SIT330-770: Natural Language Processing

Week 0 - Course Overview

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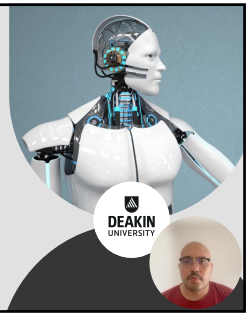

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Plan

- Introduction to SIT330-770
  - Unit team
  - Unit objectives and Introduction to NLP
  - Unit structure
  - Teaching and Assessment
  - Unit logistics

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Unit team

- Unit chair: *Mohamed Reda Bouadjenek*
  - Email: reda.bouadjenek@deakin.edu.au

- Burwood Campus Coordinator: *Bahadorreza Ofoghi*
  - Email: b.ofoghi@deakin.edu.au

- Teaching Assistants: *Aymen Khouas*
  - Email: s223766761@deakin.edu.au

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Unit Chair

- Dr. Reda Bouadjenek <reda.bouadjenek@deakin.edu.au>
  - Unit chair, Waurn Ponds
- Senior Lecturer of Applied AI at Deakin University since November 2019
  - Interested in information Retrieval, Natural Language Processing, social media analysis, recommender systems
- Previously:
  - **2017-2019**: Research fellow at Toronto University, Canada
  - **2015-2017**: Research fellow at Melbourne University
  - **2014-2015**: Research fellow at inria, France
  - **2009-2013**: PhD student at the University of Paris-Saclay, France

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Unit objectives

Understanding principals behind Natural Language Processing

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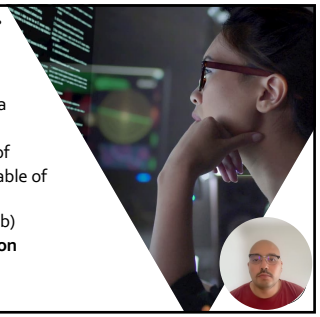
What is natural language processing?

The study of language and linguistic interactions from a computational perspective, enabling the development of algorithms and models capable of (a) **natural language understanding (NLU)** and (b) **natural language generation (NLG)**



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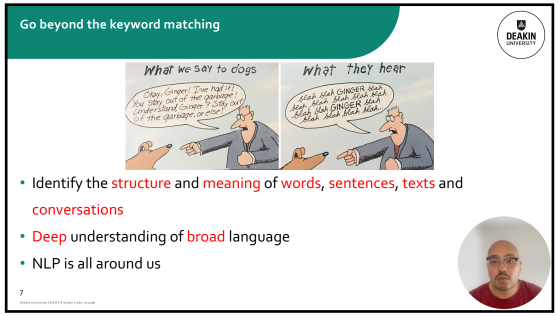
Go beyond the keyword matching
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What we say to dogs
What they hear
Identify the structure and meaning of words, sentences, texts and conversations
Deep understanding of broad language
NLP is all around us
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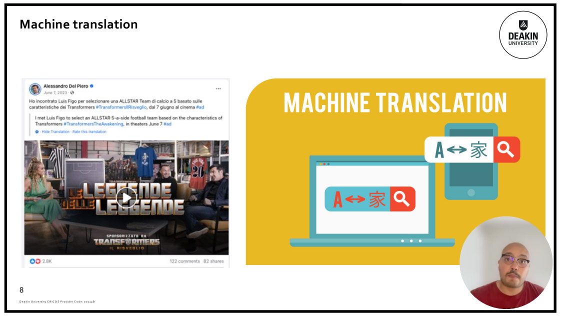
Machine translation
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MACHINE TRANSLATION
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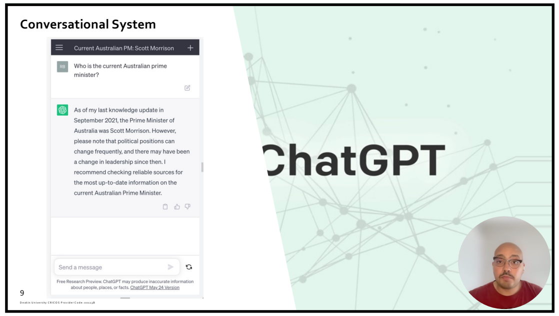
Conversational System
ChatGPT
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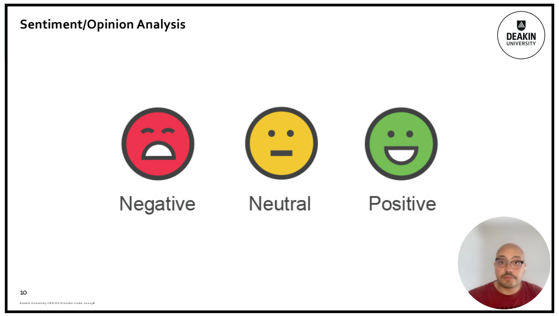
Sentiment/Opinion Analysis
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Negative
Neutral
Positive
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Text Classification
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SPAM FILTER
SPAM
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Natural language instruction
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Will it rain tomorrow?
Play music by Bruno Mars
Add soap to my shopping list
When is Australia Day?
What is the weather in Melbourne this Weekend?
Set an alarm at 8am
How many teaspoons are in a tablespoon?
Play my *dinner party* playlist
Add *make book my todo list
amazon
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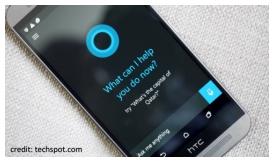
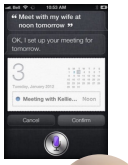
Digital personal assistant

More on natural language instruction





- Semantic parsing – understand tasks
- Entity linking – "my wife" = "Kellie" in the phone book

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Information Extraction

- Unstructured text to database entries

New York Times Co. named Russell T. Lewis, 45, president and general manager of its flagship New York Times newspaper, responsible for all business-side activities. He was executive vice president and deputy general manager. He succeeds Lance R. Primis, who in September was named president and chief operating officer of the parent.

