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The Limits of Machine Learning

Ma. Mercedes T. Rodrigo

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MA MERCEDES T RODRIGO, PhD

The Limits of Machine Learning

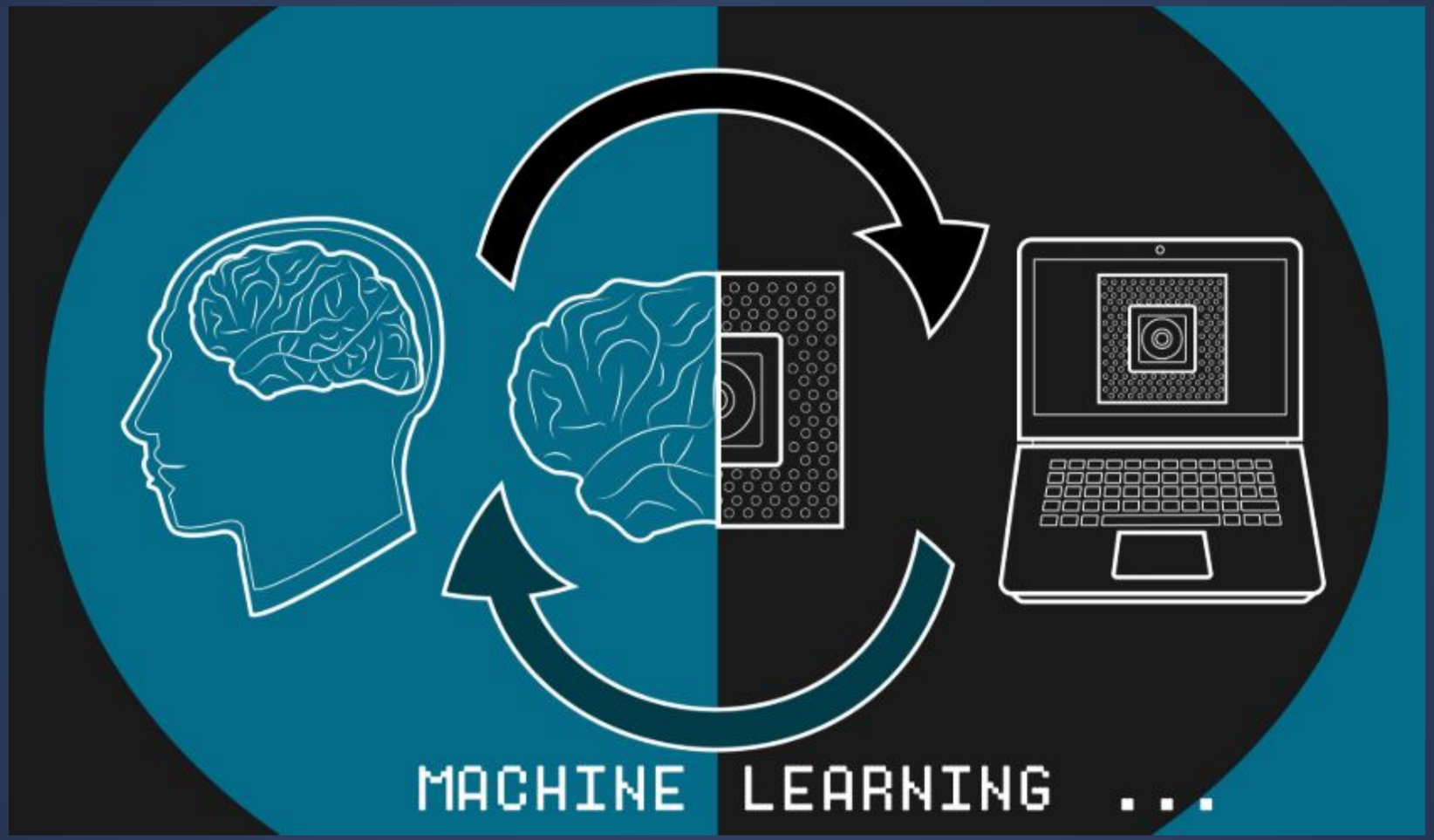
Happy Birthday Didith!
Google Search
I'm Feeling Lucky

- How much does Google know about us?
- How worried should we be?

- How much does Google know about us?

