

# 15. Measuring Objectness of Image Windows

**Github Link:** [https://github.com/Prathyusha-Akundi/Measuring\\_Objectness](https://github.com/Prathyusha-Akundi/Measuring_Objectness)

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## Main Goals of the Project:

- By combining different objectness cues, we will try to achieve about 91% of accuracy in detecting all objects with window size 1000 in PASCAL VOC test dataset.
- Our algorithm should have detection time of about 4 sec per image
- We will also take sample images from INRIA Person, Caltech 101 to demonstrate the class-generic nature of objectness measure

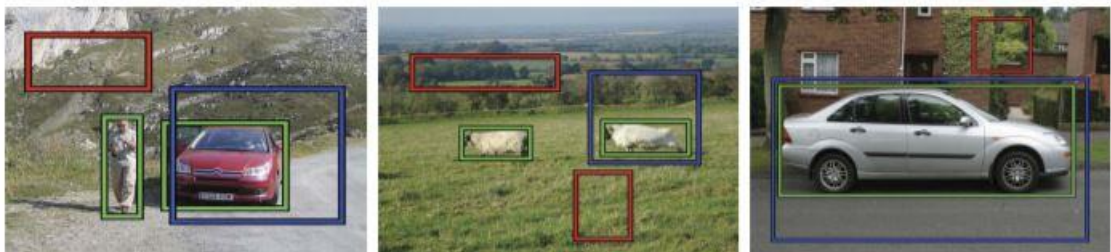
**Problem Definition:** To implement a generic objectness measure, quantifying how likely an image window contains objects of any class.

Here, we define the following measure cues whose parameters are learned using a Bayesian Framework:

- **MultiScale Saliency (MS):** It measures the uniqueness characteristic of objects
- **Color contrast (CC):** It is a measure of the dissimilarity of a window to its immediate surrounding area.
- **Edge density (ED):** It measures the density of edges near the borders.
- **SuperPixels Straddling (SS):** It captures the closed boundary characteristic of objects using superpixels as features.
- **Location and size (LS):** It measures the probability of an image window to cover an object using kernel density estimation.

## Results:

- Given a new unseen image, our algorithm should be able to detect all the possible objects of any class.
- Our algorithm should achieve desired objectness measure which is depicted in following image:



Here, a window of green contains only the object with high probability, a blue window contains image and partial background and a red window contains lowest probable objects.

- We report results on the test dataset on PASCAL VOC 07 and the results would contain bounding windows in some of the test images and the detection rate with different combinations of our cues.

#### **Tasks for each Team Members:**

- Cue implementation and parameter estimation for the following:
  - MultiScale Saliency (MS) – Anoop Karnik
  - Color contrast (CC) – Prathyusha Akundi
  - Edge density (ED) – Anoop Karnik
  - SuperPixels Straddling (SS) – Prathyusha Akundi
  - Location and size (LS) – Anoop Karnik
- Bayesian Cue Integration:
  - Cue integration using Naïve Bayes model – Prathyusha Akundi
  - NMS sampling – Anoop Karnik
  - Multinomial sampling – Prathyusha Akundi
- Testing on various datasets (Experiments):
  - PASCAL VOC – Anoop Karnik
  - INRIA and CalTech – Prathyusha Akundi

#### **Milestones:**

- Oct 10<sup>th</sup> – Completion of two out of 5 cues
- Oct 25<sup>th</sup> – Implementation of all cues and their respective parameter estimation using Bayesian framework
- Nov 5<sup>th</sup> – Bayesian cue integration
- Nov 10<sup>th</sup> – Initial testing on PASCAL VOC
- Nov 15<sup>th</sup> – Testing should be done
- Nov 20<sup>th</sup> – Completion of report.