ASR, deep networks, transformers, explainability

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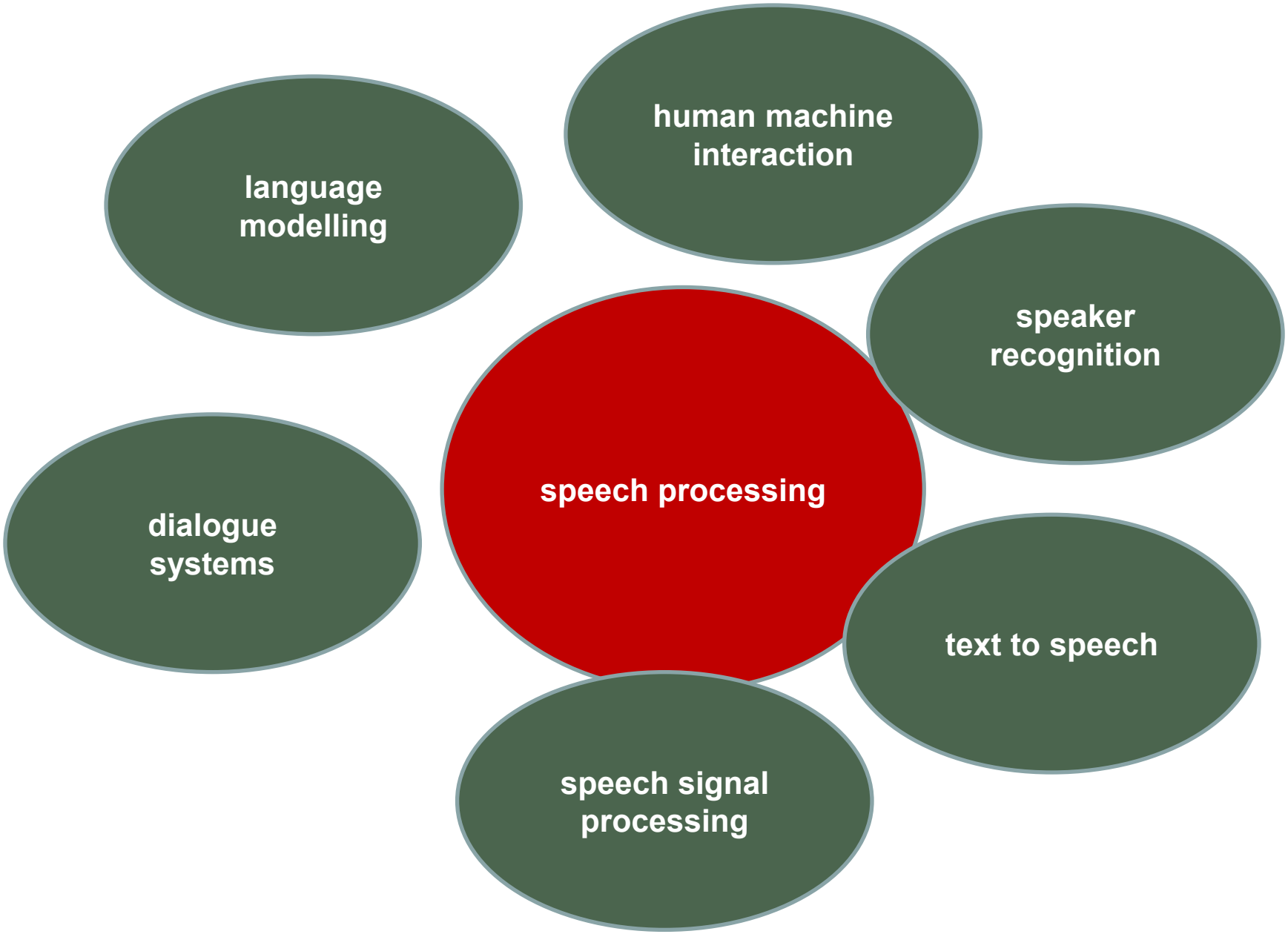
