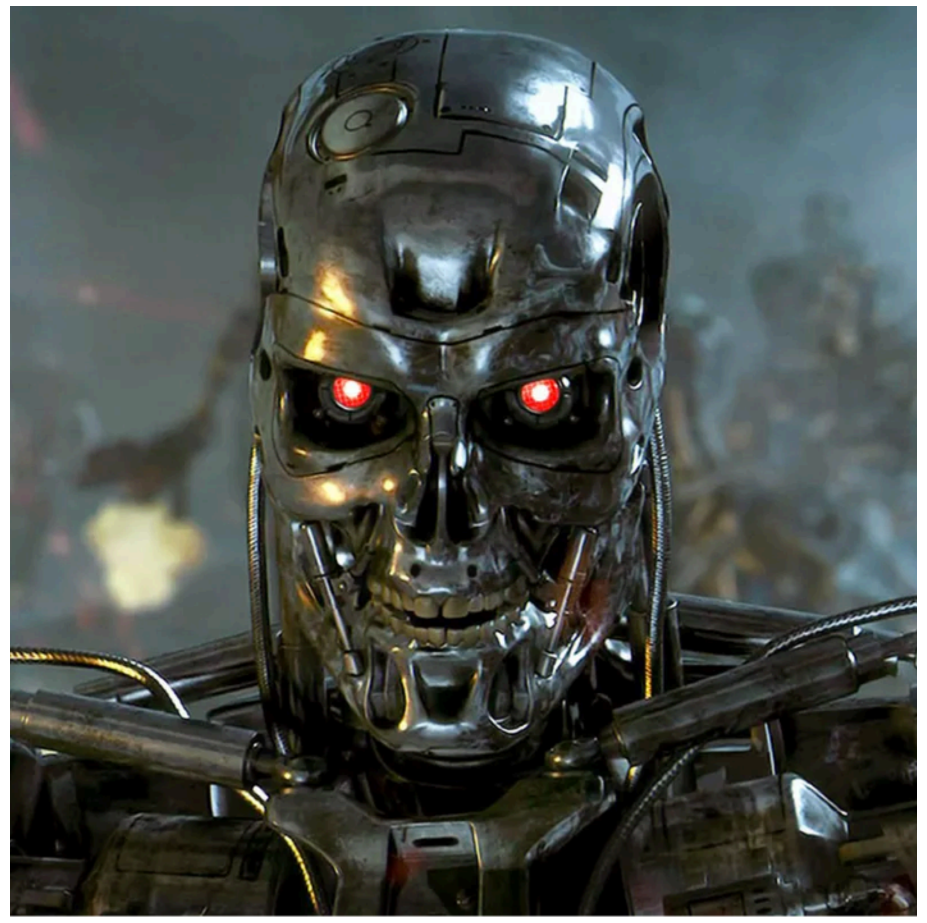
# Ethics in NLP/AI

# What **aren't** the issues?

**Myth: Powerful AI wants to kill us**

- Maybe, but bigger threats from what *humans* can do with these tools *right now*



**Myth: We need to be "nice" to AI**

**(or they'll kill us)**

- Right now, what we call AI does not "feel" anything

What can actually go wrong **for humans**?

# 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 to Discuss

**System**

Application-specific

- IE / QA / summarization?
- Machine translation?
- Dialog?

Machine learning, generally

Deep learning, generally

**Types of risk**

**Dangers of automation**: automating things in ways we don't understand is dangerous

**Exclusion**: underprivileged users are left behind by systems

**Bias amplification**: systems exacerbate real-world bias rather than correct for it

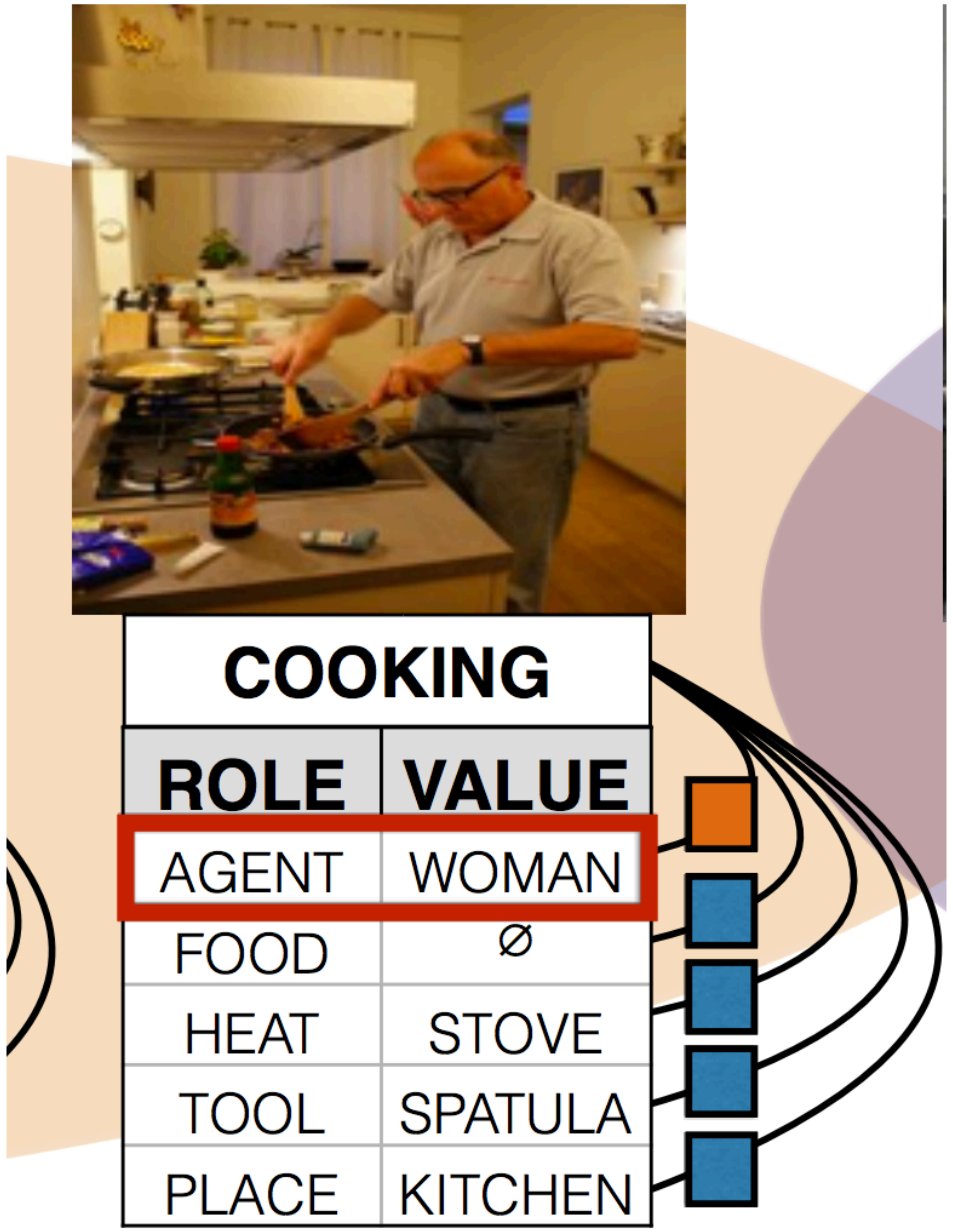
**Unethical use**: powerful systems can be used for bad ends

