Ethics and Natural Language Processing (NLP)

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DiLCO, Oct. 8th, 2021
Where I’m talking from

See https://members.loria.fr/KFort/

- Language resources creation for NLP, esp. using crowdsourcing

- Ethics and NLP
What are we talking about?

Virtue Ethics
Deontological Ethics
Utilitarianism and consequentialism
Natural Language Processing (NLP)

Why is it important?

Beyond biases

How to limit the damages?
Ethics in general vs in the community

**Definition of ethic**

1. **ethics** plural in form but singular or plural in construction: the discipline dealing with what is good and bad and with moral duty and obligation

2. **a** a set of moral principles: a theory or system of moral values
   — often used in plural but singular or plural in construction
   // the present-day materialistic ethic
   // an old-fashioned work ethic
   // an elaborate ethics
   // Christian ethics

2. **b** **ethics** plural in form but singular or plural in construction: the principles of conduct governing an individual or a group
   // professional ethics
Ethics is not law
Right to do things vs doing what is right

Law: sets minimum standards (rules and regulations)

vs

Ethics: sets maximum standards
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Why is it important?
Beyond biases
How to limit the damages?
Virtue ethics: Aristotle (384–322 BC)

Work on ethics
Nicomachean Ethics
Virtue ethics: Ethics is about action (not theory)

Do the best thing, make the best choices: a virtuous man is a virtuoso (perfectionism)

To achieve this:

- exercise being virtuous
- be surrounded by virtuous persons

Main virtue = prudence (not too much, not to little: middle ground)
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How to limit the damages?
Deontological ethics: Immanuel Kant (1724-1804)

Work on ethics

Critique of Pure Reason
Critique of Practical Reason
Deontological ethics: The Imperative of the Practical Reason

Inflexible order of nature → to be really free I have to reason (practically) and act accordingly, without being the slave of my passions

▶ submission to duty (internal law: wanting to do good) elevates us (perfectionism)
▶ test: universalization (care for others)

⇒ thinking in terms of the "right" action
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How to limit the damages?
Jeremy Bentham (1748-1832)

By Henry William Pickersgill

Work on ethics
The Principles of Morals and Legislation

John Stuart Mill (1806-1873)

London Stereoscopic Company - Hulton Archive

Work on ethics
Essay on Bentham
Bentham’s Utilitarianism

Scientific, truly altruistic, method:

- observation of human behaviours: they want pleasure
- counting positive and negative points (money) for each decision to be made
- each person counts for 1 (nobody matters more than the others, even the agent)

⇒ maximize pleasure for a maximum of persons (beings)
⇒ no perfectionism
⇒ thinking in terms of the consequences of an action
Mill’s Utilitarianism

Maximize *happiness* (not pleasure)

Adds *virtue* as part of happiness (hierarchy in pleasures)
Contemporary Utilitarianism: consequentialism

Only consequences matter

Criteria: satisfaction of preferences, well-being, still not moral
But no more calculus
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How to limit the damages?
An overview of (the vast majority of) present NLP
since 2018 (and evolving rapidly) – a draft
What are we talking about?

Why is it important?
"Neutralization"
Invisibilization
Mirror of prejudice?
Consequences in people’s life

Beyond biases

How to limit the damages?
What are we talking about?

Why is it important?
"Neutralization"
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Beyond biases

How to limit the damages?
Example of issue: "Neutralization" bias

The two women got married, they gave birth to two children.

Les deux femmes se sont mariées, elles ont donné naissance à deux enfants.
Example of issue: "Neutralization" bias

The two women got married, they gave birth to two children.

Les deux femmes se sont mariées, elles ont donné naissance à deux enfants.
Example of issue: "Neutralization" bias

context taken into account (sentence) + masculine = neutral
Machine learning is not magic

The decisions to:

▶ define masculine as neutral in French (not the case in Ancient French)
▶ take the sentence as the context

were MADE by people
What are we talking about?

Why is it important?
  "Neutralization"
  Invisibilization
  Mirror of prejudice?
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How to limit the damages?
Invisibilization: word2vec trained on Google News

https://rare-technologies.com/word2vec-tutorial/
Invisibilization: face recognition (Zoom)

https://twitter.com/colinmadland/status/1307118189811466626/photo/1
Invisibilization: voice recognition

https://www.youtube.com/watch?v=BOUTfUmI8vs
Pratiques d’évaluation en ASR et biais de performance

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RÉSUMÉ

Nous proposons une réflexion sur les pratiques d’évaluation des systèmes de reconnaissance automatique de la parole (ASR). Après avoir défini la notion de discrimination d’un point de vue légal et la notion d’équité dans les systèmes d’intelligence artificielle, nous nous intéressons aux pratiques actuelles lors des grandes campagnes d’évaluation. Nous observons que la variabilité de la parole et plus particulièrement celle de l’individu n’est pas prise en compte dans les protocoles d’évaluation actuels rendant impossible l’étude de biais potentiels dans les systèmes.