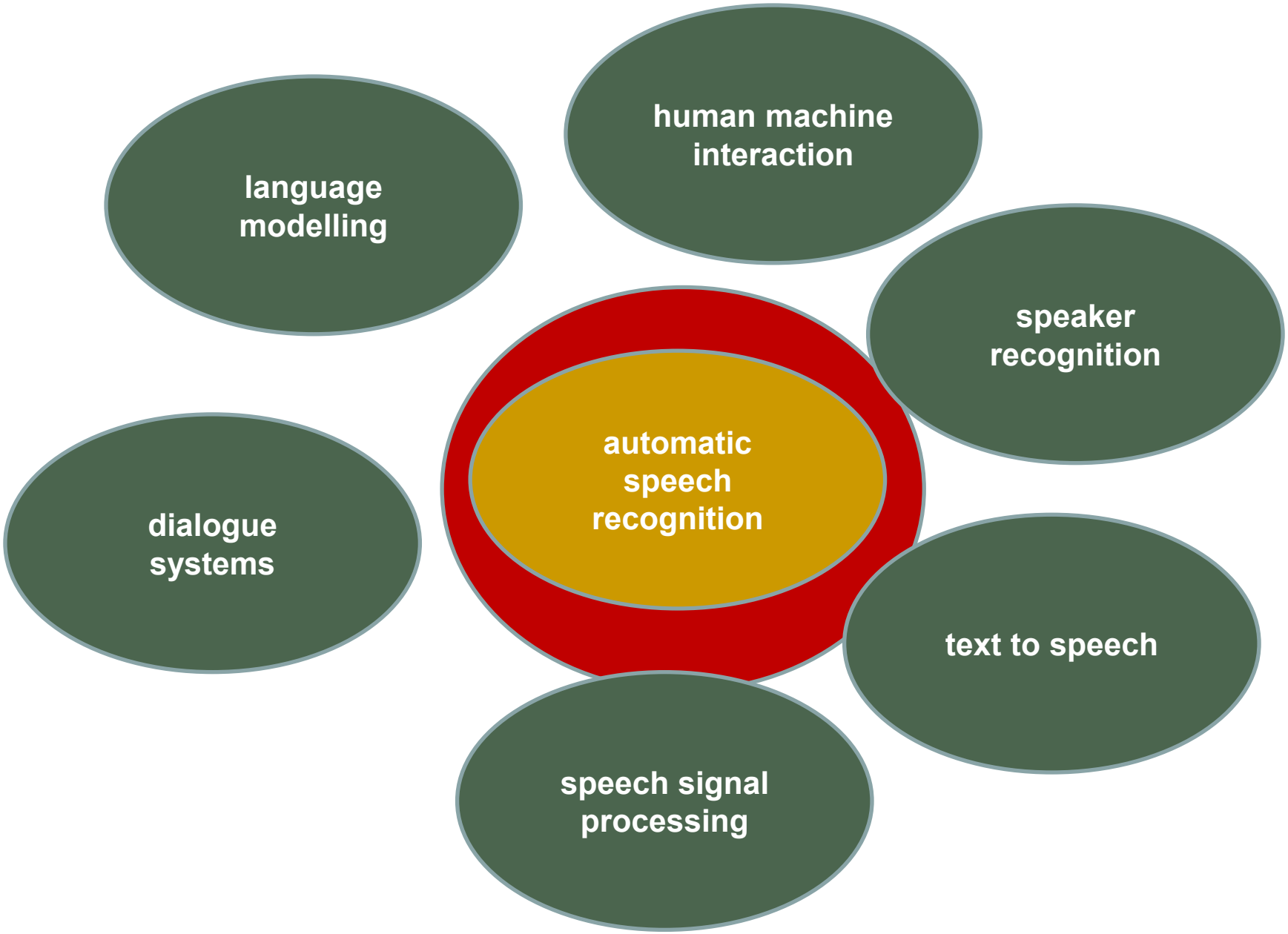
ASR & deep learning & AI are dynamic fields.
Topics and techniques are changing rapidly.