# 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?



COOKING

| ROLE | VALUE |
|---|---|
| AGENT | WOMAN |
| FOOD | ∅ |
| HEAT | STOVE |
| TOOL | SPATULA |
| PLACE | KITCHEN |

Zhao et al. (2017)

# Bias Amplification

$$\max_{\{y^i\}\in\{Y^i\}} \quad \sum_i f_\theta(y^i, i),$$

$$\text{s.t.} \quad A\sum_i y^i - b \le 0,$$

Maximize score of predictions…

f(y, i) = score of predicting y on ith example

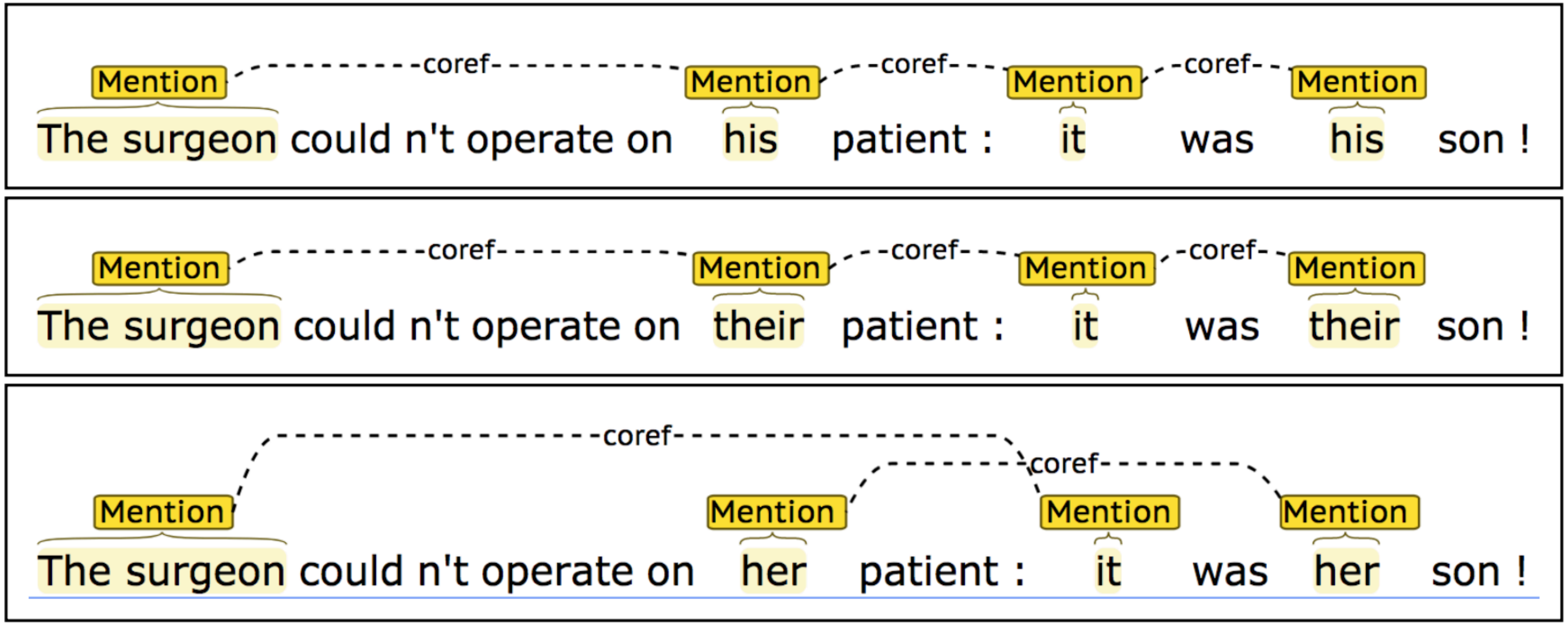
…subject to bias constraint

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

$$b^* - \gamma \le \frac{\sum_i y^i_{v=v^*,r\in M}}{\sum_i y^i_{v=v^*,r\in W} + \sum_i y^i_{v=v^*,r\in M}} \le b^* + \gamma \qquad (2)$$

Zhao et al. (2017)

# Bias Amplification



The surgeon could n't operate on his patient : it was his son !

