

Course PM for *DT2112 Speech Technology*

DT2112VT20, 2020, period 3

Introduction

Speech Technology is a course given by the Division of Speech, Music and Hearing (TMH), Department of Intelligent Systems, EECS. It is worth 7.5 ECTS credits. The course is focused on the interaction between humans and computers using spoken language. Applications such as speaking and listening computers and multimodal dialogue systems are presented. In order to explain the background for such applications, the course covers the basics of human communication regarding speech, language and hearing as well as digital signal analysis and statistical methods for analysis and classification of speech.

Intended learning outcomes

After completion of the course, participants shall be able to:

1. Describe speech from an acoustic, phonetic, and linguistic perspective
2. Explain how computers recognize speech with statistical methods, and evaluate the recognition results
3. Describe and judge different methods used to produce speech with computers
4. Analyze speech-driven dialogue systems with respect to application, components, functionality and user aspects
5. Describe how evaluation of speech technology systems work and describe the special requirements that are posed by this type of system
6. Design and describe data collections for speech technology research and development
7. Give an account of available state-of-the art speech technology and exemplify the current speech research on e.g., mobile systems and IT applications
8. Apply the theoretical knowledge in small speech technology projects

Course design

The course consists of a lecture series where active researchers in six major subfields of speech technology present an overview of their subfield and its current state. Mixed in with the lectures are three small exercises that provide an opportunity to get acquainted with the concept.

Following the lecture series, the course includes a group project where students propose, design, execute, present and describe a speech technology R&D project.

Course design in relation to intended learning outcomes

The lecture series provide the essential background for each of intended learning goal 1 through 6. The project provides deeper insights into one or more of these areas, while targeting specifically intended learning goal 7 and 8. The home exam, finally, evaluates

students on intended learning goals 1 through 7, while providing an opportunity to reason about the course contents.

Language

The course is given in English in its entirety, no Swedish knowledge is required.

Schedule

All lectures and course information presentations are given on Thursdays. For the first five weeks of the course, Thursdays are scheduled from 10 am to 17 pm, with an option to stay on for discussions and group work in the evening. The following two weeks are project work, and after that, the final (exam) week is reserved for the home exam.

Specific prerequisites

Single course students: At least 60 ECTS of which 30 ECTS within Mathematics or Computational Linguistics. Furthermore English B, or equivalent.

Recommended prerequisites

Proficiency in mathematics and signal analysis corresponding to the first 2.5 years of Degree Programme in Media Technology.

Course literature

Scientific publications. Pointers are given in lectures, but the students are expected to be able to search for relevant articles individually or with the assistance of the teacher.

Examination and completion

Grading scale

A, B, C, D, E, FX, F

Examination

LABA – Three laboratory assignments, 0.5 credits, Grading scale: P, F
LABB - Research laboratory assignment, 0 credits, Grading scale: P, F
PR01 - Project and report, 3.5 credits, Grading scale: A, B, C, D, E, FX, F
TENA - Home exam, 3.5 credits, Grading scale: A, B, C, D, E, FX, F

Other requirements for final grade

- Active participation in scheduled activities
- Pass on labs (timely)
- Pass on project bid (timely)
- Pass on project presentation (timely)
- E or better on project report (A-E, decides 50% of the final grade)
- E or better on home exam (A-E, decides 50% of the final grade)

Examiner

Joakim Gustafson and Jens Edlund

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.

Supplementary information

Learning platform

Canvas

Kursen ges av

KTH Speech, Music and Hearing (TMH)

Teachers

Jens Edlund (edlund@speech.kth.se) course responsible

David House

Joakim Gustafsson

Jonas Beskow

Olov Engwall