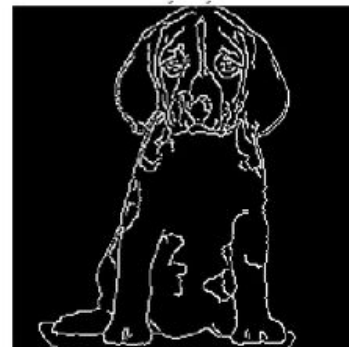# Feature Descriptors / HOG

Inceptez

What is a Feature Descriptor?

Most Popular Feature Descriptors

1. **HOG**: Histogram of Oriented Gradients
2. **SIFT**: Scale Invariant Feature Transform
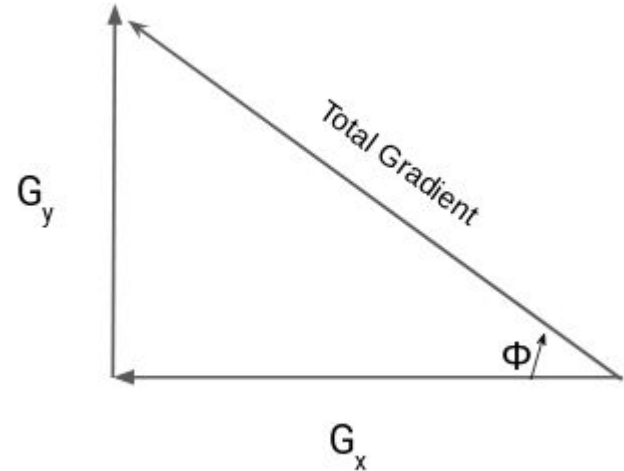3. **SURF**: Speeded-Up Robust Feature

What is HOGs?

1. Gradient and Orientation
2. 'localized' portions
3. Histogram

Steps to calculate Gradients

1. Preprocess the Data (64 x 128)
2. Calculating Gradients (direction x and y)
3. Calculate the Magnitude and Orientation

Methods of Generating Histograms

121	10	78	96	125
48	152	68	125	111
145	78	85	89	65
154	214	56	200	66
214	87	45	102	45

Magnitude		1							
Bin	0	20	40	60	80	100	120	140	160

Methods of Generating Histograms

121	10	78	96	125
48	152	68	125	111
145	78	85	89	65
154	214	56	200	66
214	87	45	102	45

Magnitude		1							
Bin	0	20	40	60	80	100	120	140	160

Methods of Generating Histograms

30	20	10
40	60	70
50	70	60

8 x 8

	20	
40	60	70
	70	

X direction = |40 − 70| = 30
Y direction = |20 − 70| = 50

58

30
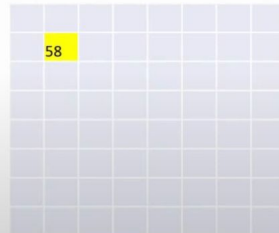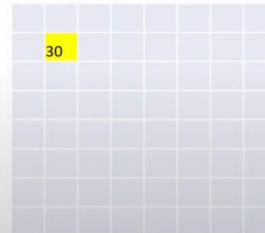
Grad Mag = sqrt(30^2 + 50^2) = ~58
Grad Direction = tan^{-1}(30/50) = ~30^0

Grad Magnitude

Grad Direction

Methods of Generating a Histogram

Grad Magnitude

Grad Direction

Feature Vector of size 9