Course Syllabus

Jump to Today | Edit

Linguistics 177: Computational Linguistics

Winter 2022

Course details

- Time: TR 6:10 PM - 7:30 PM
- Location: Wellman 6 (week 1 on zoom)
- Instructor: Kenji Sagae
- Office hours: M 4:00 PM - 5:00 PM

Contact: use the Inbox functionality on canvas.

Format: In-person lectures, with recordings available on canvas within 48h. Lectures may be held on zoom if necessary with prior notice through canvas announcements. Exams are online/remote/open-book and can be started at any time in the day of the exam.

Description

Computational Linguistics is a broad field that includes computational methods for linguistic inquiry at every level, including at least: (1) the conceptualization and formalization of language in a computational framework; (2) design and implementation of computational models of language based on linguistic theory; and (3) empirical investigation of language through the use of automated analysis. This course will introduce students to a computational way of thinking about language, its structure and its use, and the basic skills to implement computational solutions to language problems. Focus will be placed on symbolic methods, but statistical methods will also be considered. Illustrations, examples and exercises will use Prolog, a high-level logic programming language. (NLP and data-driven methods are covered in LIN 127.)

Students will acquire:

- an understanding of language and linguistics from computational and formal perspectives;
- the ability to model linguistic phenomena in a computational framework;
- an understanding of the relationship between natural language and computation.

Optional References

Ojeda. A Computational Introduction to Linguistics: Describing Language in Plain Prolog. CSLI Lecture Notes. Center for the Study of Language & Information, Stanford University.

Bender. Linguistics fundamentals for Natural Language Processing. Morgan & Claypool.

Clark, Fox & Lappin (Eds). The handbook of Computational Linguistics and Natural Language Processing. Wiley-Blackwell.

Evaluation

Short quizzes (7): 10% (lowest two scores dropped)

Homework (5): 50%

Midterm: 20%

Final exam: 20%

Update: Homework deadline extensions of up to three days will be granted if requested by canvas message to the instructor at least 24 hours before the deadline.

Schedule

Week 1

Language and computation

Brief introduction to formal languages

Deterministic finite-state machines

Week 2

Regular languages

Non-deterministic finite-state machines

Week 3

Finite-state transducers

Finite-state transducers in prolog

Basic phonetics

Week 4

Computational Phonology

Weighted FSTs

Week 5

Weighted FSTs and Data-driven methods

Computational morphology

Week 6

Midterm (Feb 8)

Computational syntax

Week 7

CFGs, ambiguity

PCFGs

Week 8

Lexical dependencies

Unification grammars

Week 9

Semantic roles

Predicate-argument structure

Week 10

Compositional semantics

The road ahead

Final exam: Online, Tue. Mar 15, any 2h block (Pacific time)

Course Summary:

Date	Details	Due
Wed Jan 12, 2022	Quiz 1: Language and Computation	due by 11:59pm
Wed Jan 19, 2022	Quiz 2: Finite-state machines	due by 11:59pm
Wed Jan 26, 2022	Quiz 3: FSTs, language sounds	due by 11:59pm
Thu Jan 27, 2022	HW 1: Wreck a nice beach	due by 11:59pm
Thu Feb 3, 2022	Quiz 4: Modeling sound systems	due by 8:00am
Mon Feb 7, 2022	HW 2: Silly convoys sing	due by 11:59pm
Tue Feb 8, 2022	Midterm	due by 11:59pm
Wed Feb 9, 2022	Midterm (1 student)	due by 10am
Thu Feb 10, 2022	Midterm (1 student)	due by 11:59pm
Wed Feb 16, 2022	Quiz 5: Word formation	due by 11:59pm
Sat Feb 19, 2022	HW 3: More foul logic	due by 11:59pm
Wed Feb 23, 2022	Quiz 6: Syntax	due by 11:59pm
Tue Mar 1, 2022	HW 4: Grandma rules!	due by 11:59pm
Wed Mar 2, 2022	Quiz 7: CFGs, PCFGs	due by 11:59pm
Thu Mar 10, 2022	Sample exam questions (eggs track reddit!?)	due by 11:59pm
Fri Mar 11, 2022	HW 5: Don't arrive the dog	due by 11:59pm
Tue Mar 15, 2022	Final	due by 11:59pm
Thu Mar 17, 2022	Final (1 student)	due by 11:59pm

October 2022

25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Assignments are weighted by group:

Group	Weight
Assignments	50%
Quizzes	10%
Exams	40%
Total	100%