**Course Title:** Pattern Recognition

**Class:** PhD

**Semester:** 1

**Session:** 2020

**File Type:** PowerPoint Presentations and PDF files

**Instructors:** Dr. Saima Farhan

**Link:** [**https://drive.google.com/drive/folders/1yv82SUUIY3PQg7uMrgKf\_5Y9GNvPsGny?usp=sharing**](https://drive.google.com/drive/folders/1yv82SUUIY3PQg7uMrgKf_5Y9GNvPsGny?usp=sharing)

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| S. No. | Course Content |
| 1 | Pattern recognition, classification and matching problemsPattern recognition system and its featuresFeature extraction and classificationSupervised vs. unsupervised pattern recognitionStatistical vs. structural pattern recognitionSensing and decision making |
| 2 | Bayes decision theory * [Bayes decision rule](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap2.Part1.pdf)
* [Minimum error rate classification](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap2.Part2.pdf)
* [Normal density and discriminant functions](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap2.Part3.pdf)
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| 3 | Bayes decision theory * [Error integrals and bounds](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap2.Part4.pdf)
* [Bayesian networks, compound decision theory](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap2.Part5.pdf)
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| 4 | Generative methods * Maximum-Likelihood and Bayesian parameter estimation
	+ [Maximum-Likelihood estimation](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part1.pdf)
	+ [Bayesian parameter estimation](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part2.pdf)
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| 5 | Generative methods * Maximum-Likelihood and Bayesian parameter estimation
	+ [Dimensionality and computational complexity](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3Part3-3.pdf)
	+ [Principal components analysis](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part5.pdf)
	+ [Fisher linear discriminant](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part6.pdf)
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| 6 | Generative methods * Maximum-Likelihood and Bayesian parameter estimation
	+ [Expectation maximization](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part7.pdf)
	+ [Hidden markov models](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap3.Part8.pdf)
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| 7 | Generative methods * Nonparametric techniques
	+ [Density estimation](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap4.DensityEstimation.pdf)
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| 8 | Discriminative methods * Distance-based methods
	+ [Nearest neighbor classification](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap4.NearestNeighbor.pdf)
	+ [Fuzzy classification](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap4.FuzzyClassification.pdf)
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| 9 | Discriminative methods * Linear discriminant functions
	+ [Hyperplane geometry](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap5.Part1.pdf)
	+ [Support vector machines](http://www.cedar.buffalo.edu/~srihari/CSE555/SVMs.pdf)
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| 10 | Discriminative methods * Artificial neural networks
	+ [Biological motivation and back-propagation](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap6.Part1.pdf)
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| 11 | Non-metric methods * [Recognition with strings](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap8.Part1.pdf)
* [String matching](http://www.cedar.buffalo.edu/~srihari/CSE555/Chap8.Part2.pdf)
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| 12 | Non-metric methods * Syntactic recognition of strings
* Syntactic recognition of trees
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| 13 | Unsupervised learning and clustering |
| 14 | Pattern recognition systems for * Character recognition
* Handwriting recognition
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| 15 |  Pattern recognition systems for * Document classification
* Fingerprint classification
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| 16 | Pattern recognition systems for * Speech and speaker recognition
* Object identification
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