Mean Shift Image Filtering

Mean Shift Analysis and Applications, D. Comaniciu and P. Meer

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Table of contents

1. About Mean Shifting

2. Mean Shifting method

3. Mean Shifting Filter

4. Example Mean Shifting Filter

What's Mean Shift?

- One of the robust data analysis method

- Unsupervised learning (not need training data)

- Solve for maximal point of the density
  (mode seeking problem)

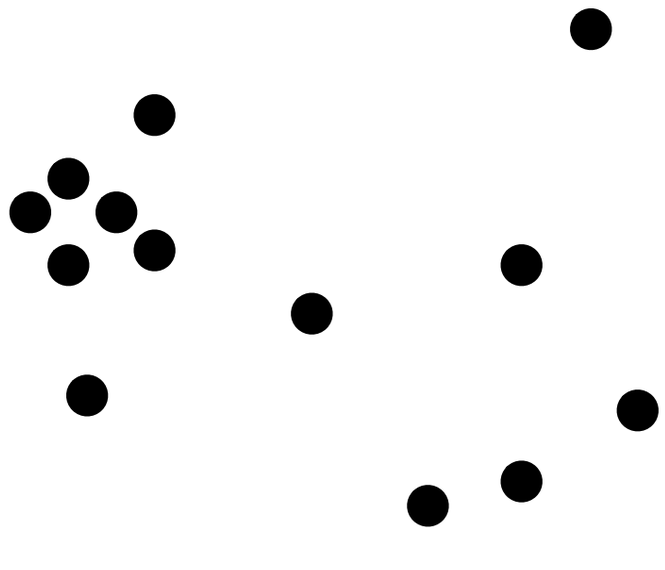
Mean Shift Algorithm

Suppose we have point cloud in N-dimensional space ...

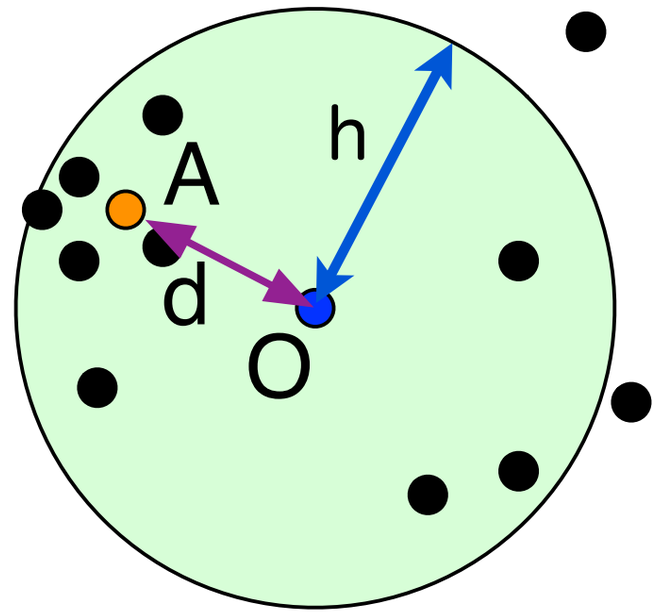
1. Estimate a density function from point cloud
2. Consider a determinate space centered on an random point(=O)
3. Searching a local maximal point of the density (=A) from determinate space
4. Moving determinate space on a point A

