Practical Ethics in Artificial Intelligence

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Summary

Other sessions

1. Supervised learning - learning from labeled examples
2. Unsupervised learning - discovering structure in data
3. Reinforcement Learning - learning how to get better from reward
4. Combinatorial Game Theory - exploring various solutions to a problem

Today's session

1. Generalities on Ethics in AI
2. Practical challenges in machine learning with ethical consequences

Why ?

Search AI and Ethics ?

Why ?

1. Hype vs true risks, and associated Technical Challenges.
2. Technical Challenges can become ethical issues:
   - Dataset biases (lack of diversity)
   - Overfitting
   - Imbalanced classes
   - Reward definition
   - ...

Acknowledgment

This course is highly inspired from recommendations in the Villani report on AI (openly accessible), as well as O'neil's book.

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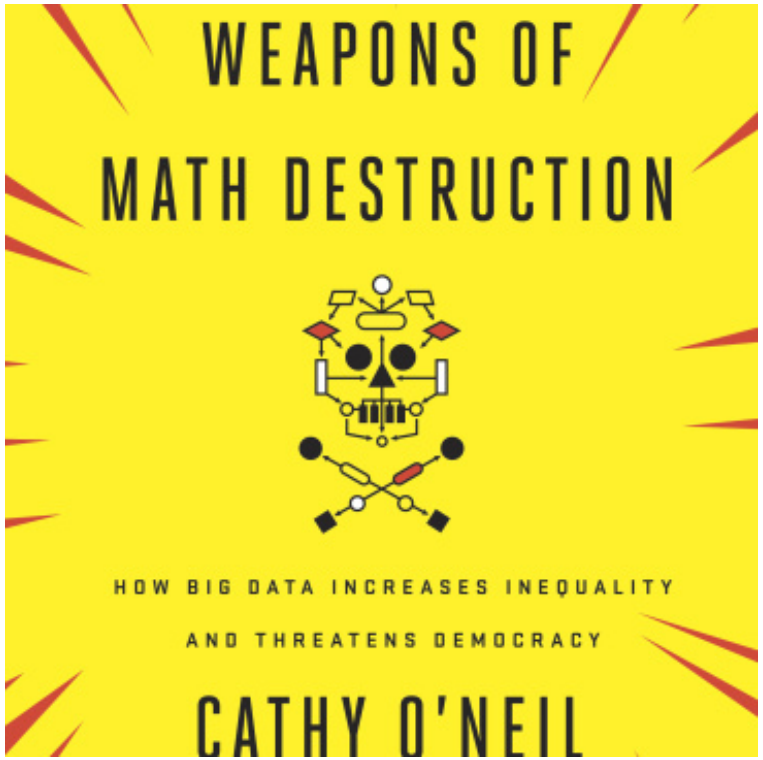
DONNER UN SENS À L'INTELLIGENCE ARTIFICIELLE

POUR UNE STRATÉGIE NATIONALE ET EUROPÉENNE



Also another recent good read :

`https://www.journalofdemocracy.org/ai-and-catastrophic-risk/`

Technical Challenges relating Ethics and AI

Regulatory and societal aspects

- Collective rights regarding data
- Keeping control on what (not) to develop
- Governance

Technical aspects

- Black-Boxes, transparency and bias
- Integrating ethics in engineering / design
- Differential privacy
- Federated learning

Regulatory and societal aspects

Collective rights regarding data

- Existing regulations on (individual) private data (e.g. GDPR)
- No common policies on collective rights - group data

Main issue: (statistical / data) relationship between single individuals and grouped data.

Keeping control

- Open solutions for auditing / controlling
- Non-proliferation of autonomous weapons

A similar issue than with nuclear weapons.

Regulatory and societal aspects

A specific governance for Ethics in AI

- Role of public debate and transparency
- Towards specific governance (consulting councils?)

What can we do ?

