Ethics in NLP/AI
What can actually go wrong?
Machine-learned NLP Systems

- Aggregate textual information to make predictions
- Hard to know why some predictions are made
- More and more widely use in various applications/sectors

- What are the risks here?
  - ...of certain applications?
    - IE / QA / summarization?
    - MT?
    - Dialog?
  - ...of machine-learned systems?
  - ...of deep learning specifically?
Broad Areas

- Bias amplification: systems exacerbate real-world bias rather than correct for it
- Exclusion: underprivileged users are left behind by systems
- Dangers of automatic systems: automating things in ways we don’t understand is dangerous
- Unethical use: powerful systems can be used for bad ends
Bias Amplification

- Bias in data: 67% of training images involving cooking are women, model predicts 80% women cooking at test time — amplifies bias

- Can we constrain models to avoid this while achieving the same predictive accuracy?

- Place constraints on proportion of predictions that are men vs. women?
Bias Amplification

\[
\max_{\{y^i\} \in \{Y^i\}} \sum_i f_\theta(y^i, i), \quad \text{Maximize score of predictions...}
\]

\[
f(y, i) = \text{score of predicting } y \text{ on ith example}
\]

\[
\text{s.t.} \quad A \sum_i y^i - b \leq 0, \quad \text{...subject to bias constraint}
\]

- Constraints: male prediction ratio on the test set has to be close to the ratio on the training set

\[
b^* - \gamma \leq \frac{\sum_i y^i_{v=v^*}, r \in M}{\sum_i y^i_{v=v^*}, r \in W + \sum_i y^i_{v=v^*}, r \in M} \leq b^* + \gamma
\]

(2)

Zhao et al. (2017)
Bias Amplification

(a) Bias analysis on imSitu vSRL without RBA

(c) Bias analysis on imSitu vSRL with RBA

Zhao et al. (2017)
Coreference: models make assumptions about genders and make mistakes as a result
Bias Amplification

(1a) **The paramedic** performed CPR on **the passenger**
even though **she/he/they** knew it was too late.

(2a) **The paramedic** performed CPR on **the passenger**
even though **she/he/they** was/were already dead.

(1b) **The paramedic** performed CPR on **someone**
even though **she/he/they** knew it was too late.

(2b) **The paramedic** performed CPR on **someone**
even though **she/he/they** was/were already dead.

- Can form a targeted test set to investigate

Rudinger et al. (2018), Zhao et al. (2018)
Bias Amplification

- Test set is balanced so a perfect model has female%-male% = 0 (black line)
- Neural models actually are a bit better at being unbiased, but are still skewed by data

Zhao et al. (2017)
Bias Amplification

- Harder to quantify this for machine translation

- “dancer” is assumed to be female in the context of the word “charming”... but maybe that reflects how language is used?

Alvarez-Melis and Jaakkola (2017)
Exclusion

- Most of our annotated data is English data, especially newswire

- What about:
  
  - Dialects?
  
  - Other languages? (Non-European/CJK)
  
  - Codeswitching?
Facebook apologizes after wrong translation sees Palestinian man arrested for posting ‘good morning’

Facebook translated his post as ‘attack them’ and ‘hurt them’

by Thuy Ong | @ThuyOng | Oct 24, 2017, 10:43am EDT
## Dangers of Automatic Systems

### Translations of gay

#### adjective

- **homosexual**
  - homosexual, gay, camp
- **alegre**
  - cheerful, glad, joyful, happy, merry, gay
- **brillante**
  - bright, brilliant, shiny, shining, glowing, glistening
- **vivo**
  - live, alive, living, vivid, bright, lively
- **vistoso**
  - colorful, ornate, flamboyant, colourful, gorgeous
- **jovial**
  - jovial, cheerful, cheery, gay, friendly
- **gayo**
  - merry, gay, showy

#### noun

- **el homosexual**
  - homosexual, gay, poof, queen, faggot, fagot
- **el jovial**
  - gay

- **Offensive terms**

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Slide credit: allout.org
“Instead of relying on algorithms, which we can be accused of manipulating for our benefit, we have turned to machine learning, an ingenious way of disclaiming responsibility for anything. Machine learning is like money laundering for bias. It's a clean, mathematical apparatus that gives the status quo the aura of logical inevitability. The numbers don't lie.”

- Maciej Cegłowski
Dangers of Automatic Systems

“Amazon scraps secret AI recruiting tool that showed bias against women”

- “Women’s X” organization was a negative-weight feature in resumes
- Women’s colleges too

Was this a bad model? May have actually modeled downstream outcomes correctly...but this can mean learning humans’ biases
Unethical Use

- Surveillance applications?
- Generating convincing fake news / fake comments?

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<td>In the matter of</td>
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<tr>
<td>rather than</td>
<td>rather than</td>
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</tbody>
</table>

What if these were undetectable?
Unethical Use

- Sophia: “chatbot” that the creators make incredible claims about
- Creators are actively misleading people into thinking this robot has sentience
- Most longer statements are scripted by humans
- “If I show them a beautiful smiling robot face, then they get the feeling that 'AGI' (artificial general intelligence) may indeed be nearby and viable... None of this is what I would call AGI, but nor is it simple to get working”

Slide credit: https://themindlist.com/2018/10/12/sophia-modern-marvel-or-mindless-marketing/
Wang and Kosinski: gay vs. straight classification based on faces

Authors: “this is useful because it supports a hypothesis” (physiognomy)

Blog post by Agüera y Arcas, Todorov, Mitchell: mostly social phenomena (glasses, makeup, angle of camera, facial hair)

Slide credit: https://medium.com/@blaisea/do-algorithms-reveal-sexual-orientation-or-just-expose-our-stereotypes-d998fad6477
Unethical Use

OUR CLASSIFIERS

High IQ  Academic Researcher  Professional Poker Player  Terrorist

Utilizing advanced machine learning techniques we developed and continue to evolve an array of classifiers. These classifiers represent a certain persona, with a unique personality type, a collection of personality traits or behaviors. Our algorithms can score an individual according to their fit to these classifiers.

Learn More>

http://www.faceception.com
Final Thoughts

- You will face choices: what you choose to work on, what company you choose to work for, etc.

- Tech does not exist in a vacuum: you can work on problems that will fundamentally make the world a better place or a worse place (not always easy to tell)

- As AI becomes more powerful, think about what we *should* be doing with it to improve society, not just what we *can* do with it