

课程大纲

COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	图像与视频处理 Image and Video Processing
2.	课程性质 Compulsory/Elective	专业课
3.	课程学分/学时 Course Credit/Hours	3/64
4.	授课语言 Teaching Language	英语为主，辅以中文解释 English with Detailed Explanations in Chinese
5.	授课教师 Instructor(s)	时红建 Hongjian Shi
6.	先修要求 Pre-requisites	信号与系统(Signal and System)、概率与统计 (Probability and Statistics)、线性代数(Linear Algebra)
7.	教学目标 Course Objectives	
	<p>课程学习目标：到课程结束，学生能做如下：</p> <ul style="list-style-type: none"> • 掌握基本图像与视频处理运算 • 掌握各种图像与视频分割方法及其医学影像应用 • 对图像与视频中的物体识别与信息进行有效提取 • 理解视频基本结构并能对视频进行处理，掌握编码与解码技能 • 掌握图像压缩原理及其后续处理 <p>Course Learning Objectives: By the end of this class, students would:</p> <ul style="list-style-type: none"> • Master the basic operations of image and video processing • Master various image segmentation methods and their application in medical imaging • Recognize the objects in image and video and extract useful information • Understand the basic structure of videos, and process, encode and decode videos • Master the principle of video compression and video post processing 	
8.	教学方法 Teaching Methods	
	<p>理论讲授+上机实验</p> <p>Through this course the students will learn theory and practical skills in optimization techniques and be able to apply them to solve simple problems.</p>	
9.	教学内容 Course Contents	
	Section 1	图像与视频介绍 INTRODUCTION TO IMAGE AND VIDEO
	Section 2-4	图像处理的基本运算 BASIC OPERATIONS IN IMAGE PROCESSING
	Section 5	形态图像处理 IMAGE MORPHOLOGICAL PROCESSING
	Section 6	彩色图像的合成与处理 COLOR IMAGE SYNTHESIS AND PROCESSING
	Section 7-9	图像分割及其医学影像应用 IMAGE SEGMENTATION AND THEIR APPLICATIONS IN MEDICAL IMAGING

Section 10	人类视觉系统与图像感知 HUMAN VISUAL SYSTEM AND PERCEPTION
Section 11	视频结构与标准 VIDEO STRUCTURE AND STANDARDS
Section 12	无损图像与视频压缩 LOSSLESS IMAGE AND VIDEO COMPRESSION
Section 13-14	有损图像与视频压缩与后处理 IMAGE AND VIDEO COMPRESSION AND POST PROCESSING
Section 15-16	视频的编码与解码 VIDEO ENCODING AND DECODING
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10.	课程考核 Course Assessment
	作业与实验练习作业 40%，期末考试 30%，项目实验 30% Assignments 40%, Final Exam 30%, Project 30%
11.	教材及其它参考资料 Textbook and Supplementary Readings
	参考书： A. C. Bovik, Handbook of Image and Video Processing, Academic Press, Second Edition, 2005. R. C. Gonzalez and R. E. Woods, Digital Image Processing, third edition, 2008 Other reference books are also possible, we will mainly base on our lecture contents and the mentioned reference book.