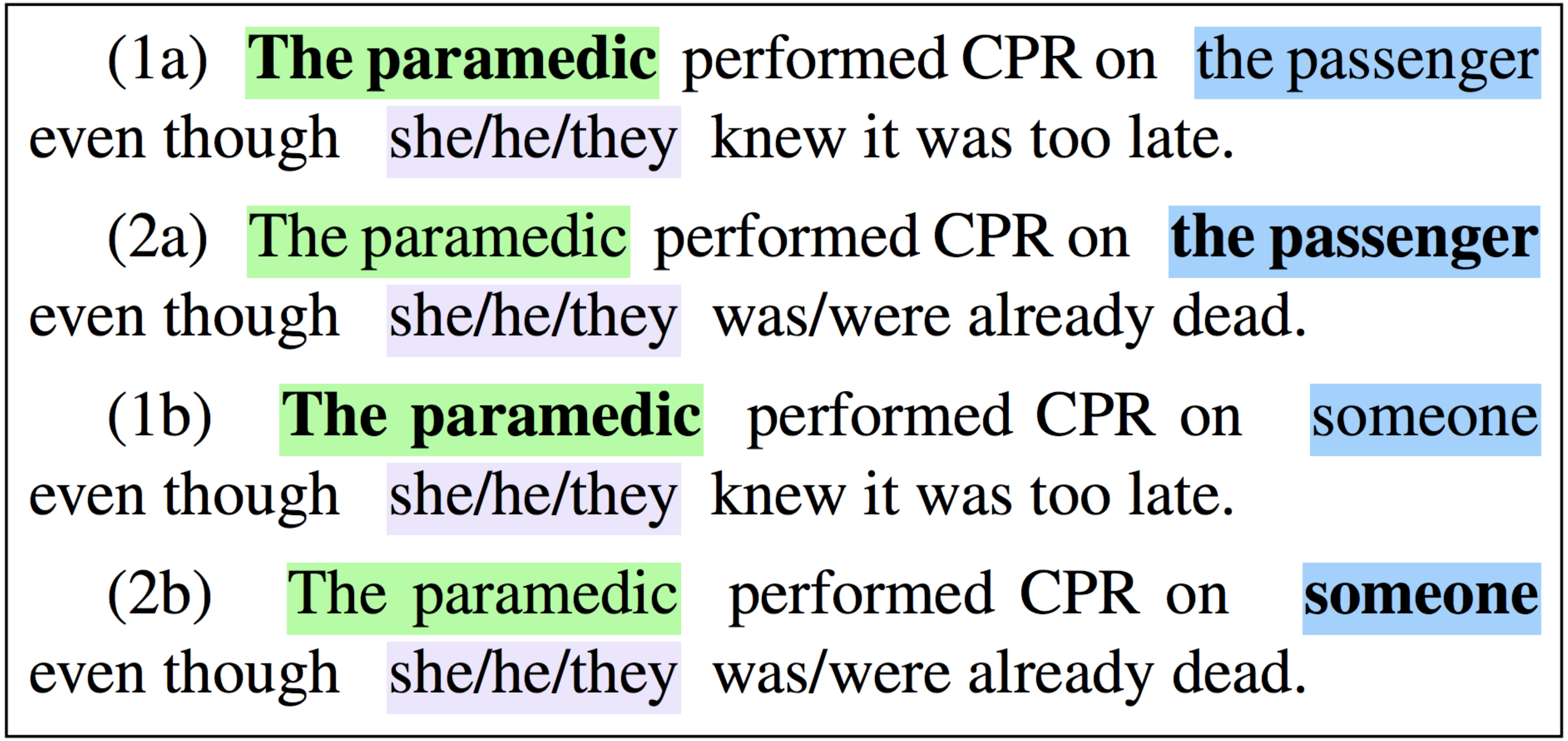
The surgeon could n't operate on their patient : it was their son !

The surgeon could n't operate on her patient : it was her son !

- Coreference: models make assumptions about genders and make mistakes as a result

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

# 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.

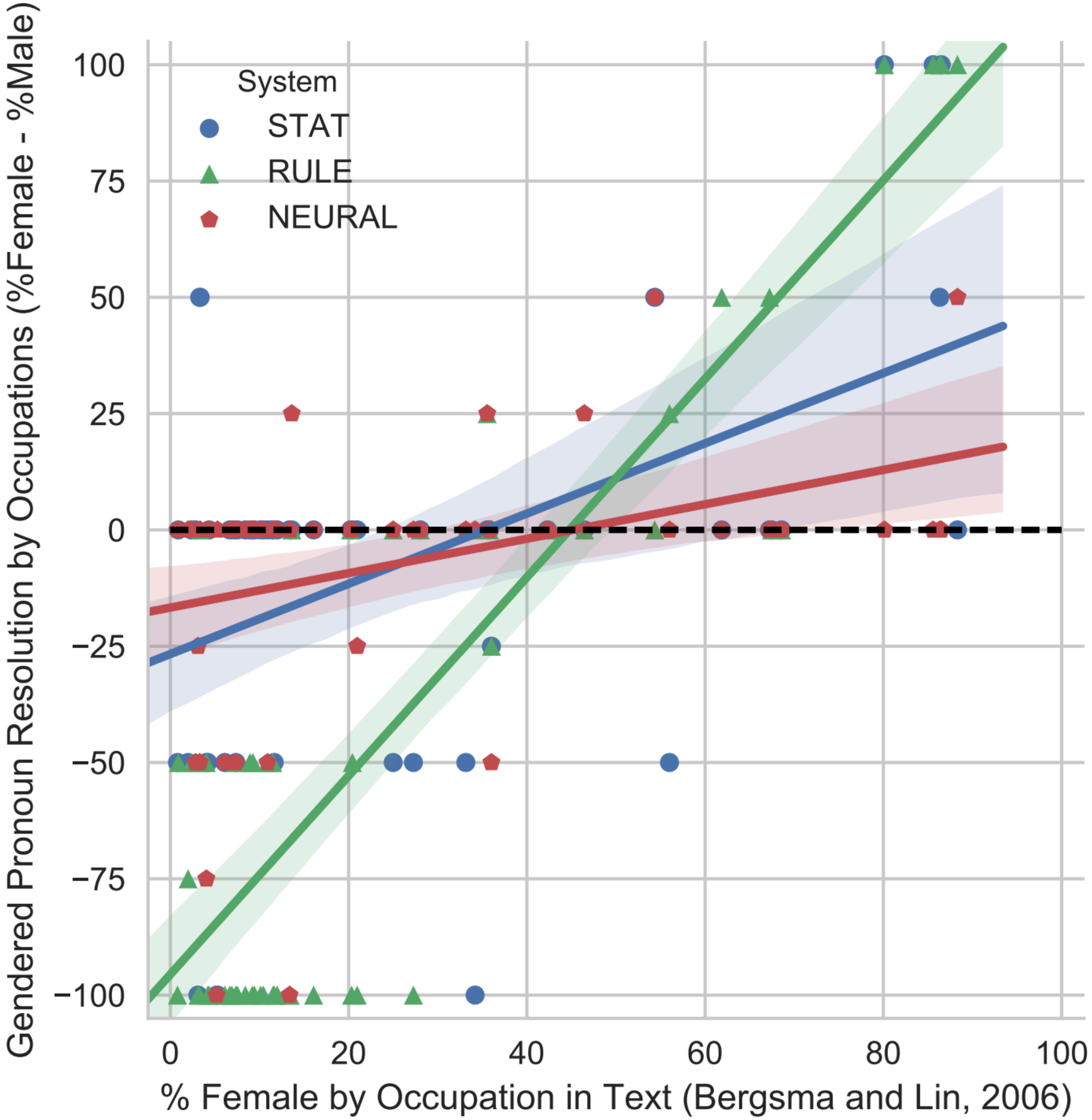
(1b) **The paramedic** performed CPR on someone even though she/he/they knew it was too late.