language modelling
human machine interaction
speaker recognition
dialogue systems
speech processing
text to speech
speech signal processing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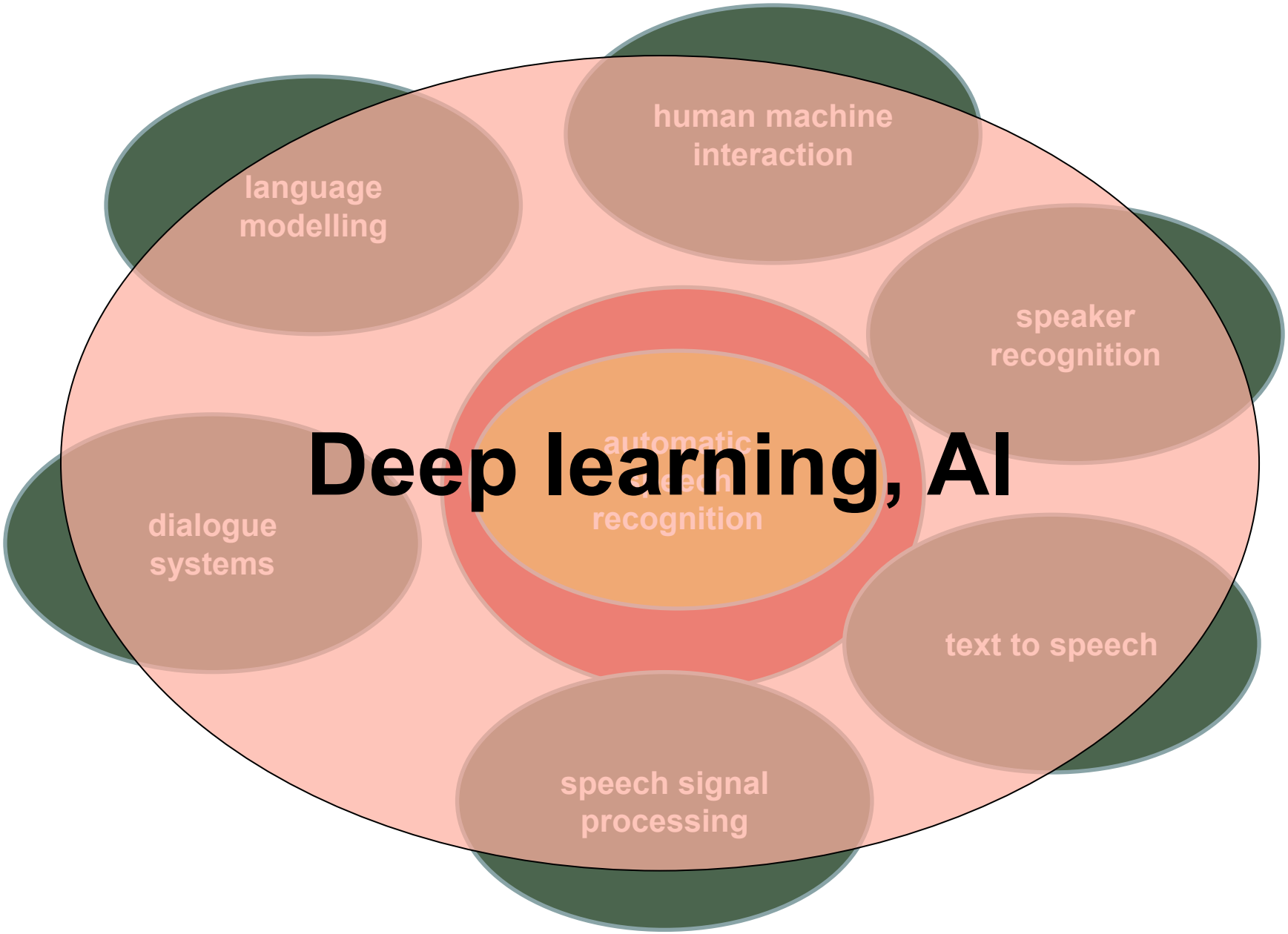
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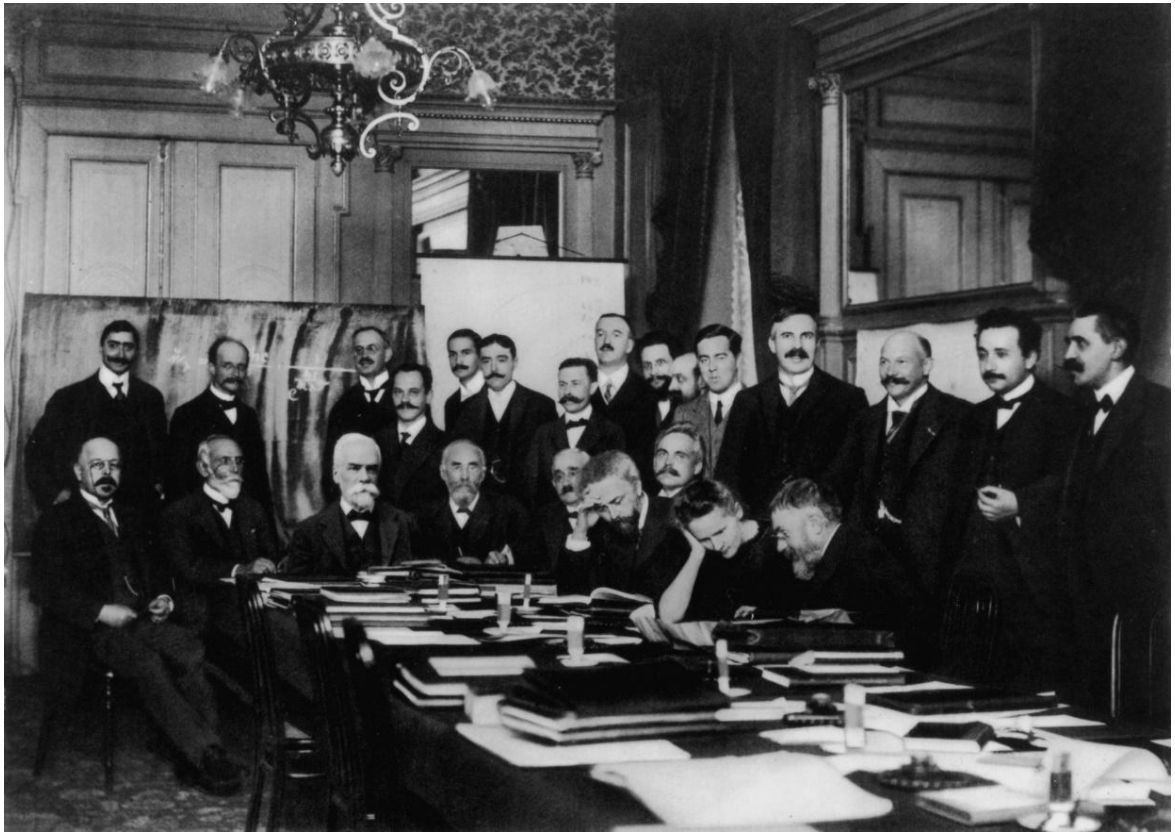
Audience?



