

信号処理論

科目番号		履修年度	2015年前期
開設学部等	理工学研究科(前期) 情報工学専攻 システム情報工学	期間	前期
曜日時限	木曜日 4時限 E1-322	単位数	2
担当教員	アシャリフモハマッド	講義コード	R0007600

■授業内容と方法

In this lecture, we shall concentrate about 2-D signal processing, which is digital image processing. First, we shall study the necessary mathematics for 2-D processing. Then, the fundamental of digital image are aimed for study. Image transformations, which are used in this topic, will be reviewed. Image enhancement is one of the main point in image processing to be studied. Then after, we should know about image restoration, where many techniques are going to be said there. One big aim in digital image processing is the image compression algorithms. Here, again we need our concentration on these topics. Image segmentation, representation and description are the remainder topics to make one becomes with full fundamental knowledge about these topics, which could be studied for further readings. There are many applications for digital image processing, medical imaging, remote sensing, communications, image recognition and so on are few to be mentioned here.

■達成目標

To understand mathematics of 2-D signal processing.
 To understand human visual perception, robot vision & 3-D stereoscope, image sampling & pixel relations, film, camera.
 To understand image transformation.
 To understand different algorithm in image enhancement.
 To understand different algorithm in image restoration.
 Image coding algorithm & segmentation & description

■評価基準と評価方法

Present at class 10%
 Simulation home work 30%
 Report 30%
 Presentation 30%

■履修条件

Basic DSP, Communications

■授業計画

第1回目
 Introduction: 2-D system, related theorems
 第2回目
 Mathematical characteristics of image
 第3回目
 Digital Image fundamental: Elements of visual perceptions
 第4回目
 Image model, sampling and quantization
 第5回目
 Basic relationship between pixels
 第6回目
 Image geometry, photography film
 第7回目
 Image transforms: 2-D Fourier transform, FFT, WT, HT, DCT
 第8回目

Haar transform, Slant transform

第9回目

The Hotelling transform

第10回目

Image enhancement: Enhancement by point processing, Histogram processing, Subtraction, Averaging

第11回目

Spatial filtering, frequency domain, Homomorphic filtering

第12回目

Color image processing

第13回目

Image restoration: Model, algebraic approach, inverse filtering, LMS (wiener) filter

第14回目

Constraint LS restoration, interactive restoration, geometric transformation

第15回目

Image compression: Fundamentals, models, error-free compression, lossy compression, standards

第16回目

Last Examination: Students' Presentation & Report Submission

■事前・事後学習

■教科書

ISBN

Digital Image Processing, by Rafael G. Gonzalez, Richard E. Woods	9780131687288
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■参考書

ISBN

■備考(メッセージ)

ニュースグループ

ura.ie.classes.signal

■オフィスアワー

Tuesday 3:00-5:00、 Friday 3:00-5:00

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