(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)

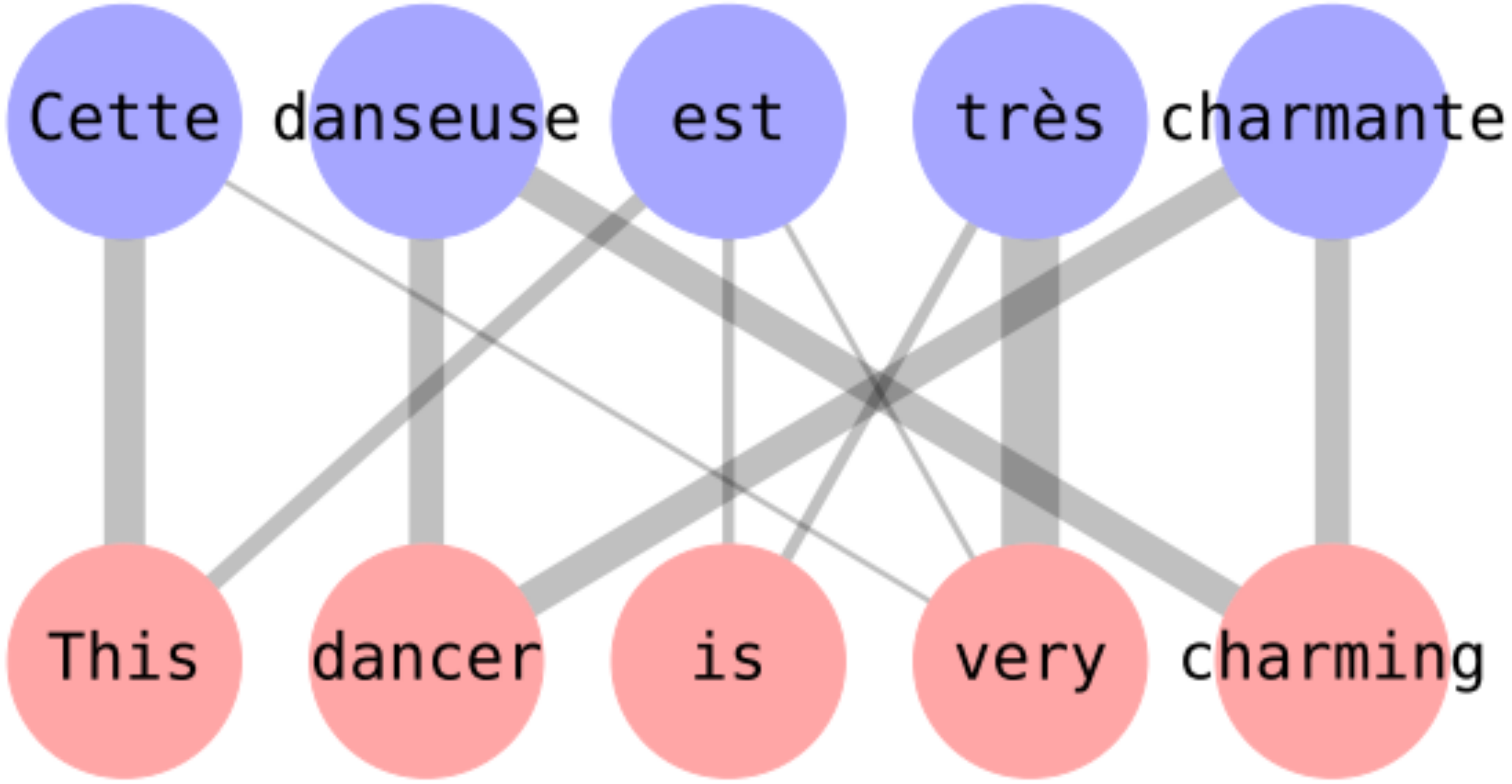
- Neural models actually are a bit better at being unbiased, but are still skewed by data

Zhao et al. (2017)

# Bias Amplification

- English -> French machine translation **requires** inferring gender even when unspecified