Person	Company	Post	State
Russell T. Lewis	New York Times newspaper	president and general manager	start
Russell T. Lewis	New York Times newspaper	executive vice president	end
Lance R. Primis	New York Times Co.	president and CEO	start

Yoav Artzi: Natural language pro...

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Course Outline

First part

- **Week 1:** Information Retrieval Part 1
- **Week 2:** Information Retrieval Part 2
- **Week 3:** Text processing
- **Week 4:** N-gram Language Models
- **Intra-trimester break**

Second part

- **Week 5:** Naïve Bayes and Sentiment Classification
- **Week 6:** Vector Embeddings
- **Week 7:** Neural Networks and Neural LMs
- **Week 8:** Sequence Labeling
- **Week 9:** RNNs and LSTMs
- **Week 10:** Transformers and Pretrained LMs
- **Week 11:** Wrap-up

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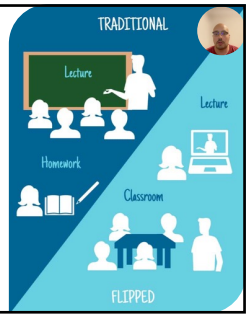
Teaching: Engaging Learning Experience

What to Expect:

- **Active Learning:** Get ready for an interactive and hands-on learning experience.
- **Flipped Classroom Model:** We're flipping the traditional classroom! Pre-class materials will be provided for self-study before our sessions.
- **Your Role:** Come prepared to discuss, question, and apply concepts during class time.
- **Collaborative Environment:** Engage with your peers, share ideas, and actively participate.



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Assessment

- OnTrack learning portfolio 100% https://ontrack.deakin.edu.au/
  - An introduction video is available on DeakinCloud
- You set your target grade (P/C/D/HD)
  - Several tasks (tailored to your target grade) need to be completed regularly
  - Tasks have different due dates
- Weekly submissions are to get feedback
  - **Maximum two feedbacks. Please review carefully your assignment before submitting it!**
- Portfolio submission at the end of the trimester is very important!
  - **Assessments will be published gradually during the trimester!**
- **Please do not put assessments on public repositories (GitHub)!**

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Weekly Session Details

- **SIT330**
  - Session 1:
    - Time: Monday 15:00-17:50
    - Location : Burwood B1.29
  - Session 2:
    - Time: Monday 18:00-19:50
    - Location : Online on MS Teams
- **SIT770**
  - Session 1:
    - Time: Monday 9:00-11:50
    - Location : Burwood HE2.007
  - Session 2:
    - Time: Wednesday 17:00-18:50
    - Location : Waurn Pond KA4.412
  - Session 3:
    - Time: Friday 18:00-19:50
    - Location : Online on MS Teams

Do not create a calendar meeting!
Weekly material will be gradually released!

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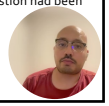
Communication

- Please ask questions on the discussion forum to share with others and avoid redundant inquiries
- **Please use email only if necessary**
  - You must start your email subject with **"[SIT330] or [SIT770]"**
  - I will normally answer your email within 48 hrs (working days)
  - If you don't receive a reply within 48 hrs, this often means that your question had been answered somewhere else before (e.g., in the class, forum, etc.)
  - If in doubt, check with me again during allocated contact time



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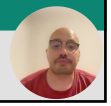
This course requires you to write substantial code in Python to achieve a C, D, or HD grade!

The unit does not teach Python!



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Unit Guide

- Graduate Learning Outcomes (GLOs)
- Unit Learning Outcomes (ULOs)
- Teaching team contact details
- Learning activities
  - Class and workshop
- Reference resources
- Trimester plan
- Key dates

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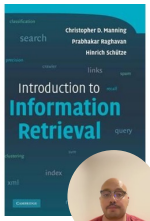
Textbook: Information Retrieval

- **Introduction to Information Retrieval**
  - *Christopher D. Manning, Prabhakar Raghavan, and Hinrich Schütze*
    - Draft chapters, April 1, 2009

  - https://nlp.stanford.edu/IR-book/pdf/irbookonlinereading.pdf



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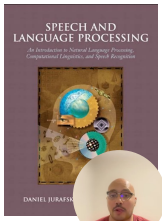
Textbook: Natural Language Processing

- **Speech and Language Processing** (3rd ed. draft)
  - *Dan Jurafsky and James H. Martin*
    - Draft chapters in progress, January 7, 2023

  - https://web.stanford.edu/~jurafsky/slp3/



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Related units

- SIT744- Deep Learning
  - Explain deep learning and its role in data science and AI

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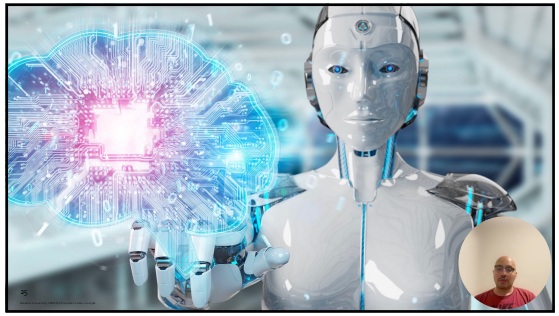

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