For now:

- AI
- Data Science
- Linguistics
- …

Outline of this course

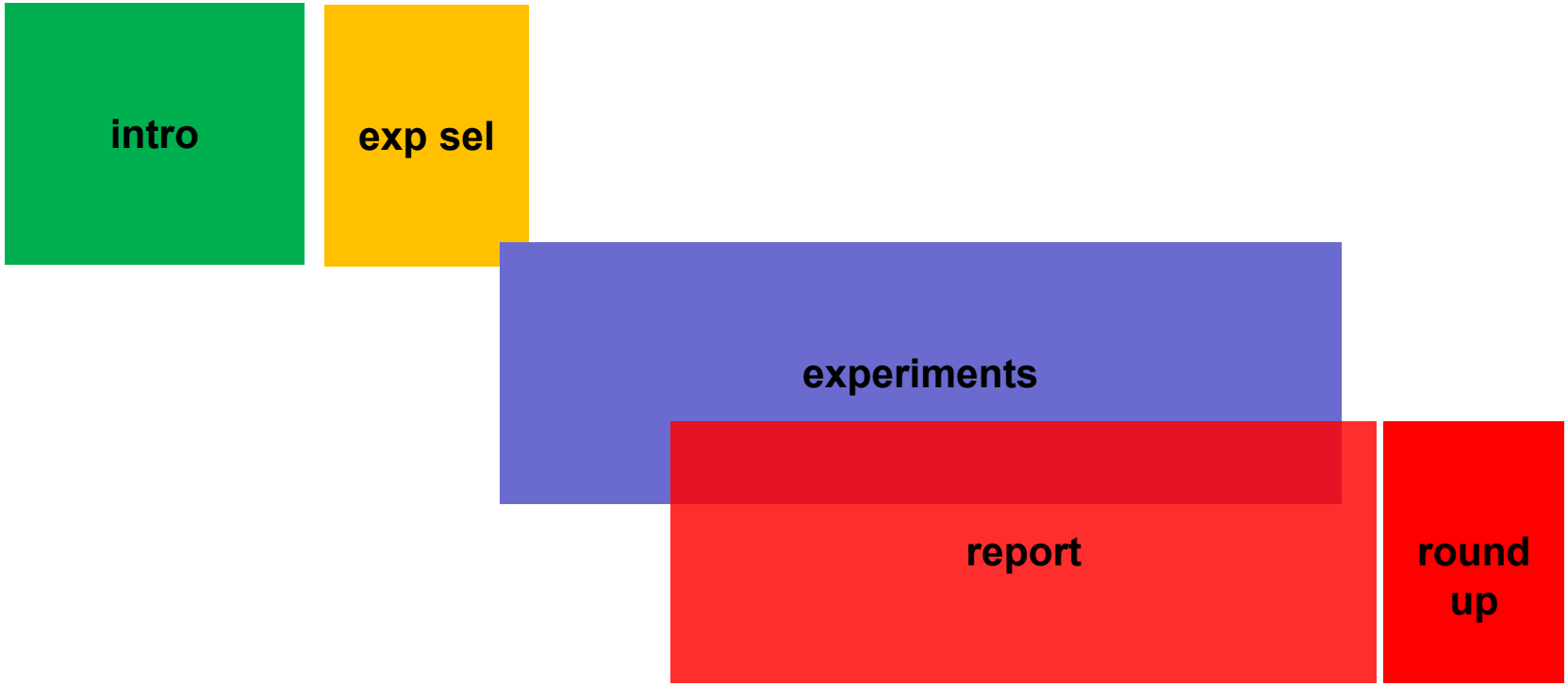
- Lectures
  - Discussion
- Experiments
  - Working individually or in small groups
  - You may choose your own topic/experiment (starting from a list – see later)
  - You may use your own database, or one from the web
- Brief report
  - Assessment done by Dec 15/18 (ideally)

