Natural Language Processing

@ Information & Computing Sciences

Albert Gatt
Department of Information & Computing Sciences
NLP Group
https://albertgatt.github.io
a.gatt@uu.nl
Natural Language Processing @ ICS

Group founded in 2018

Led by Kees van Deemter

Currently, around 16 members, including associate members in other departments/universities.
What kind of AI is human-centered AI?

- Human-centered AI is model-driven AI?
- Human-centered AI is AI that is developed in consultation with all stakeholders?
- Human-centered AI is AI that is designed not to harm anyone?
- Human-centered AI is AI that is developed taking human values in consideration at every step?
- Human-centered AI is explainable AI?
- Human-centered AI is AI showing social behavior?
Examples from recent research

Hot and cool languages
Some languages (e.g. Mandarin) seem to rely more heavily on context than others, leaving more “unsaid”. What are the implications of this for computational models?

Grounding language in perception
Do models learn adequate meaning representations solely from textual data? Do models which ground language in visual data acquire better meaning representations?


Examples from recent research

Bias in large language models
Why does my model learn that doctors are men, while nurses are women?
How can we measure bias reliably, in order to mitigate it better?

Stylistic variation
What characterizes linguistic style and to what extent is it independent of content?
Can we accurately identify stylistic dimensions?


Examples from recent research

Bias in large language models (again)
Do language models developed specifically for clinical settings also exhibit bias?
What are the practical implications for, e.g., models which aid in diagnosis or prescription?

Risk of violent incidents in clinical settings
Can clinical notes help to predict possible incidence of violent behaviour?


Examples from recent research

Evaluation of text generation systems
How can we reliably “teach” our systems to generate optimal linguistic output (e.g. from numerical data, or logical formulas)?
And do all errors matter to the same extent?

Cognitive models of language production
Which of the many features identified by psycholinguists matter most for choosing how to refer to entities in discourse?
Why do speakers sometimes say more than is required?
Can this be captured by a stochastic model?
What about the computation?

Models are at the heart of most NLP. Currently, deep neural models dominate the research landscape. But a model can play different roles in our work...
Perspective #1: Design, train, evaluate

In some work, the focus is on model design/architecture, and the goal is to maximise results.

But that can’t be the whole story...
Perspective #2: Design, train, probe/analyse

- Why do models perform the way they do?
- What are their shortcomings?

To address these questions, we need techniques to probe/analyse models. We also need benchmarks to test them.
Perspective #3: Design, train, explain

Explainable AI techniques seek to understand model outcomes based on features of their inputs.

For NLP, this is a fledgling enterprise, but its importance is growing.

Currently, AI “explanations” are mostly for experts. Can we also explain models in NL?
Collaboration

Much of our work involves collaboration with:
• Domain experts
• Data scientists
• Computer vision researchers
• Logicians
• ...

Especially fruitful collaborations with UiL-OTS:
• Co-teaching at bachelors and masters level
• Co-supervision of Master and PhD students
• Joint research projects

We want more of this!
Pay us a visit…

We’re at Buys Ballotgebouw, 5th floor.

NLP Group meetings: Thursdays @ 11:30 (in hybrid mode)

Get in touch with questions, ideas for collaboration...!