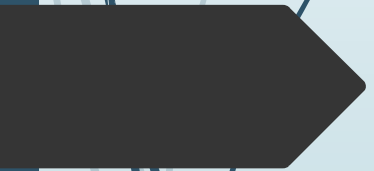


# Saliency Filters

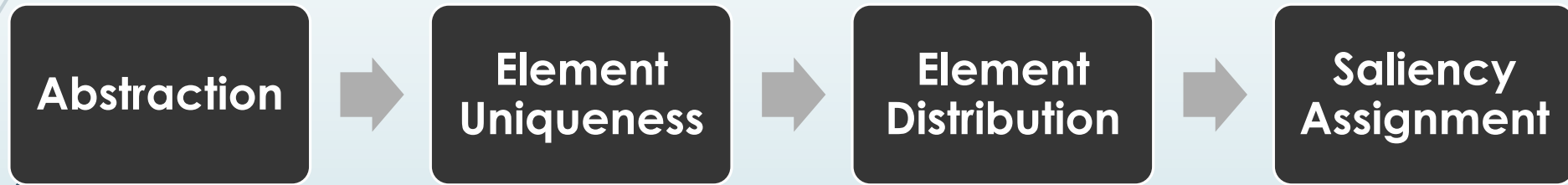
Contrast Based Filtering for Salient Region Detection



# Introduction


- The computational identification that are likely to catch the attention of a human observer is a typical perceptual research problem.
- The research indicate that the most influential factor in low level visual saliency is contrast
- This project is based on the observation that an image can be decomposed into basic, structurally representative elements that abstract away unnecessary detail and at the same time allow for very clear and intuitive definition of contrast based saliency.

# Processing Pipeline





# Abstraction

- Decompose images into “elements” (superpixels) which represent relevant features of the image by abstracting unnecessary detail and clustering pixels.
  - These elements are perceptually homogeneous.
- 

## Element Uniqueness

- Evaluate how different each respective element is from all the other elements that constitute the image by essentially measuring the “rarity” of each element.
- This is the first contrast measures used to calculate saliency.

$$U_i = \sum_{j=1}^N \|\mathbf{c}_i - \mathbf{c}_j\|^2 \cdot \underbrace{w(\mathbf{p}_i, \mathbf{p}_j)}_{w_{ij}^{(p)}}.$$

## Element Distribution

- It renders unique elements more salient when they are grouped in a particular region of the image rather than evenly distributed across the whole image.
- This is the second contrast measure used to find saliency.

$$D_i = \sum_{j=1}^N \|\mathbf{p}_j - \mu_i\|^2 \underbrace{w(\mathbf{c}_i, \mathbf{c}_j)}_{w_{ij}^{(c)}},$$

# Saliency Assignment

- The 2 contrast measures namely “Element Uniqueness” and “Element Distribution” are defined on a per element level.
- Saliency Assignment as a final step of the pipeline assigns the actual saliency values to the input image to get a pixel accurate “Saliency Map” using the following equation.

$$S_i = U_i \cdot \exp(-k \cdot D_i),$$

Input image used





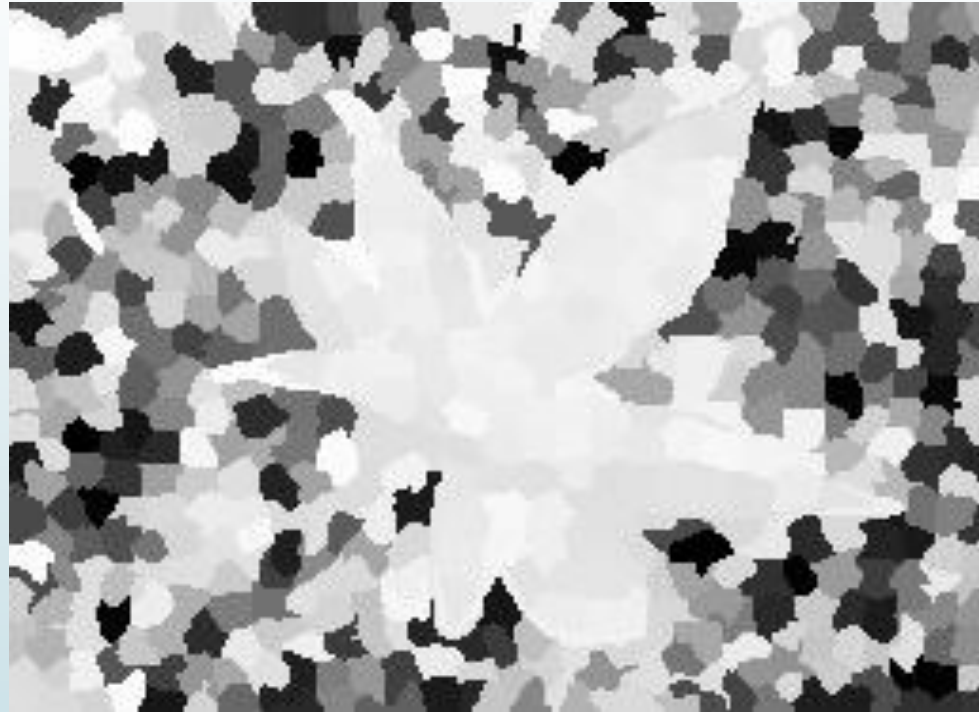
# Abstraction



# Element Uniqueness



# Element Distribution





# Project Milestones Achieved

- **Getting Accustomed To GitHub Environment**
- **Understanding the concept of Contrast Based Filters**
- **Implementing Abstraction**
- **Implementing Element Uniqueness and Element Distribution**



# Milestones to be Achieved

- Improving the result of “Element Distribution” by using the concept of Permutohedral Lattice
- Implementing Saliency Assignment
- Testing , Improvement, and running the algorithm on multiple images