Institutional proposals

- GDPR
- European union AI Act
- UNESCO Recommendation on the Ethics of Artificial Intelligence
- Montreal declaration

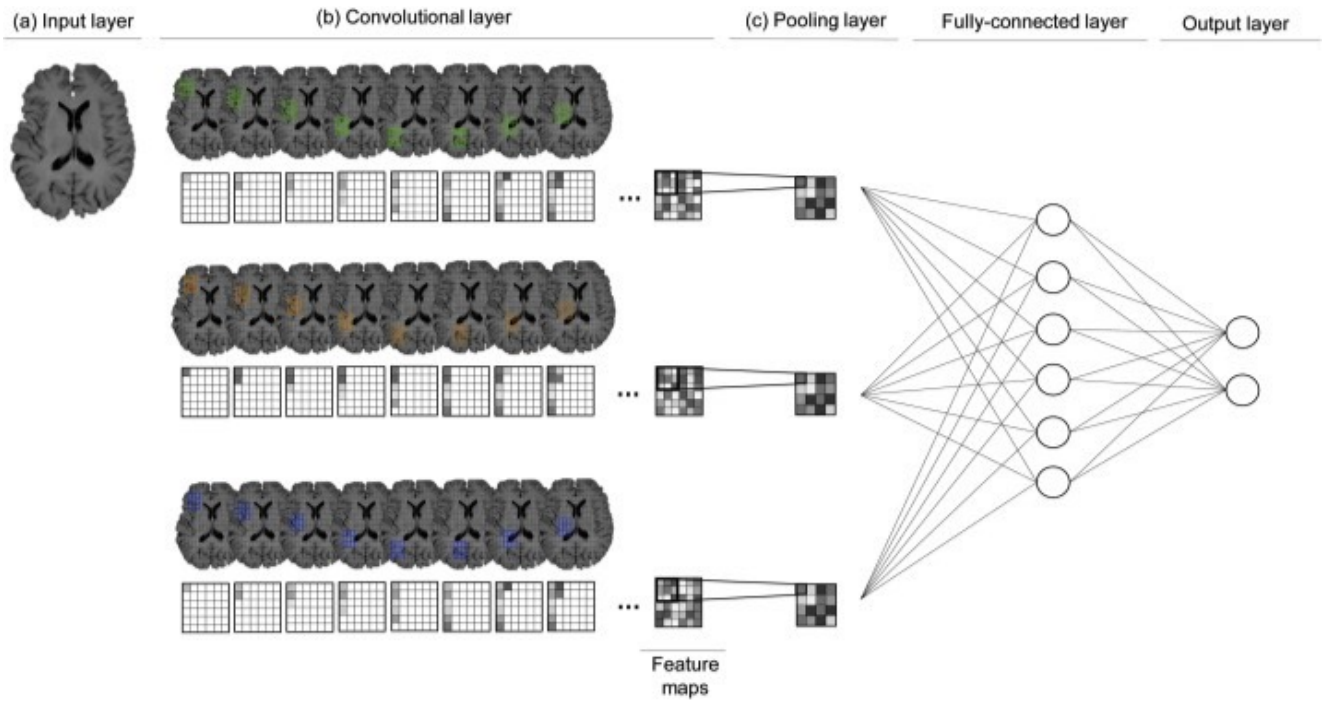
Technical aspects

- Black-Boxes, transparency and bias
- Integrating ethics in engineering / design
- Federated learning
- Differential Privacy

Black-Boxes, transparency and bias 1/2

The problem of black boxes

- Trust by users
- Verifiability



Black-Boxes, transparency and bias 1/2

Bias

- Reproducing the biases seen in society
- Potentially difficult to detect

Related technical problems in machine learning

- Difficulty to generalise from train to test due to a lack of diversity
- Similarity between train and test data
- Imbalanced classes

Black-Boxes, transparency and bias 2/2

Tackling interpretability

Neural networks, Random Forest (and others) are difficult to interpret.

- Interpretability is an active research field,
- Procedures to explain algorithms by manipulating data.

Auditing AIs ?

Trust in AI approaches can potentially be increased using:

- Open-source and open data,
- Specific test procedures targetted to "fool" algorithms, to evaluate their robustness.

Integrating ethics in engineering / design

Dataset construction

Not always trivial to collect data...

- Because humans collect data, data can reproduce human biases.
- In some cases, exceptions, irregularities and accidents are more significant than the norm.

Training and benchmarking

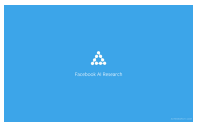
It is essential to systematically consider:

- Accuracy, precision and recall
- Cross-validation

Some examples

- Open AI used to develop all-open solutions for AI...
- Facebook AI Research publishes only open access papers and publishes all associated code.
- Google Open-sourcing some of its software.

See the additional file with the list of ressources.



Some examples

- Awesome open datasets and code `https://laion.ai/`
- Open models, datasets and code !! `https://huggingface.co/`
- Posts about AI risks from one of the most reknowned AI researcher `https://yoshuabengio.org/`
- `https://www.eleuther.ai/`
- `https://www.sashaluccioni.com/`
- Science4all on Youtube
- See the "ressources" list on github