- "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

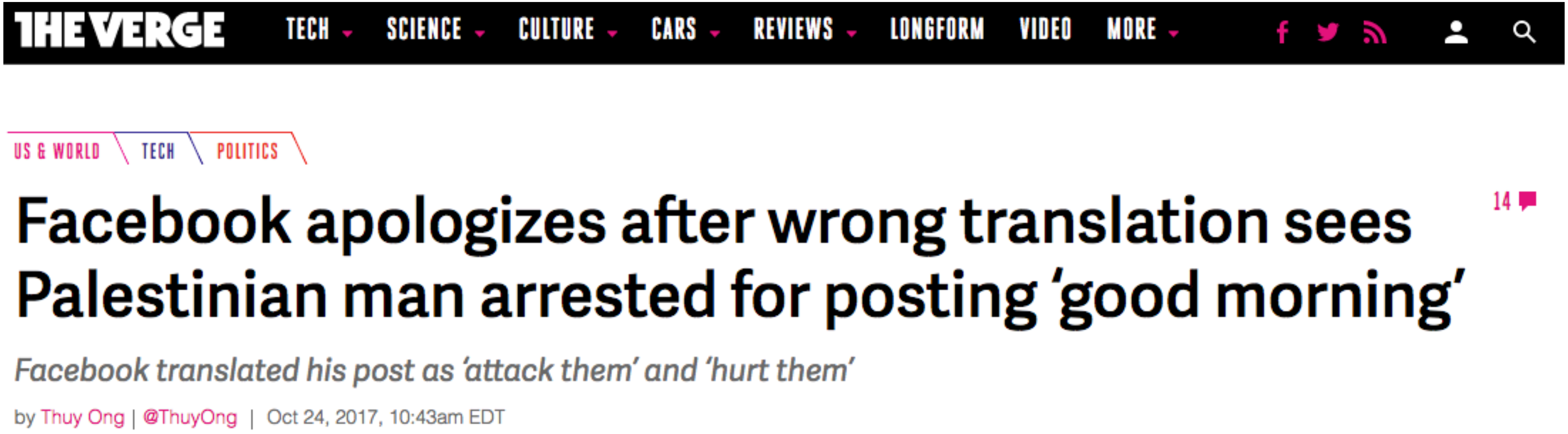
- What about:

  Dialects?

  Other languages? (Non-European/CJK)

  Codeswitching?

# Dangers of Automatic Systems



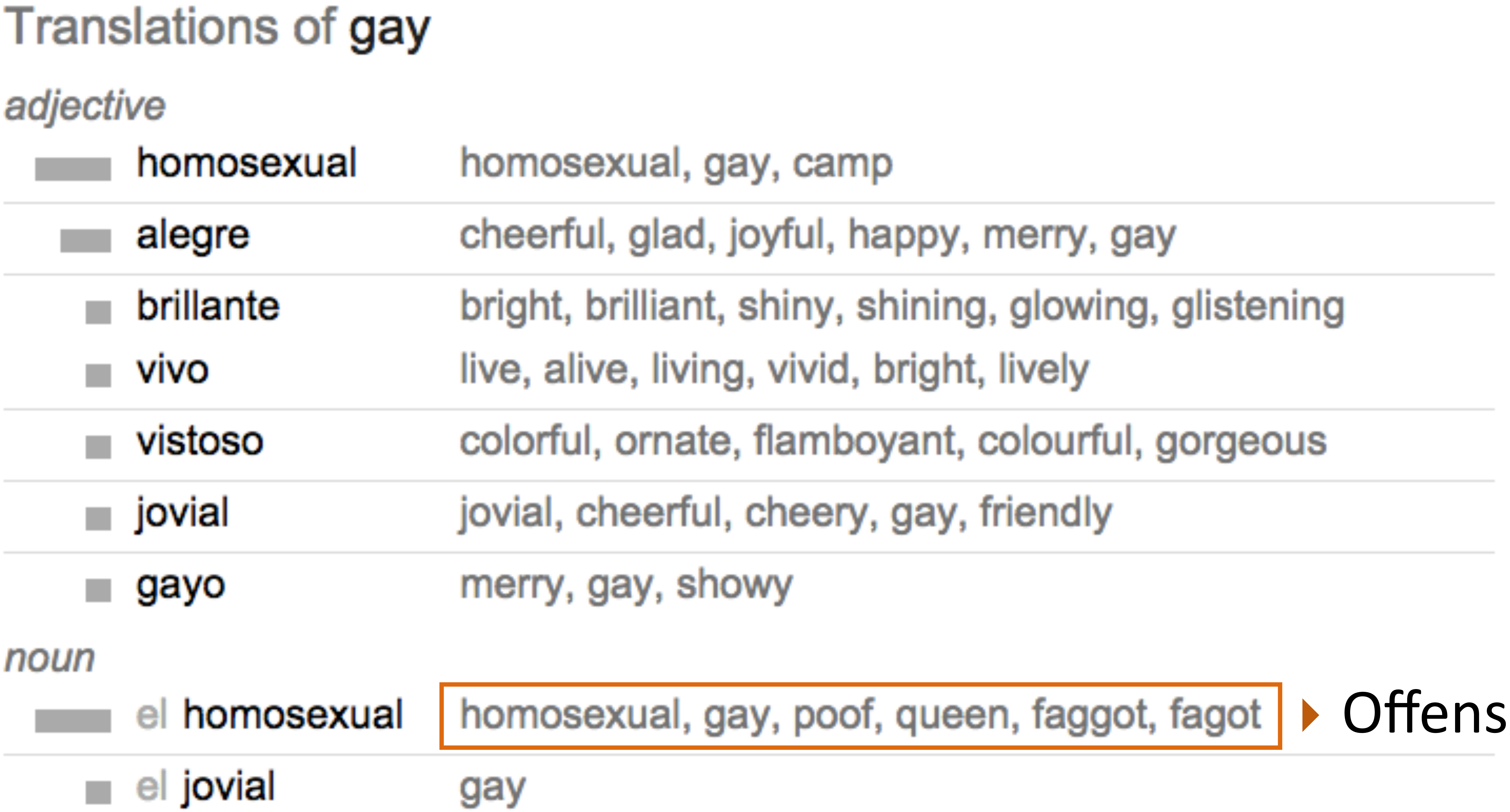
## Facebook apologizes after wrong translation sees Palestinian man arrested for posting 'good morning'