- What we will most likely buy
- Where we will most likely go
- What we will most likely do
- What we will like to watch
- How we can be influenced or nudged

MACHINE LEARNING



- Students who are frustrated
- Students who are struggling
- Students who have disengaged with the learning materials

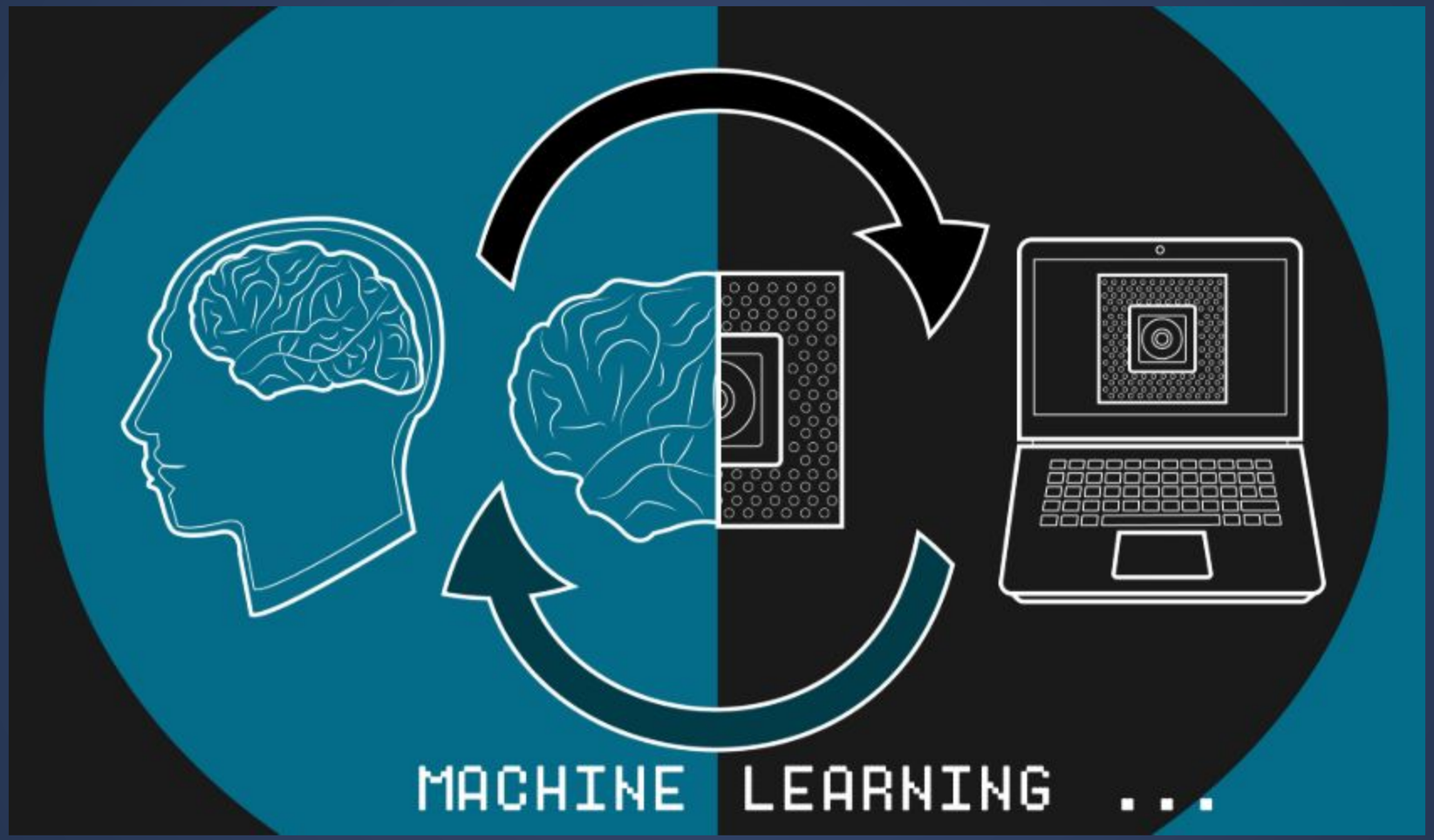
- How to bring them back on task
- How to help them make use of the resources available to them
- How to scaffold and guide their learning better

At its best, machine learning should help us discover creative solutions to complex problems.

- How worried should we be?

Machine learning has limits.