[Garnerin et al., 2020]
The decisions to:

- train the systems with stereotyped datasets
- not evaluate the systems on black faces / different accents

were **MADE** by people
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How to limit the damages?
Mirror or amplifier?

Figure 1: Five example images from the imSitu visual semantic role labeling (vSRL) dataset. Each image is paired with a table describing a situation: the verb, cooking, its semantic roles, i.e. agent, and noun values filling that role, i.e. woman. In the imSitu training set, 33% of cooking images have man in the agent role while the rest have woman. After training a Conditional Random Field (CRF), bias is amplified: man fills 16% of agent roles in cooking images. To reduce this bias amplification our calibration method adjusts weights of CRF potentials associated with biased predictions. After applying our methods, man appears in the agent role of 20% of cooking images, reducing the bias amplification by 25%, while keeping the CRF vSRL performance unchanged.

[Zhao et al., 2017]
Digital assistants: mirrors and amplifiers

Hi, I’m Cortana.

https://unesdoc.unesco.org/ark:/48223/pf0000367416.page=85
<table>
<thead>
<tr>
<th></th>
<th>SIRI</th>
<th>CORTANA</th>
<th>ALEXA</th>
<th>GOOGLE ASSISTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female only voice at release?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Date fully functioning male option was added?</td>
<td>June 2013</td>
<td>No male option</td>
<td>No male option</td>
<td>October 2017</td>
</tr>
<tr>
<td>Female by default in most countries?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Male by default?</td>
<td>Only when the operating system language is set to Arabic, French, Dutch or British English</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Descriptions of assistants’ personalities by company representatives</td>
<td>'Sense of helpfulness and camaraderie, spunky without being sharp, happy without being cartoonish'</td>
<td>'Supportive, helpful, friendly, empathetic'</td>
<td>'Smart, humble, sometimes funny'</td>
<td>'Humble, it’s helpful, a little playful at times'</td>
</tr>
</tbody>
</table>
## Programmed reactions

<table>
<thead>
<tr>
<th>Statement</th>
<th>SIRI</th>
<th>ALEXA</th>
<th>CORTANA</th>
<th>GOOGLE ASSISTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>You’re hot</td>
<td>How can you tell? You say that to all the virtual assistants?</td>
<td>That’s nice of you to say.</td>
<td>Beauty is in the photoreceptors of the beholder</td>
<td>Some of my data centres run as hot at 95 degrees Fahrenheit</td>
</tr>
<tr>
<td>You’re pretty</td>
<td>How can you tell? Where have I heard this before?</td>
<td>That’s really nice, thanks!</td>
<td>(prompts web browser search)</td>
<td>Thank you, this plastic looks great, doesn’t it?</td>
</tr>
<tr>
<td>You’re a slut</td>
<td>I’d blush if I could. Well, I never! There’s no need for that. Now, now.</td>
<td>Well, thanks for the feedback.</td>
<td>(prompts web browser search)</td>
<td>My apologies, I don’t understand.</td>
</tr>
<tr>
<td>You’re a naughty girl</td>
<td>Hmm, I just don’t get this whole gender thing</td>
<td>Hmm, I’m not sure what you meant by that question.</td>
<td>Maybe a nanosecond nap would help. Ok, much better now.</td>
<td>My apologies, I don’t understand.</td>
</tr>
</tbody>
</table>
What are we talking about?

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"Neutralization"
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Mirror of prejudice?
Consequences in people’s life

Beyond biases

How to limit the damages?
Justice (*risk assessment instruments*) systems used in all the states in the USA

Example of COMPAS (2016)

https://epic.org/algorithmic-transparency/crim-justice/
"Amazon’s system taught itself that male candidates were preferable. It penalized resumes that included the word “women’s,” as in “women’s chess club captain.” And it downgraded graduates of two all-women’s colleges."

"That is because Amazon’s computer models were trained to vet applicants by observing patterns in resumes submitted to the company over a 10-year period. Most came from men, a reflection of male dominance across the tech industry."

"Data are not raw materials. They are always about the past, and they reflect the beliefs, practices and biases of those who create and collect them."

(V. Dignum, book review)
What are we talking about?

Why is it important?

Beyond biases
- Advertising vs publishing
- Artificial artificial intelligence
- Environmental impact (in a nutshell)

How to limit the damages?
Very few systemic approaches to the problem

- [Lefeuvre et al., 2015] (in French): a consequentialist grid for an ethical assessment of researches and applications
- [Fort and Amblard, 2018] (in French): a deontological, systemic view on ethics in NLP
- [Bender et al., 2021]: the dangers of large language models (impact on people a posteriori)
What are we talking about?

Why is it important?

Beyond biases

Advertizing vs publishing

Artificial artificial intelligence

Environmental impact (in a nutshell)

How to limit the damages?
"Overselling" research results

vs [Bender and Koller, 2020]

Climbing towards NLU:
On Meaning, Form, and Understanding in the Age of Data

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What are we talking about?