- All material on github: ltenbosch2/Graz_github

Overview of the course

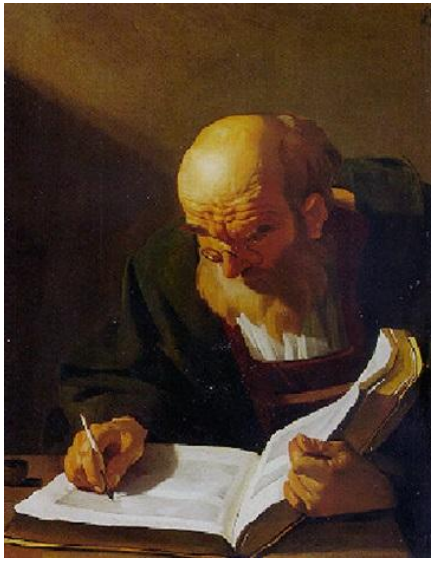
Date	Topic
Nov 10, 14	Overview course, global intro, literature (Vaswani: NIPS*, Baevski: NeurIPS*) Relation with phonetics
Nov 17, 20	Verdini paper, architectures, a bit on reasoning. Brainstorm topics for experiment
Fr Nov 21	Final selection of experimental topic Set-up of (small) experiments
Nov 24 (2x)	Discussion ongoing experiments
Dec 1	In groups or individual: short presentations of prelim experimental results
Tue Dec 9	Finalization of experiments
Mon Dec 15	Assessments and closing

Time line of this course



Report

- Topic:
  - ASR/AI is way too broad to be dealt with in a few weeks, so start small
  - based on experimental work
  - (but may also be more theoretical)
  - Topics: will be discussed later

