EECS 442 Discussion

Arash Ushani

December 2, 2015

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Announcements

- Homework 5 is out
- Keep an eye out to sign up for project presentation times

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• What is the goal of k-means?

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- Why is segmentation and clustering an important problem to solve?

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- What is the goal of k-means? Segmentation/Clustering
- Why is segmentation and clustering an important problem to solve? Many applications! In the HW, you need to create a library of "codewords" for your Bag of Words representation



• Given a set of unlabeled data (ie, a set of images, some of shoes and some of handbags), we need to learn both the labels for the data and the representative data point for each type



• Given a set of unlabeled data (ie, a set of images, some of shoes and some of handbags), we need to learn both the labels for the data and the representative data point for each type



- If I knew what the labels were for all of the data, I could find the cluster centers
- If I knew what the cluster centers were, I could find the labels for the data



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Expectation - Maximization

- Two step process to iteratively solve this type of problem
- Step 1 (Expectation): Using current estimate of all of the cluster centers, compute the labels for all of the data
- Step 2 (Maximization): Using the current guess for the labels, compute the best guess (ie, maximimum likelihood estimate) of the cluster centers
- Repeat as long as desired (until labels don't change, or cluster centers don't move very far)

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In action...



In action...



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In action...



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In action...



In action...



MATLAB

- $\bullet~\mbox{Go}$ to CTools $\rightarrow~\mbox{Resources}$ $\rightarrow~\mbox{Discussion}$ $\rightarrow~\mbox{12_02_matlab.zip}$
- Given a set of points, run k-means



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