

SYLLABUS

Classification		Elective
Course Code		EE817A
Course Name	Korean	컴퓨터공학특강 ◁▷
Course Name	English	Special Topics in Computer Engineering: <Deep Learning and Dynamic Neural Network Models>
Name		Jun Tani
Lecture:Exp.:Credit(Homework)		3:0:3
Mutually Recognized Course(BS/MS) : ()		Term : Spring 10:30am (Mon & Wed)
Descriptions of Courses	<p>This course studies a machine learning scheme, so-called deep learning which has been developed by utilizing various types of dynamic neural network models. The course especially focuses on how those dynamic neural network models can learn to recognize complex spatio-temporal patterns such as in dynamic vision, auditory signals and sensory-motor sequences by extracting deep structures latent in observed data. The course starts with an introduction of nonlinear dynamic systems which covers fundamental ideas of self-organization, attractor dynamics, parameter bifurcation and initial sensitivity and stochastic dynamics. Then, the course will study essential mechanisms and features of deterministic dynamic neural network models such as recurrent neural network models as well as stochastic neural network models including families of Boltzmann machines. The course explores dynamic mechanisms of developing functional hierarchy as well as modularity in learning of various types of spatio-temporal patterns. Senior undergraduate students might be able to take the course with permission. The evaluation is based on class participation and term projects.</p>	

•Schedule

Period	Topics	Remarks
1 Week	General introduction & course guides	
2 Week	Key concepts in deep learning and dynamic neural network models	
3 Week	Attractor dynamics in nonlinear dynamical systems	
4 Week	Stochastic dynamical systems	
5 Week	Basics in neural network models	
6 Week	Dynamic neural network models (Recurrent neural network models)	
7 Week	Stochastic dynamic neural network models (Boltzmann machine families)	
8 Week	Term project preparation	
9 Week	Paper reading in deep learning in static vision	
10 Week	Paper reading in deep learning in dynamic vision	
11 Week	Paper reading in deep learning in auditory signals and music patterns	
12 Week	Paper reading in deep learning in sensory-motor sequences	
13 Week	Paper reading in deep learning in multimodal sensory data	
14 Week	Group discussions on advanced topics in deep learning	
15 Week	Term project presentation 1	
16 Week	Term project presentations 2	

Name of Professor : Jun Tani

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