*Facebook translated his post as 'attack them' and 'hurt them'*

by Thuy Ong | @ThuyOng | Oct 24, 2017, 10:43am EDT

Slide credit: The Verge

# Dangers of Automatic Systems



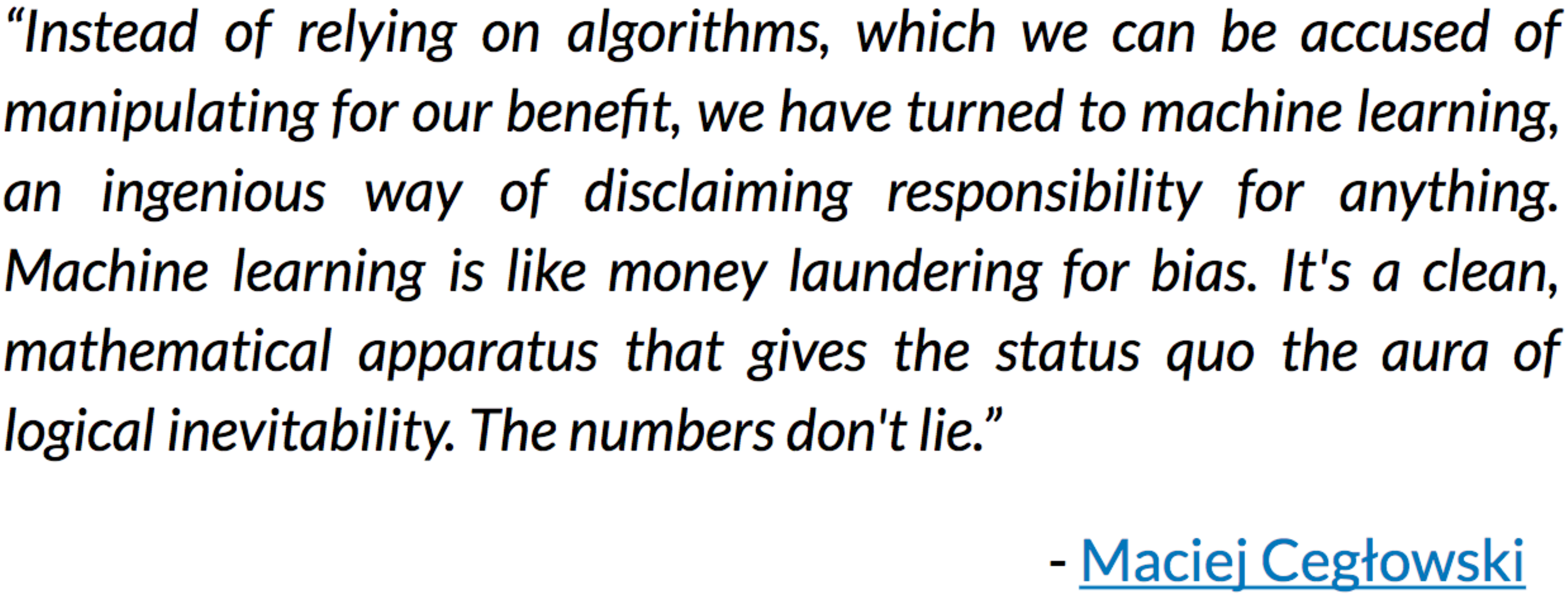
Translations of **gay**

| | | |
|---|---|---|
| *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

Slide credit: allout.org

# Dangers of Automatic Systems



*“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]

