COURSE	Name	: Intelligent Pattern Recognition
	Code	: EE185554
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

In this course, basic concepts, theories and algorithms for pattern recognition are used to study computer vision, voice recognition, data mining, statistics, information recovery and bio informatics. The topics of the course include: Bayesian decision theory, parametric and non-parametric learning, data grouping, component analysis of support vector machine and deep learning.

Learning Outcomes

Knowledge

(P01) Mastering the concepts and principles of science in a comprehensive manner, and to develop procedures and strategies needed for the analysis and design of systems related to the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics as a preparation for further education or professional career.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

(S12) Working together to be able to make the most of his/her potential.

Course Learning Outcomes

Knowledge

Mastering the concepts and methods related to pattern recognition and machine learning.

Mastering the concept of features and being able to find features that are suitable for grouping a pattern.

Mastering algorithms and methods for grouping data based on features that have been found.

Specific Skill

Able to group and match data based on linear and non linear models.

Able to apply data dimension reduction method using principal component analysis (pca).

General Skill

Being able to build feature-based pattern recognition applications that have been found to be applied in the field of biometrics, voice recognition, robotics and computer vision.

Attitude

Demonstrating attitude of being responsible for the work in his area of expertise independently.

Working together to be able to make the most of their potential.

Main Subjects

1. Bayes Decision Theory: Discriminant function, normal distribution, density probability estimation function, Bayesian classification.
2. Linear classification: Perceptron algorithm, Least Suquare method.
3. Non-linear classification: Perceptron's Multilayer, backpropagation algorithm, Decision Trees, Combinations of Classifiers, Boosting
4. Feature selection: Data Preprocessing, ROC Curves, Class Separability Measures, Feature Subset Selection, Bayesian Information Criterion
5. Dimensity reduction: Base Vectors, Singular Value Decomposition, Independent Component Analysis, Kernel PCA, Wavelets
6. Matching templates
7. Classification based on context classification

Reference(s)

[1] R. Duda, et al., Pattern Classification, John Wiley & Sons, 2001.
[2] T. Hastie, et al., The Elements of Statistical Learning, Spinger, 2009.
[3] C. Bishop, Pattern Recognition and Machine Learning, Springer, 2006

Prerequisite(s)

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