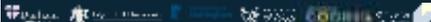


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# Advanced Data Science

Topic 11b – Part 6



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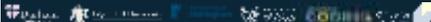
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## 1. What We'll Cover



The aim: to provide an overview of some of the ethical issues faced when applying data science, why these are important, and how to ensure responsible working moving forward.



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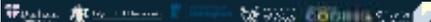
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## 2. What are Ethics?



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### 3. What are Ethics?

- Ethics is a branch of Philosophy - It systematizes right and wrong.
- Deciding right from wrong is tricky. It involves choosing a metric to compare against, such as the "greatest good" - the best behaviour yields the greatest good.



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### 4. What are Ethics?

- Stoicism - behaviour that brings about contentment and serenity achieves the greatest good.
- Hedonism - behaviour that maximizes pleasure and minimizes pain achieves the greatest good.
- Utilitarianism - behavior that maximizes a positive effect, e.g. happiness, achieves the greatest good.
- This isn't a full ethics course, so we can't review all the theories.
- That said, we'll press on and use utilitarianism as our focus point.



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### 5a. Utilitarianism



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### 5b. Utilitarianism

**PROBLEMS FOR UTILITARIANISM**

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### 6. Relation to Data Science

Ethical questions related to the application of domain expertise to problems at hand.

Credit: Shelley Palmer & Crata.io

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### 7. Relation to Data Science

Ethical questions related to the application of domain expertise to problems at hand.

The way in which data is collected, processed, cleaned.

Ethical questions related to research goals and methods.

Questions surrounding application of ML and A.I. in general.

Ethical questions related to the application / use of statistics.

Credit: Shelley Palmer & Crata.io

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### 8. Importance & Fairness

- Ethics becoming increasingly important as we relinquish human decision making responsibilities to algorithms.
- These systems must operate in an ethical fashion.
- Let's avoid the "tyranny of algorithms".
- Mistakes have already been made. Perhaps unknowingly, a utilitarian style approach to building automated systems has been adopted by many.
- This is because learning systems are usually trained with a singular purpose in mind – to achieve the best predictive accuracy. Consider an example.




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### 9. New Framework

- How long it can be kept.
- That it should be maintained in a secure manner.
- That its integrity and data validity must be preserved.
- That our consent must be sought before that data can be used.
- The right to be informed.
- The right of access to our data.
- The right to erase data held about us.
- The right to demand our data repaired if erroneous.
- The right to object.
- Plus rights related to how automated systems use our data.




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### 9a. GDPR

- GDPR is a legally enforceable framework that complements the ethical considerations we should already be making as data scientists.
- With GDPR in place, we can ask a question of ourselves when facing a data science problem: is it ethically acceptable and legal to apply data science to the problem?
- Is the potential application fair?




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### 12. Security, Privacy, Anonymity



Windows taskbar icons: Edge, File Explorer, Microsoft Store, OneDrive, Mail, Photos, Settings, Task View, Start, Search, Power, Network, Volume, Battery, System Tray.

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### 13. Legal Consequences

- When privacy and anonymity are overlooked, things can go very wrong.
- For example, the Cambridge Analytica scandal. Here a company exploited multiple data sources to probe & manipulate our emotions.
- The legality of these actions has been questioned & fines levied – yet the ethical impact is profound.
- It has raised concerns about the validity of elections, discourse, and the stability of our democracy.
- All brought about by a small number of data scientists.



Windows taskbar icons: Edge, File Explorer, Microsoft Store, OneDrive, Mail, Photos, Settings, Task View, Start, Search, Power, Network, Volume, Battery, System Tray.

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### 14. Ethical Consequences



Windows taskbar icons: Edge, File Explorer, Microsoft Store, OneDrive, Mail, Photos, Settings, Task View, Start, Search, Power, Network, Volume, Battery, System Tray.

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15. Code of Ethics

Why develop a data science code of ethics?

Evielee Ann Gonsalves  
2018

The slide features a dark blue background with a white text box containing the title and author information. At the bottom, there is a row of small logos for various institutions and organizations.

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15. Code of Ethics

- UK Government developed Data Ethics Framework

The screenshot shows the homepage of the Data Ethics Framework website, which has a blue header and white content area. The text 'Data Ethics Framework' is prominent in the center.

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16. Summary

We've considered:

- What Ethics is.
- Covered some introductory ethical theories.
- Explained the importance of ethics in data science.
- Been made aware of the legal frameworks within which we should operate ethically.
- Heard about GDPR, codes of ethics, and the consequences of discarding ethical considerations.

1. Legal Framework (GDPR) → 2. Code of Conduct → 3. Governmental & Personal Ethical Framework

The slide includes a flow diagram with three boxes connected by arrows, showing the progression from legal frameworks to codes of conduct and finally to governmental and personal ethical frameworks.

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Age 8-10  
Literacy

### 17. Resources

SAS GLOBAL FORUM 2017

Students' Perceptions of Social Science

SCIENCE  
SOCIAL SCIENCE  
HISTORY

Logos at the bottom: U.S. State Department, National Science Foundation, National Endowment for the Humanities, National Geographic, National History Education Research Center, National Center for History Education, National Center for Science Education, National Center for Social Studies, National Center for the History of the United States, National Center for the History of the United States, National Center for the History of the United States.

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