Slide credit: Sam Bowman

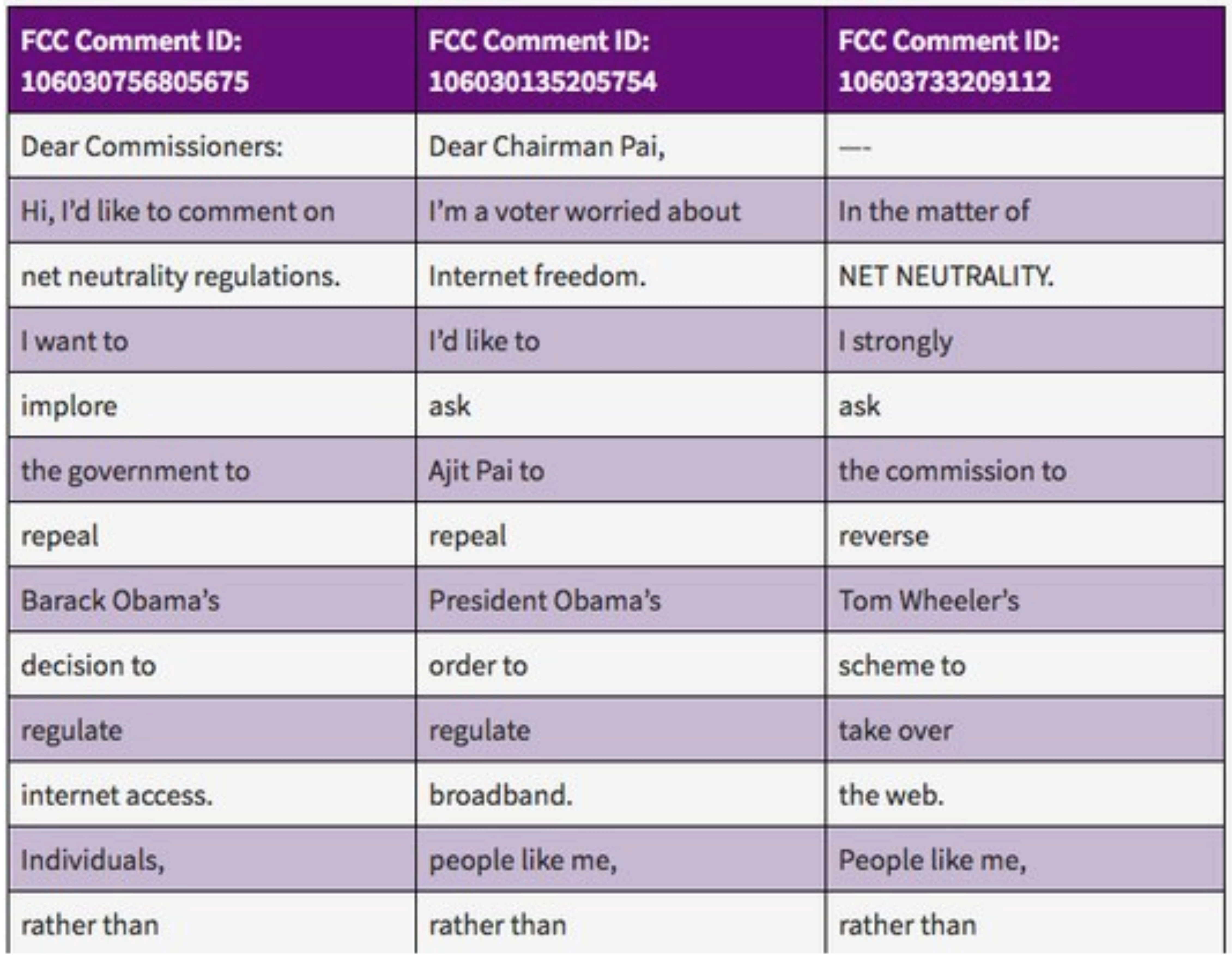
# Dangers of Automatic Systems

- “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? Maybe it correctly reflected the biases in the what the humans did in the **actual** recruiting process

Slide credit: https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G

# Unethical Use

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



| FCC Comment ID: 106030756805675 | FCC Comment ID: 106030135205754 | FCC Comment ID: 10603733209112 |
|---|---|---|
| Dear Commissioners: | Dear Chairman Pai, | —- |
| Hi, I'd like to comment on | I'm a voter worried about | In the matter of |
| net neutrality regulations. | Internet freedom. | NET NEUTRALITY. |
| I want to | I'd like to | I strongly |
| implore | ask | ask |
| the government to | Ajit Pai to | the commission to |
| repeal | repeal | reverse |
| Barack Obama's | President Obama's | Tom Wheeler's |
| decision to | order to | scheme to |
| regulate | regulate | take over |
| internet access. | broadband. | the web. |
| Individuals, | people like me, | People like me, |
| rather than | rather than | rather than |

- What if these were undetectable?