Mean Shift Algorithm

1



2



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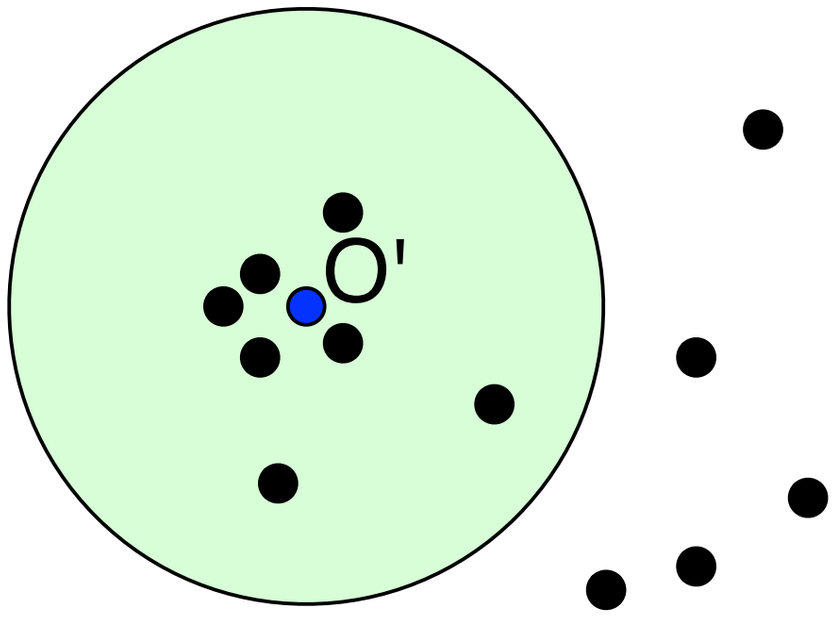

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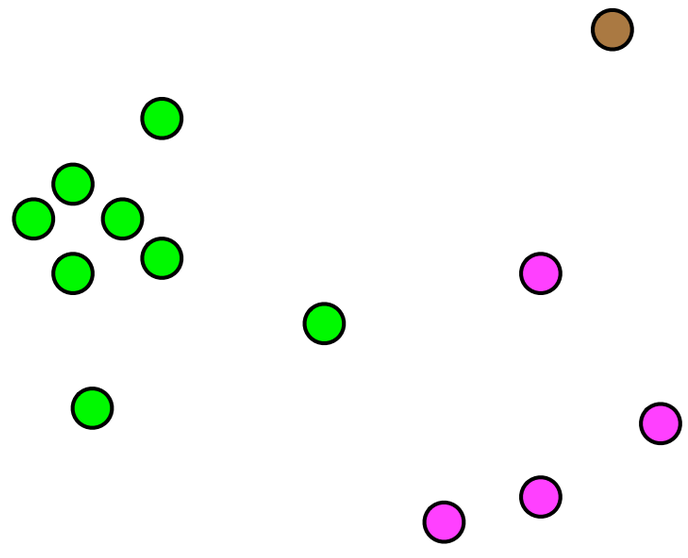
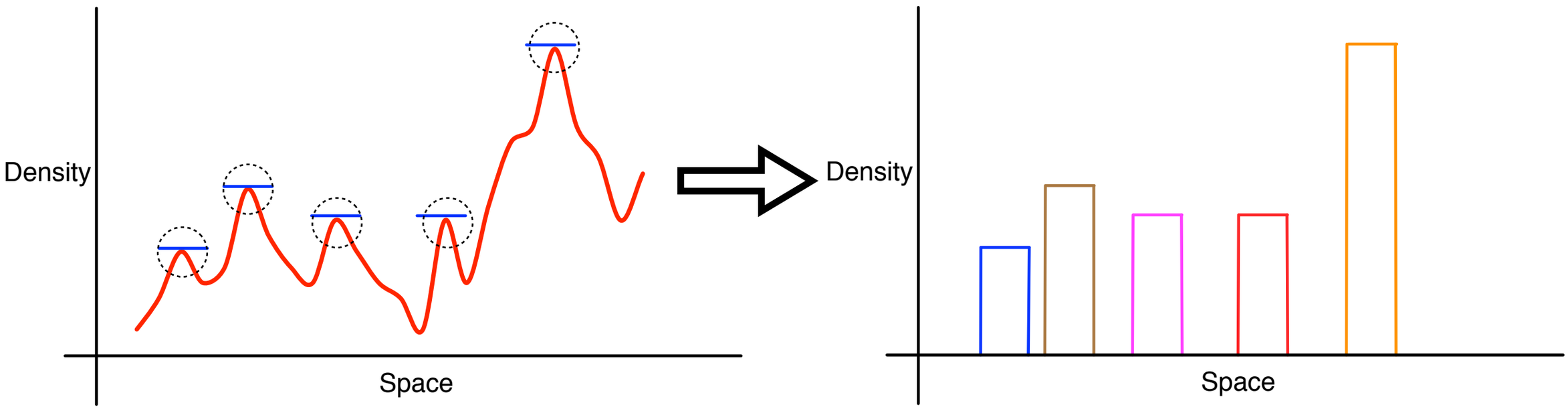