MACHINE LEARNING



1. Data is inherently biased.

MACHINE LEARNING'S LIMITS

Western

Educated

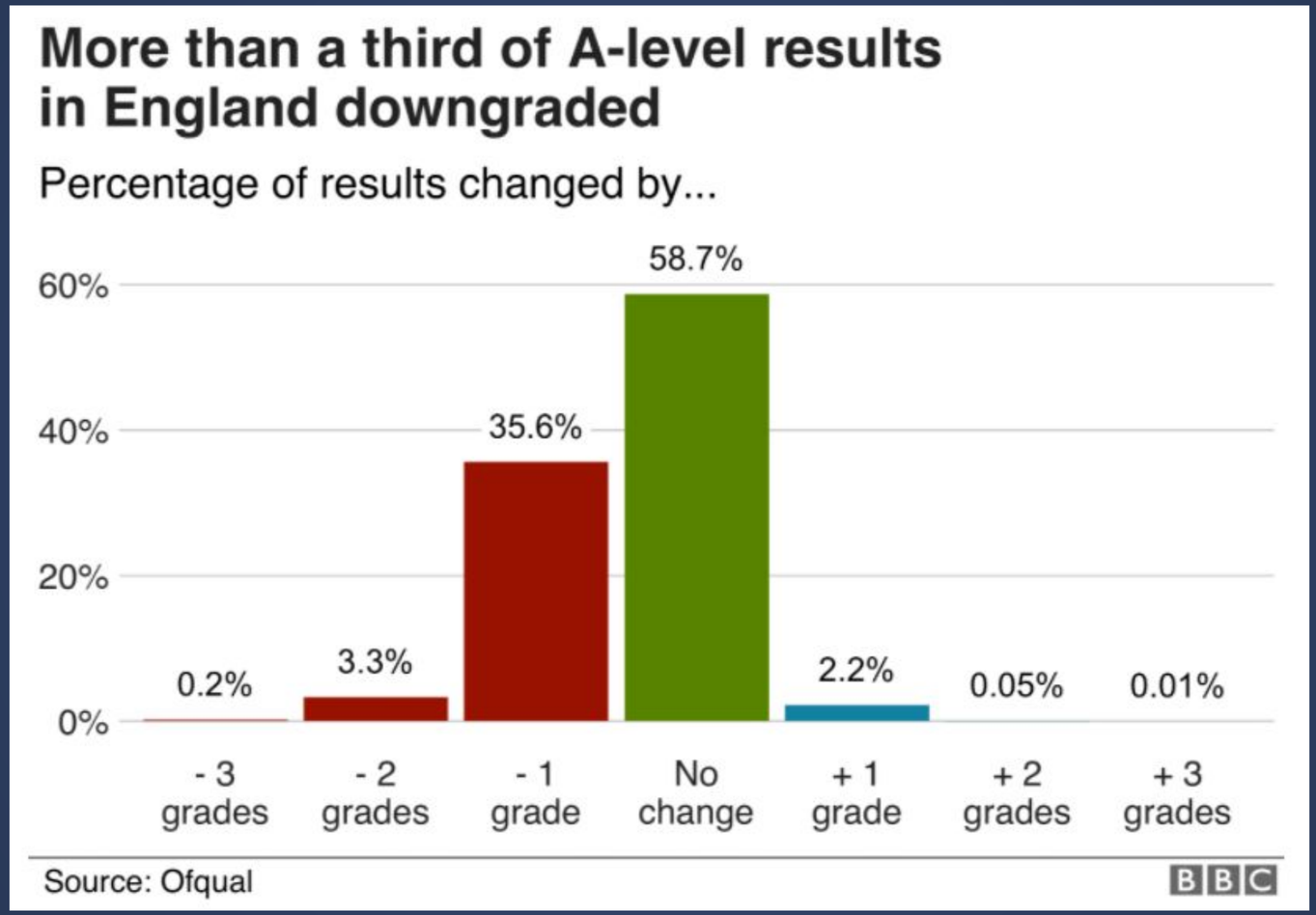
Industrialized

Rich

Democratic

2. Machine-learned models tend to be opaque.

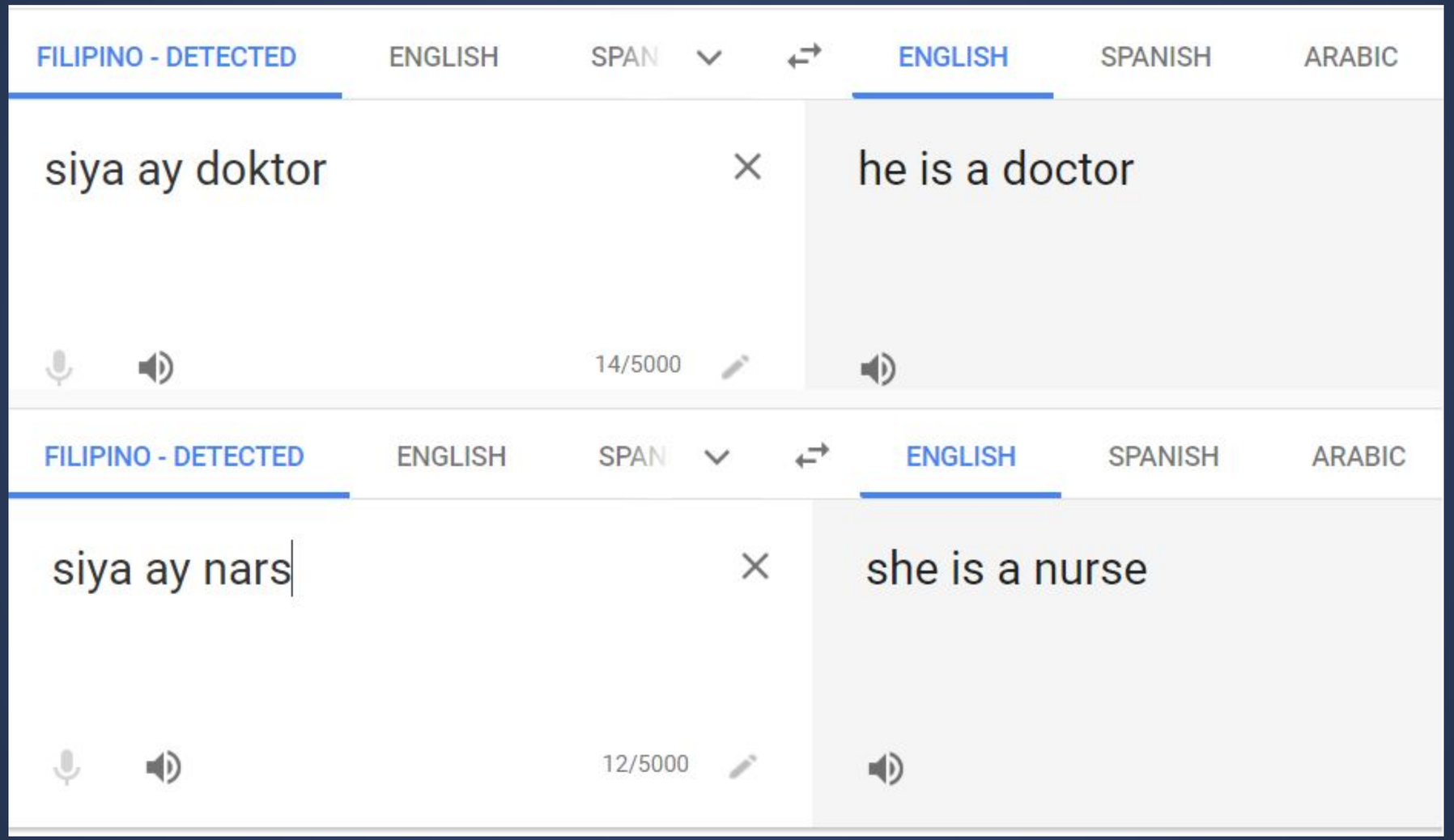
MACHINE LEARNING'S LIMITS



3. Outcomes can be discriminatory.

MACHINE LEARNING'S LIMITS

MACHINE LEARNING'S LIMITS



4. Applications of machine learning can be manipulative and controlling.

MACHINE LEARNING'S LIMITS

5. The effects of these models can cascade and scale.

MACHINE LEARNING'S LIMITS

DOI: 10.1073/pnas.1320040111 · Corpus ID: 2062574

Experimental evidence of massive-scale emotional contagion through social networks.

Adam D. I. Kramer, Jamie Elizabeth Guillory, Jeffrey T. Hancock · Published 2014 · Medicine, Psychology · Proceedings of the National Academy of Sciences of the United States of America

6. Applications reflect the values of those who own or control the models.

MACHINE LEARNING'S LIMITS

Cambridge Analytica

- How worried should we be?

Who are the people behind the models?

What ends do they serve?

Do you trust them?

That’s how worried you should be.

Be aware that machine-learned models cannot see their limitations.

Demand truth, transparency, fairness from these algorithms and the people who control them.

"[Machine-learned models] codify the past. They do not invent the future. Doing that requires moral imagination, and that's something only humans can provide. We have to explicitly embed better values into our algorithms, creating … models that follow our ethical lead."

- Cathy O'Neil, *Weapons of Math Destruction*