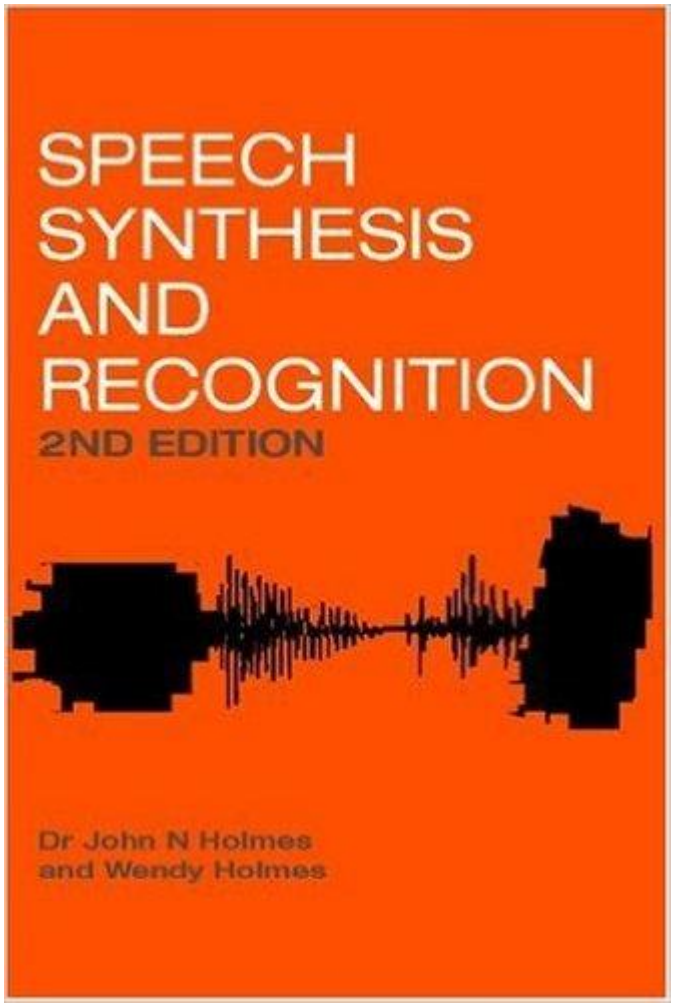


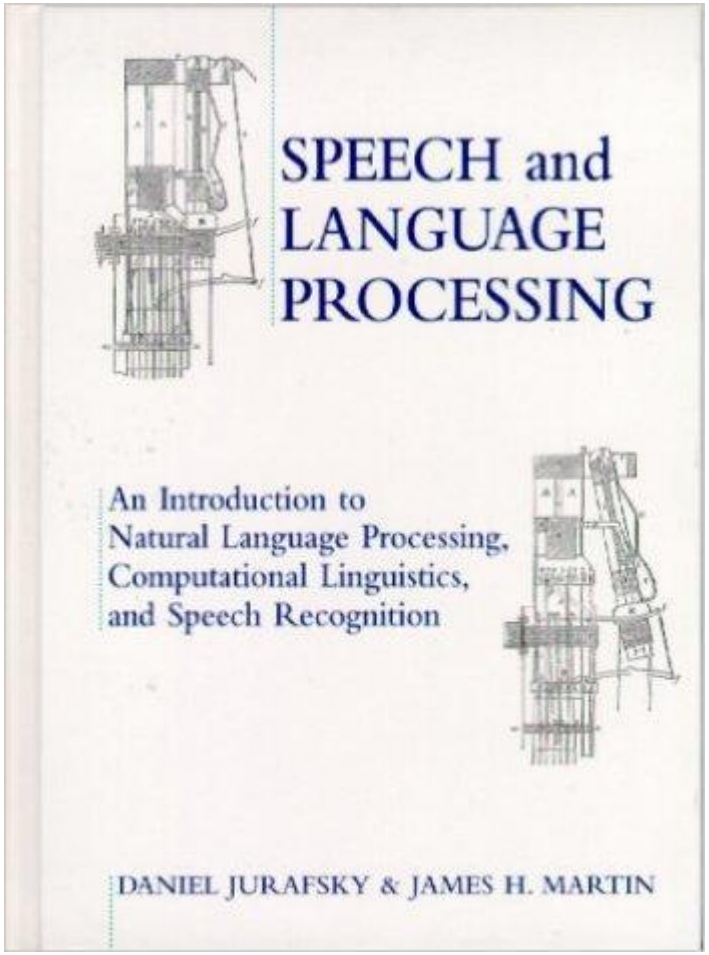
- Experiment: individual or in a group
- Writing: always individual
- Assessment: individual

Reading material

- Classical books
  - Holmes & Holmes
  - Jurafsky and Martin: https://web.stanford.edu/~jurafsky/slp3/
- Papers
  - Github
  - the “classics” (e.g., Vaswani et al., Baevski et al.)
  - Interspeech
  - https://www.isca-archive.org/interspeech_2025/index.html
  - ICASSP
- A number of key papers are given in the course
  - Additional material may vary – depends on your experimental project

Books – the classical ones





May be helpful: Interspeech 2025 tutorial presentations

- 1. Tutorials - Automatic Quality Assessment for Speech and Beyond https://voicemos-challenge-2023.github.io/speech-synthesis-evaluation/IS2025_tutorial.pdf

- 2. Nvidia NeMo toolkit for speech applications https://drive.google.com/file/d/1hlfFnVNrdHQ_FrvgVJRw4XNszl-aXVUz/view?usp=drivesdk

- 3. Speech Technology meets early Language acquisition: How interdisciplinary efforts benefit both the fields https://zenodo.org/records/17018214

As simple as it can be …

Your three lines of python code!

```python
from transformers import pipeline
classifier = pipeline("sentiment-analysis")
classifier(["I've been waiting for a HuggingFace course my whole life.", "I hate this so much!"])
```

```
[{'label': 'POSITIVE', 'score': 0.9598047137260437},
 {'label': 'NEGATIVE', 'score': 0.9994558095932007}]
```