Pattern and Speech Recognition

(aka: Speech Technology; Mustererkennung; Echtzeitdatenverarbeitung II)

Dietrich Klakow
Formalities

- Language
  - Default: English
Formalities

- Lecture:
  - Tuesday 14:15-15:45
  - Location: seminar room in building C7 3
  - Contact:
    - D. Klakow: tel. 58122, dietrich.klakow@lsv.uni-saarland.de
Formalities

• Exercises:
  • Friday 14:15-15:45
  • Location: seminar room in building C7 3.
  • Tutor: Marcela Charfuelan (tel. 58127, Marcela.Charfuelan@lsv.uni-saarland.de)
Prerequisites

Mathematics:
- Probability theory
- Some linear algebra and calculus

Programming
- Java
- C/C++
- ...
Formalities

- Exam:
  - Most likely an oral exam
  - 30 minutes
  - Date and time: to be arranged
  - SET, CuK, Mechatronik: 4.5 LP
  - Coli, MSc LS&T, CS: 6 LP
1. Introduction
Pattern Classification
by Richard O. Duda, Peter E. Hart, David G. Stork
Wiley-Interscience
ISBN: 0471056693

- A classic on pattern recognition
- Used for the centre part of the lecture
Pattern Recognition and Machine Learning
by Christopher M. Bishop
ISBN: 0387310738

• New book
Automatische Spracherkennung
Ernst Günter Schukat-Talamazzini
Vieweg Verlag
ISBN 3-528-05492-1

• German!
• Only available via the internet (http://www.minet.uni-jena.de/www/fakultaet/schukat/asebuch.html)
• The book I use most
Spoken Language Processing
by Xuedong Huang, Alex Acero, Hsiao-Wuen Hon, Xuedong Huang, Hsiao-Wuen Hon
Prentice Hall
ISBN: 0130226165

• very comprehensive
Applied Pattern Recognition
von Dietrich W. R. Paulus, Joachim Hornegger
Vieweg
**ISBN:** 3528355581

- Speech and image analysis
- Software oriented
- Signal processing
Outline of the Lecture

1. Introduction
2. Basic Task of Pattern Recognition
3. Speech Production and Perception
4. Feature Extraction for Speech and Image Processing
5. Bayesian Decision Theory
6. Parameter Estimation
7. Nonparametric techniques
8. Gaussian Mixture Models and the EM-Algorithm
9. Speaker Recognition
10. Decision Trees
11. Hidden Markov Models
12. Acoustic Modeling
13. Language Models
14. Search