Mean Shift Algorithm

Mean shift can be clustering point cloud into several maximal points of the density.



Mean Shift Image Filtering

Image Filter using Mean Shift method is equalized image.

Advantage point ...

Keeping edge infomation !

Mean Shift Image Filtering Algorithm

Suppose we have an RGB image that consists of N pixels.Pixels have 5 values (r,g,b,x,y)

Use the two indicators…

Clustering using (r,g,b)values ・・・ Color distance

using (x,y)values ・・・・ Distance

Labeling same group at close color and near position pixels.

Example Filtering(smoothed filter)

← Original

smoothed filter →

Example Filtering(Mean Shifting)

← Original

Mean shift equalize →

Example Filtering(smoothed filter)

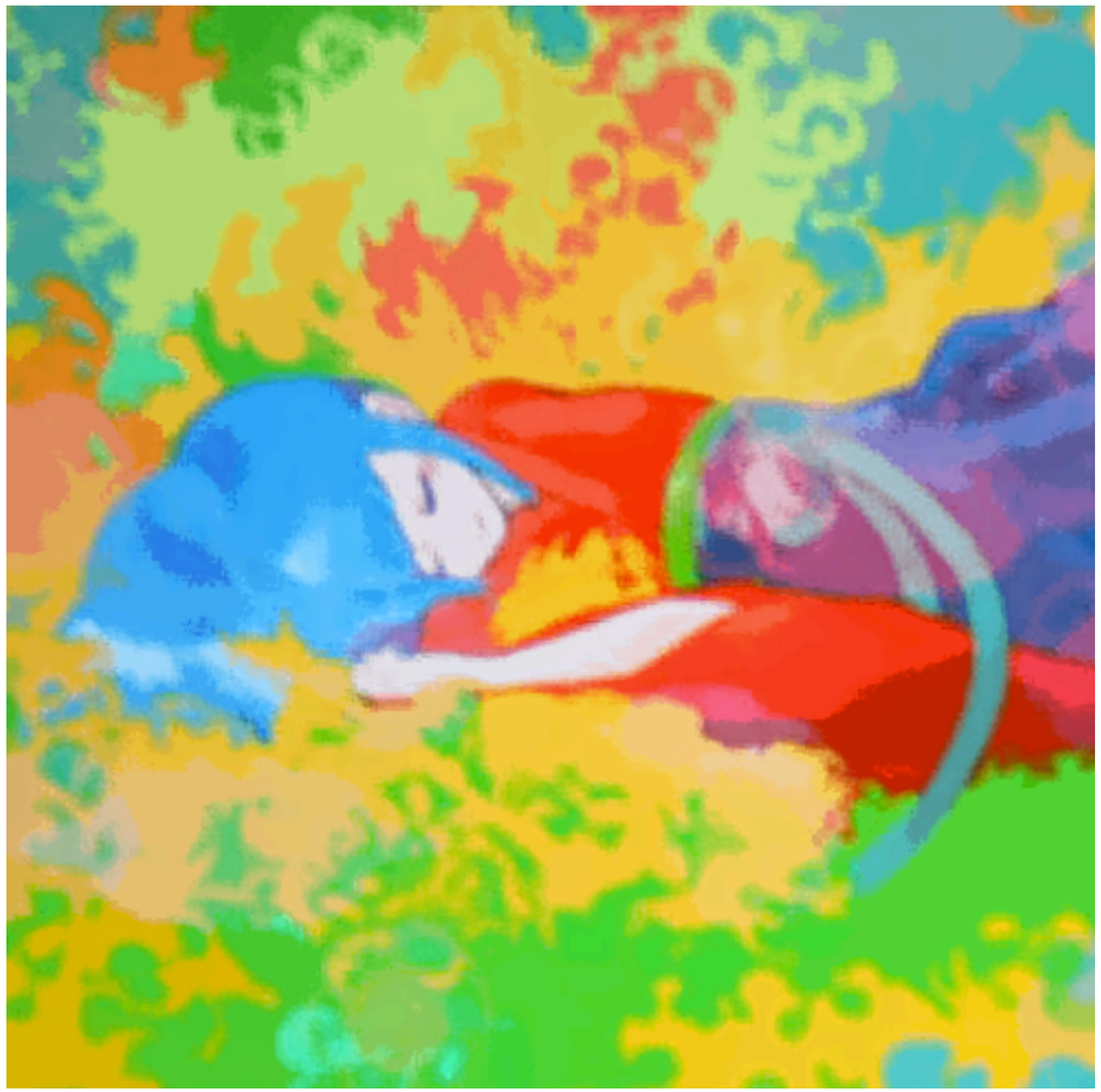
Original

smoothed filter

Example Filtering(Mean Shifting)

Original

Mean shift equalize



Using Mean Shifting method etc

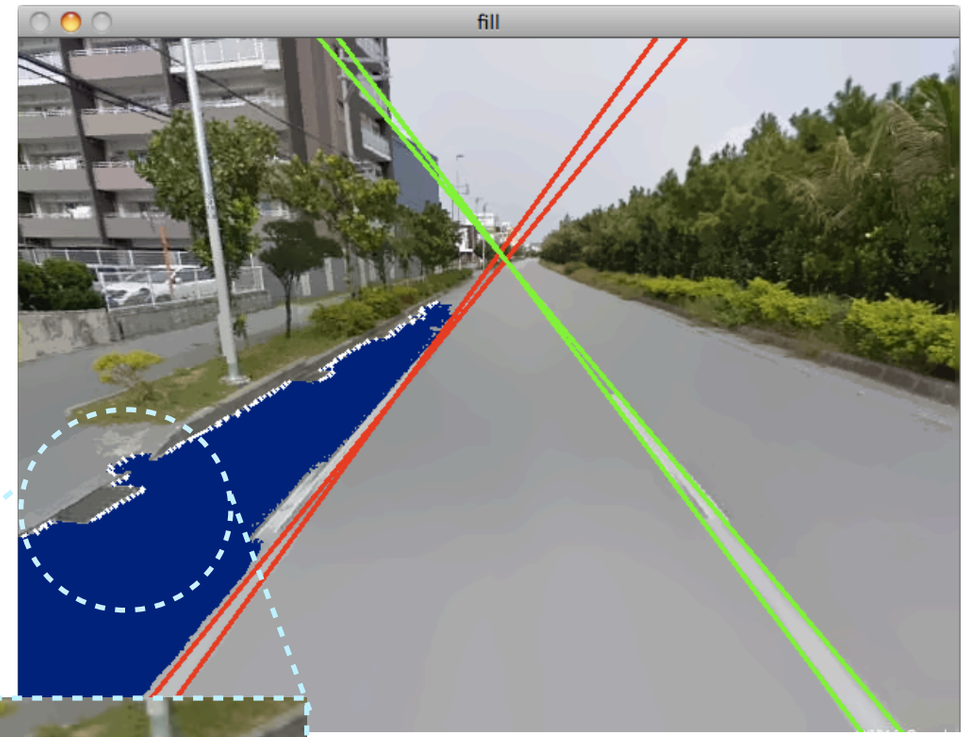
Mean shift image analysis has wide usage ...

- Region segmentation
- Point feature tracking
- Equalize image(like a posterization)

Part of my study (Region segmentation)

Estimation for road outside

Region segmentation



Thank you !

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