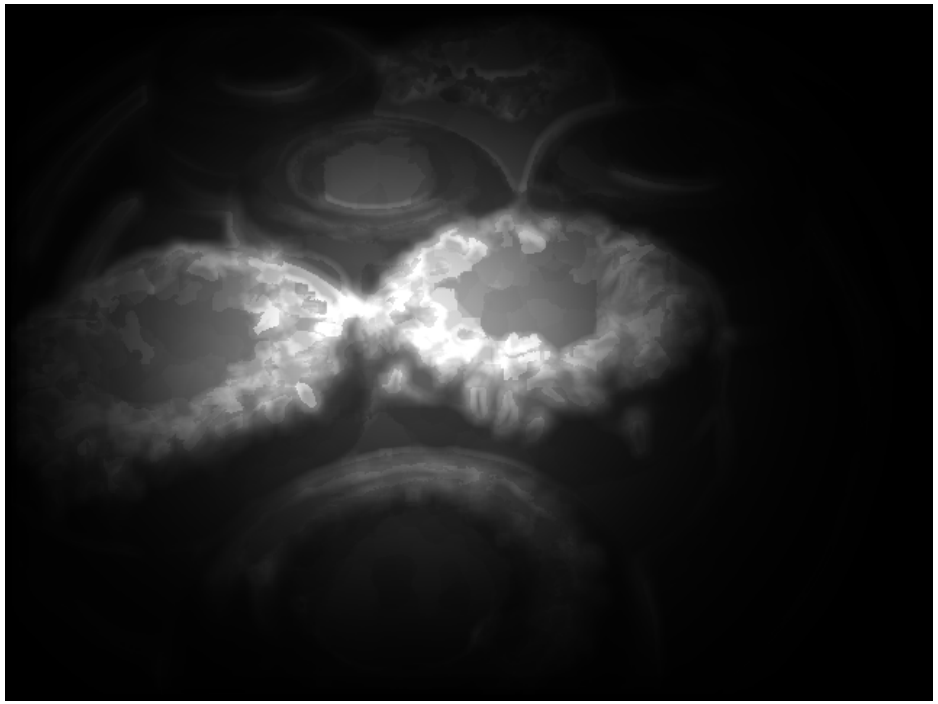
There may be other visual saliency more than these
However, they need complicated factors

Visual saliency: context-awareness



Stas Goferman, Lihi Zelnik-Manor, Ayellet Tal, Context-Aware Saliency Detection, CVPR 2010.

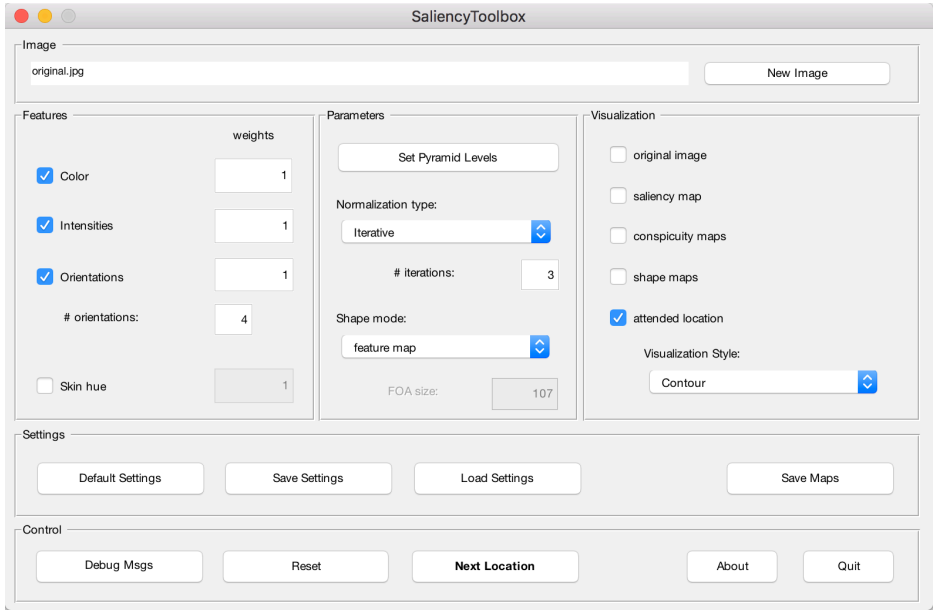
Visual saliency: Principal Component Analysis



R. Margolin, L. Zelnik-Manor and A. Tal. What Makes a Patch Distinct, CVPR 2013.

Where is visual saliency? Run your toolbox!

1. Copy Day4 folder
2. Double-Click on the **Day4/srcs/saliency-2.3/guiSaliency.m**
3. Run Matlab Program
4. You can now test either color, intensity, orientation, or their combinations for getting visual saliency



How to test advanced techniques of visual saliency?

Context-awareness

1. Insert test images to **Day4/imgs**
2. Double-Click on **Day4/srcs/CA/run_saliency.m**
3. Run Matlab Program
4. You can see test results at **Day4/imgs/Output**

Principal Component Analysis

1. Insert test images to **Day4/imgs**
2. Double-Click on **Day4/srcs/PCA/demo.m**
3. Run Matlab Program
4. You can see test results at **Day4/imgs/pca_out**