FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Computers and Information Technology

Pattern Recognition

Information :

Course Code :	DM351	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours
Department :	Department of Computer Science				

Area Of Study :

Define knowledge that enhances skills in fundamental area of pattern recognition
Use and adopt fundamental and advanced mathematics, basic sciences and computer science theories in all development phases of pattern recognition.
Solve problems using mathematical knowledge through analyzing and interpreting data.
Comprehend deeply the basic concepts of pattern recognition to be ready for further and continuous learning

Description :

Introduction; Probability theory: Bayesôrule; Parameter estimation; Statistical decision making: discriminate functions; measures of classification performance and measures of classification risk; Non-parametric decision making: Adaptive discriminate functions; Minimum squared error discriminate functions; Clustering techniques: Hierarchical clustering, Partitioning clustering; Artificial neural networks Hopfield nets- Other PR systems: Syntactic pattern recognition; Hidden Markov Model based; Application examples

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define the fundamental mathematics and statistics required to solve problems in pattern recognition area
2 -	Explain what constitutes pattern recognition system and how to address issues related to design of each system components
3 -	Explain the principles and techniques of pattern recognition
b.Intellectual Skills: :	
1 -	Illustrate a set of alternative solutions for a given pattern recognition problems associated with their results
2 -	Select appropriate methodologies and techniques for a given pattern recognition problem solution and setting out their limitations, restrictions and errors
3 -	Classify methods, techniques and algorithms used in pattern recognition problems solutions
c.Professional and Practical Skills: :	
1 -	Deploy effective supporting tools to implement pattern recognition systems
2 -	Apply effective information to learn pattern recognition programming languages
3 -	Use human computer interaction principles in the construction and evaluation of user interfaces for wide ranges of pattern recognition applications
d.General and Transferable Skills: :	
1 -	Work in a team to develop the requirement documentation
2 -	Apply communication skills in presentations and report writing using various methods and tools

ABET Course outcomes :	
1 -	Use fundamental and advanced mathematics, basic sciences and computer science theories in all development phases of pattern recognition
2 -	Demonstrate adequate understanding of the basic concepts of pattern recognition to be ready for further and continuous learning

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to pattern recognition	4	2	2
Feature Extraction	4	2	2
Bayesian methods	4	2	2
Feature transformation	4	2	2
Feature transformation	4	2	2
Supervised classification	4	2	2
Supervised classification	4	2	2
Linear classifiers	4	2	2
Mid Term Exam	2		
Non-Linear classifiers	4	2	2
Principle Component Analysis	4	2	2
Clustering methods	4	2	2
Project presentation	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :

- Interactive Lectures including discussion
- Practical Lab Sessions
- Self-Study (Project / Reading Materials / Online Material / Presentations)
- Case Studies

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00	14	
Midterm Exam (s)	20.00	9	
Others (Participation)	10.00		
Practical Exam	10.00		
Quizzes	10.00	5	
Team Work Projects	10.00		

Course Notes :

Course Notes are available with all the slides used in lectures in electronic form on Learning Management System (Moodle)

Recommended books :

Duda and Hart, "Pattern Classification ", Wiley, latest edition

Web Sites :

IEEE transactions on Pattern Recognition
IEEE pattern analysis and machine intelligence
www.ai.com