Information Theory
IT4592E

Dang Tuan Linh

Focus and Goal

- This course focuses on definitions and implications of information, entropy, the source coding and the channel coding

Goals in details

Gain knowledge:

- *Information measures (definition of amount of information and entropy)*
- Information rate: amount of information that source generate in one unit of time
- *Capacity of information channel:* maximum average *amount of information* so that channel can transmit in one unit of time
- *Source Coding (information compression):* using finite set of symbols to represent information of source by minimum number of symbols
- *Channel Coding: information coding for r*eliable communication (communication without errors)

Course descriptions

- Information theory explores the fundamental limits of the representation and transmission of information.
- This course will mathematically focus on the definition and implications of information entropy, the source coding theorem, and the channel coding theorem.
- These concepts provide a vital background in the areas of data compression, signal processing, controls, and pattern recognition.

Duty of students

- Reading the provided materials before class, print/ photo lectures, prepare questions
- Attend the full class according to the university rules, active in the classroom
- Do homework

Pre-courses recommendation

- Mathematics
- Probability

References

- *Class Slides: https://users.soict.hust.edu.vn/linhdt/it4592e/*
- *Information Theory and Coding,* N. Abramson, McGraw-Hill Book Co.
- *Fundamentals of Information Theory and Coding Design*, R. Togneri, C. deSilva, CRC Press Co.
- *A Mathematical Theory of Communications*, Shannon 1948
- *Elements of Information Theory*, Cover and Thomas, Wiley
- *Probability, Random Variables and Stochastic Processes*, A. Papoulis, McGraw-Hill
- *Information Theory and Reliable Communications*, R. G. Gallager, Wiley, 1968
- *Cryptography Theory and Practice,* E. Stinson, CRC Press Co.

Course information

- Information theory
- 15 weeks, 2 lessons per week
- Evaluation:
  - Continuous Assessment (30%)
    - Attendance
    - Midterm Exam
  - Final Exam (70%)

Lecturer

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Question?