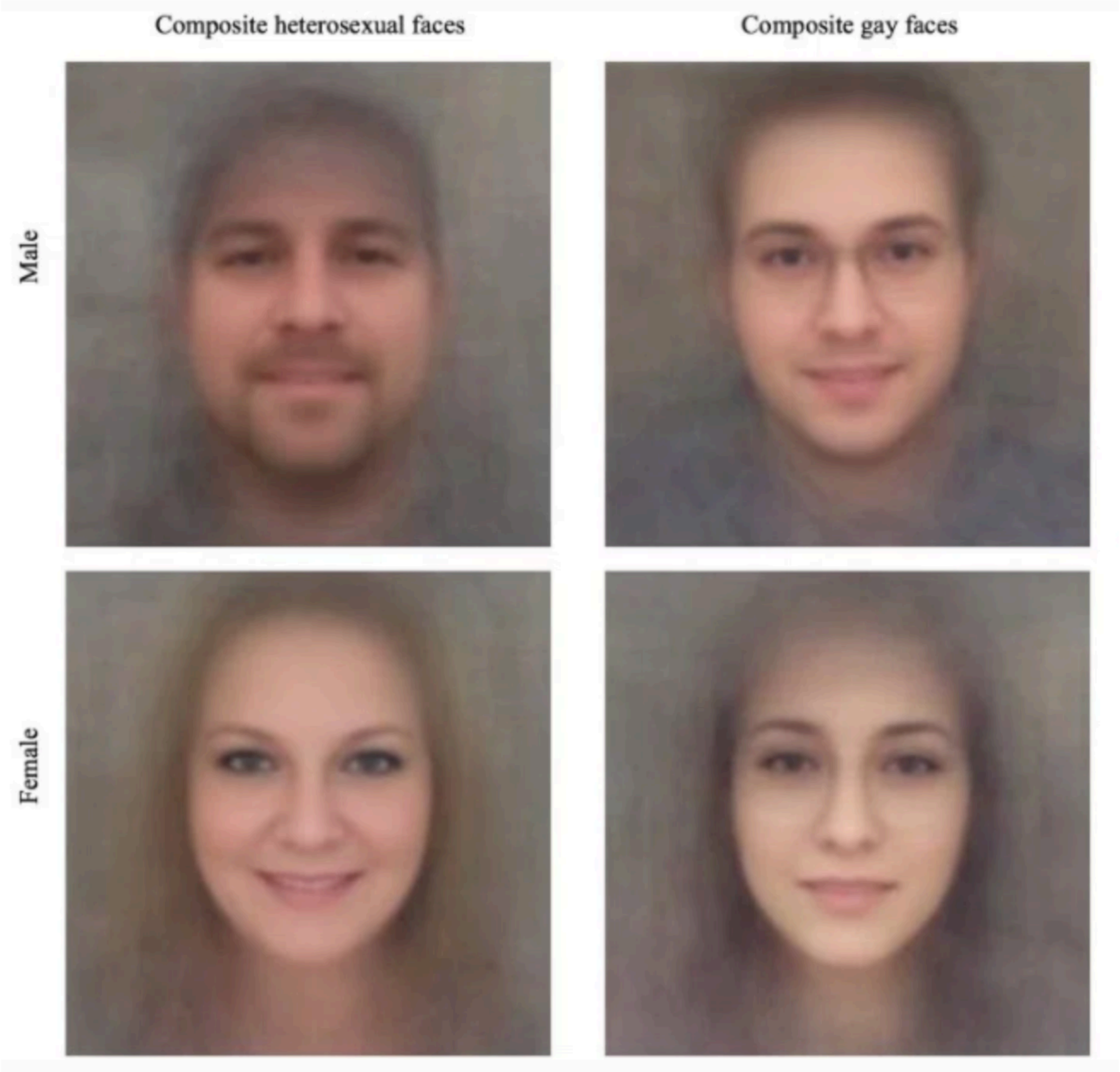
# Unethical Use

- Sophia: “chatbot” that the creators make incredible claims about
- Creators are actively misleading people into thinking this robot has sentence
- 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/

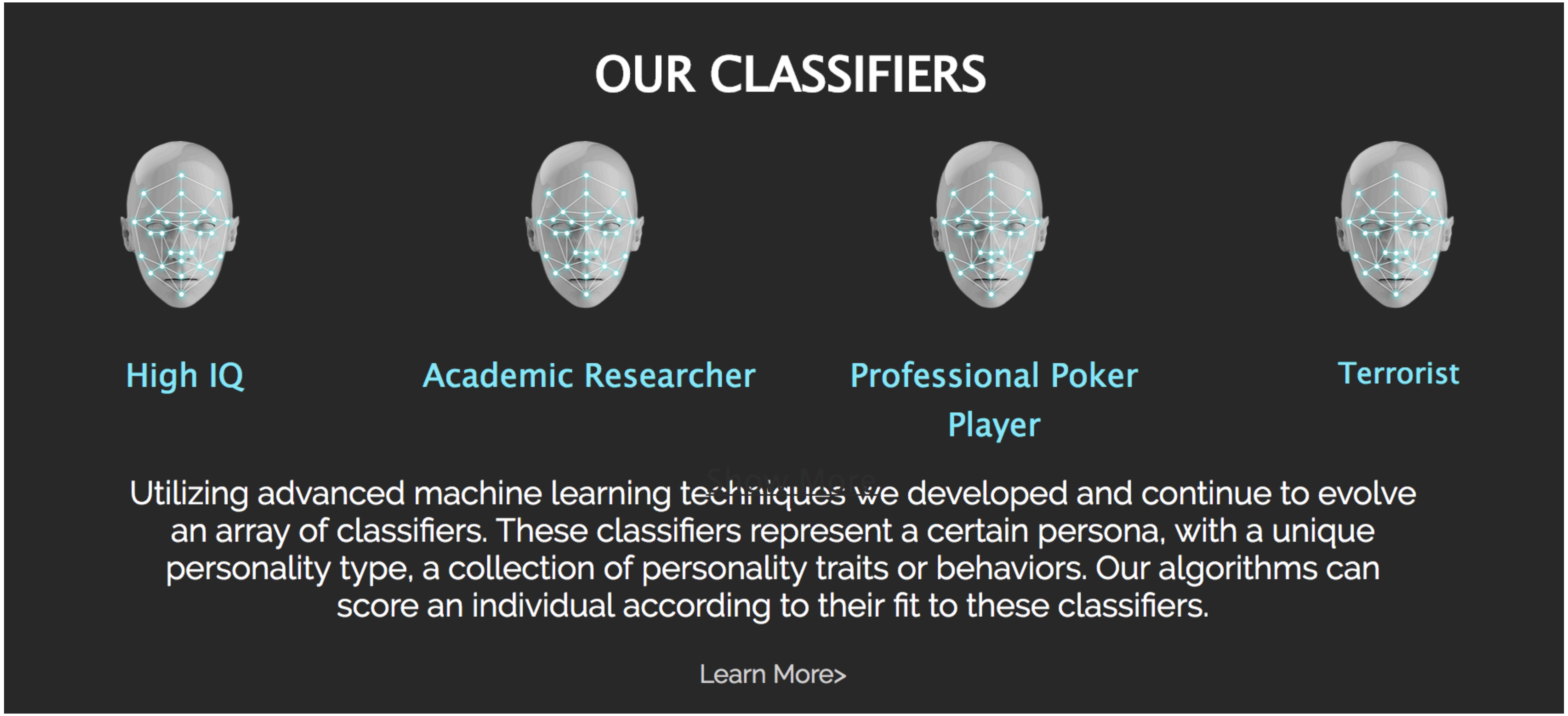
# Unethical Use

- Wang and Kosinski: gay vs. straight classification based on faces
- Authors argued they were testing a hypothesis: sexual orientation has a genetic component reflected in appearance
- Blog post by Agüera y Arcas, Todorov, Mitchell: the system detects mostly social phenomena (glasses, makeup, angle of camera, facial hair)
- Potentially dangerous tool, and **not even good science**



Slide credit: https://medium.com/@blaisea/do-algorithms-reveal-sexual-orientation-or-just-expose-our-stereotypes-d998fafdf477

# Unethical Use



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Academic Researcher

Professional Poker Player

Terrorist

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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

# How to move forward

- Hal Daume III: Proposed code of ethics
  https://nlpers.blogspot.com/2016/12/should-nlp-and-ml-communities-have-code.html
  - Many other points, but these are relevant:
    - Contribute to society and human well-being, and minimize negative consequences of computing systems
    - Make reasonable effort to prevent misinterpretation of results
    - Make decisions consistent with safety, health, and welfare of public
    - Improve understanding of technology, its applications, and its potential consequences (pos and neg)
- Value-sensitive design: vsdesign.org
  - Account for human values in the design process: understand *whose* values matter here, analyze how technology impacts those values

# 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