Course Syllabus

Name: Vision and Control of Industrial Robots
Description: Independent joint robot dynamics and control. Classical loopshaping scheme. PID control. State feedback and PID with feedforward control. Discrete-time controller implementation. System identification of robot joints. Robot dynamics. Nonlinear multivariable control. Vision-based control. Image processing basics. Introduction to neural networks and deep learning.
Schedules: (1)   Fri 13 – 16   (250)   Tue 13 – 16   (450)   Fri 9– 12
Instructor: Dr.Varodom Toochinda   Room M04 RDiPT
                 Mobile: 084-3239613   Email: varodom.t@gmail.com
Texts: Industrial Robot Analysis and Control (sec 1, 250) or Robot Analysis and Control with Scilab and RTSX, V. Toochinda. 2014 (sec 450)
References: Robot Modeling and Control, Mark W. Spong, S. Hutchinson and M. Vidyasagar, John Wiley & Sons, 2006
                 Robotics, Vision and Control: Fundamental Algorithms in MATLAB, Peter Corke, Springer 2011.
                 Introduction to Robotics: Mechanics and Control, 3rd Ed, John Craig, Addison-Wesley, 2005
                 Instructor handouts
Grading: 1) Homework Assignments 20 %   2) Quizzes   10 %
                 3) Midterm   30 %   4) Final   40 %

Course Outline

Lecture	Topic
1	Course outline. Software tools and basic programming
2	Command generation
3	Independent joint dynamics and control
4	Classical control design
5	PID controllers
6	State feedback and PID with feedforward control
7	Discrete-time controller implementation
	Midterm
8	Least-square system identification
9	Robot dynamics
10	Nonlinear multivariable control
11	Vision-based control
12	Image processing basics
13	Introduction to deep learning
14	Convolutional neural networks (CNN)
	Final