

t.INT - Informationstheorie

Person responsible for the course: Kurt Hauser, husr

Credits: 4

Valid for: 2010/2011

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Learning objectives:

INT deals with digital data transmission systems and their optimization:

- The students will get knowledge about the 'source coding' and 'error control coding' issues.
 - The students will know how to realize the source coding and the error control coding in practice.
 - The students will know the modelling and simulation of digital transmission systems by the use of pseudo noise sequences.
 - The students will be able to implement a data compression device based on technical specification.
 - The students will have the knowledge to implement a channel coding system fit to work in a noisy channel.
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Course content:

Theory:

- The information theory (Shannon)
- The definition of entropy in communication theory, calculating entropy.
- Optimized source coding by Huffman and Lempel-Ziv algorithms. Image compression with JPEG.
- Error control coding: Error detection & correction. Hamming distance, channel capacity, Hamming code, CRC-code, BCH-code and RS-code.
- Convolutional codes

Exercises:

- Entropy and binary memoryless source
- Lossless source coding and Huffman coding
- Calculation the information quantity per event and calculating entropy of a given file by applying PHP.

Development of a Huffman code generator for the given file.

- Data compression based on the dictionary approach.
 - Pseudo noise sequences; error correction by the use of block codes.
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Previous knowledge:

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Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	14*2
Tutorial/Practicum	14*2
Group teaching	
Block instruction	
Seminar	

Assessment:

According to the table or as specified in writing by the lecture at the beginning of the semester!

Number	Type	Weighting
1	End of term exam	70%
2	Exam during the semester	15% + 15%
	Further assessments	

Language of instruction:

German

Instruction material:

Script (80%), slides (20%)

Written exercises

Literature: Grundlagen der Kommunikationstechnik. Autor: John G. Proakis. Verlag: Pearson Studium.

Comments:

In "Übungen / Praktika": It will be Übungen.

This course description is for information. If the lecturer himself orders further work to be done it will be his order which has to be fulfilled.