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**ECE471-571 – Pattern Recognition**

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**Midterm Review**

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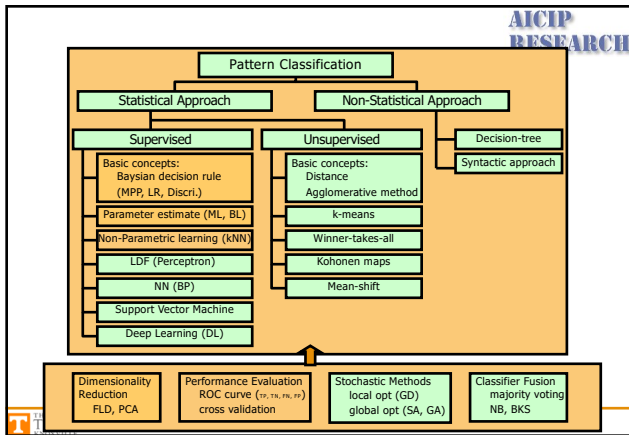
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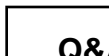

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**Q&A**

- ◆ What is the common feature of statistical pattern classification?
- ◆ What is supervised pattern classification? How is it different from unsupervised classification?
- ◆ When performing classification, what is the general rule that Bayesian decision methods follow? (MPP, Discriminant function)
- ◆ What are the differences between the three cases of discriminant function?
- ◆ What's the difference between Euclidean distance and Mahalanobis distance?
- ◆ What is the difference between parametric classification and non-parametric classification?
- ◆ Understand behavior/characteristics of m-D Gaussian
- ◆ What is maximum likelihood estimation?
- ◆ Both FLD and PCA reduce the dimension of a dataset. However, different projection directions are generated from the two approaches. Comment on the fundamental differences.
- ◆ How to quantify error in representation in PCA?

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## Q&A

- Can you verbally describe kNN? And possible improvements?
- Performance evaluation
  - Learn to plot and use and explain an ROC curve
  - Be familiar with the relationship between TP, FP, TN, FN, precision, recall, specificity, sensitivity, and accuracy
  - What is cross validation?

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## Forming Objective Functions

- Maximum a-posteriori probability
- Maximum likelihood estimate
- Fisher's linear discriminant
- Principal component analysis
- kNN
- ROC curve

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## Distance Metrics

- Euclidean distance
- Mahalanobis distance
- Minkowski distance
  - Manhattan distance (city-block distance)
  - Euclidean distance

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## Review Materials

AICIP  
RESEARCH

- HW1, 2
- Proj 1, 2
- Lectures 1-10

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