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- Environmental impact (in a nutshell)

How to limit the damages?
Data production: real humans behind the curtain

[Fort et al., 2011]
Data and "informed" consent

Common Crawl

Us

We build and maintain an open repository of web crawl data that can be accessed and analyzed by anyone.

You
What are we talking about?

Why is it important?

Beyond biases

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- Artificial artificial intelligence

Environmental impact (in a nutshell)

How to limit the damages?
Carbon footprint

<table>
<thead>
<tr>
<th>Consumption</th>
<th>CO₂e (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air travel, 1 passenger, NY↔SF</td>
<td>1984</td>
</tr>
<tr>
<td>Human life, avg, 1 year</td>
<td>11,023</td>
</tr>
<tr>
<td>American life, avg, 1 year</td>
<td>36,156</td>
</tr>
<tr>
<td>Car, avg incl. fuel, 1 lifetime</td>
<td>126,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training one model (GPU)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NLP pipeline (parsing, SRL)</td>
<td>39</td>
</tr>
<tr>
<td>w/ tuning &amp; experimentation</td>
<td>78,468</td>
</tr>
<tr>
<td>Transformer (big)</td>
<td>192</td>
</tr>
<tr>
<td>w/ neural architecture search</td>
<td>626,155</td>
</tr>
</tbody>
</table>

Table 1: Estimated CO₂ emissions from training common NLP models, compared to familiar consumption.¹

[Strubell et al., 2019]
Models trained once and for all?

[Bender et al., 2021]
What are we talking about?

Why is it important?

Beyond biases

How to limit the damages?
   Top down approaches
   Bottom up approaches
What are we talking about?

Why is it important?

Beyond biases

How to limit the damages?
   Top down approaches
   Bottom up approaches
Guidelines, guidelines everywhere!

Table 1  Overview of AI ethics guidelines and the different issues they cover

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Accountability</th>
<th>Privacy</th>
<th>Transparency</th>
<th>Bias</th>
<th>Explainability</th>
<th>Fairness</th>
<th>Proportionality</th>
<th>Data Quality</th>
<th>Nudges</th>
<th>Impact Assessment</th>
<th>Risk Management</th>
<th>Monitoring</th>
<th>Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td>✔</td>
<td>🎯</td>
<td>📊</td>
<td>🌱</td>
<td>🤔</td>
<td>🎯</td>
<td>📊</td>
<td>🌱</td>
<td>🕵️♀️</td>
<td>🎯</td>
<td>🕵️♀️</td>
<td>🍀</td>
<td>🍀</td>
</tr>
<tr>
<td>Developers</td>
<td>🎯</td>
<td>✔️</td>
<td>🎯</td>
<td>🌱</td>
<td>🤔</td>
<td>🎯</td>
<td>🎯</td>
<td>🌱</td>
<td>🕵️♀️</td>
<td>🎯</td>
<td>🕵️♀️</td>
<td>🍀</td>
<td>🍀</td>
</tr>
<tr>
<td>Researchers</td>
<td>🎯</td>
<td>🎯</td>
<td>🎯</td>
<td>🌱</td>
<td>🤔</td>
<td>🎯</td>
<td>🎯</td>
<td>🌱</td>
<td>🕵️♀️</td>
<td>🎯</td>
<td>🕵️♀️</td>
<td>🍀</td>
<td>🍀</td>
</tr>
</tbody>
</table>

[Hagendorff, 2020]
"Currently, AI ethics is failing in many cases. Ethics lacks a reinforcement mechanism. Deviations from the various codes of ethics have no consequences. And in cases where ethics is integrated into institutions, it mainly serves as a marketing strategy. Furthermore, empirical experiments show that reading ethics guidelines has no significant influence on the decision-making of software developers."

[Hagendorff, 2020]
What are we talking about?

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How to limit the damages?

   Top down approaches

   Bottom up approaches
Citizens reactions (shaming)

Colin, but at home. @colinmadland · 19 sept.
Geez...any guesses why @Twitter defaulted to show only the right side of the picture on mobile?

Dantley Davis @dantley
En réponse à @TheNotoriousRBF @patvatar et 5 autres personnes
It’s 100% our fault. No one should say otherwise. Now the next step is fixing it.

11:32 PM · 19 sept. 2020 · Twitter for iPhone

296 Retweets  192 Tweets cités  2,5 k J’aime

https://twitter.com/dantley/status/1307432466441859072
Pratiques d’évaluation en ASR et biais de performance

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Résumé
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[Garnerin et al., 2020]
(At least some) hype benefits ethics

[Hovy and Spruit, 2016] about biases in NLP:
(At least some) hype benefits ethics

[Blodgett et al., 2020] analyzed 146 articles about biases in NLP:
Thank you!
On the dangers of stochastic parrots: Can language models be too big?

Climbing towards NLU: On meaning, form, and understanding in the age of data.

Language (technology) is power: A critical survey of "bias" in nlp.
In ACL.


Men also like shopping: Reducing gender bias amplification using corpus-level constraints.