Syllabus: IE661 – Applications of AI and DM Technology

Course Code:

IE661 : Applications of AI and DM Technology (인공지능 및 데이터마이닝 응용 기술)

Prerequisite:

IE362, or equivalent course

Credit:

3 Units

Class hour and location:

Location : TBD

Time: Every Monday and Friday 1600-1730

Professor:

Prof. Il-Chul Moon

Tel: 042-350-3118

Office location: E2 #4105

Office hour: See the department website

Email: icmoon@kaist.ac.kr

TA:

TBD

Textbook:

- Primary Textbook
  - **Bishop**: Pattern Recognition and Machine Learning by Bishop
  - **Alpaydin**: Introduction to Machine Learning by Alpaydin
- Secondary Reference
  - Probabilistic Graphical Models: Principles and Techniques (Adaptive Computation and Machine Learning series) by Daphne Koller and Nir Friedman
  - Bayesian Reasoning and Machine Learning by David Barber
  - The Elements of Statistical Learning: Data Mining, Inference, and Prediction by

Hastie et al

- Online Materials from Courseera.com

  - **Andrew Ng**: https://class.coursera.org/ml/lecture/preview

  - **Daphne Koller**: https://class.coursera.org/pgm/lecture/preview

  - **Dan Jurafsky**: https://class.coursera.org/nlp/lecture/preview

Course websites:

See KLMS Website

Grading:

Project abstract evaluation: 10%

Mid-Project evaluation: 30%

Final Project evaluation: 60%

Subject to change by the students' performance and participation

We will invite professors to evaluate the performance for the final evaluations.

Course Description:

The discipline of Industrial engineering utilizing artificial intelligence and machine learning techniques in diverse applications. This course will teach the supervised learning methods, the unsupervised learning methods, as well as the applications of probabilistic graphical learning models. These methods are applicable to quality control, text mining, time series analyses, etc.

Brief Course Schedule:

- **Week 1: Bayesian Network**

- **Week 2: K-Means Clustering and Gaussian Mixture Model**

- **Week 3: Hidden Markov Model and Conditional Random Field**

- **Week 4: Sampling Based Inference**

- **Week 5: Variational Inference**

- **Week 6: Deep Generative Model : Explicit Model**

- **Week 7: Reserved for spare classes or holidays**

- **Mid-Term**

- **Week 9: Deep Generative Model : Implicit Model**

- **Week 10: Deep Generative Model : Flow Model**

- **Week 11: Deep Generative Model : Diffusion Model**

- **Week 12: Dirichlet Process**

- **Week 13: Gaussian Process**

- **Week 14: Neural Process**

- **Week 15: Reserved for spare classes or holidays**

- **Final Exam**

Readings:

In the last slide of each lecture