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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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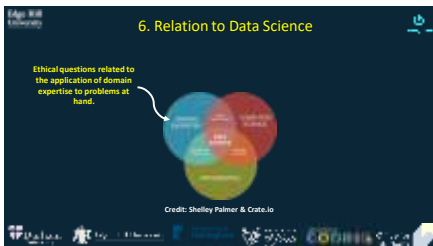
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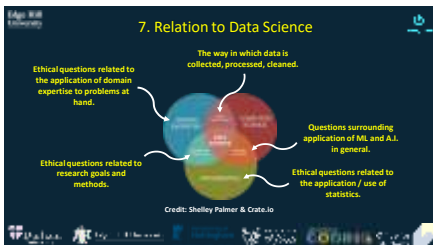
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## 8. Importance & Fairness

- Ethics becoming increasingly important as we relinquish human decision making responsibilities to algorithms.
- These systems must operate in an ethical fashion.
- Lets' 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:



Amazon scraps secret AI recruiting tool that showed bias against women

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## 9. New Framework

- How long it can be kept.
- That it should be maintained in a secure manner.
- That it's 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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## 9b. GDPR

GDPR: Everything you need to know

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## 10. Consent

- Consent is becoming an increasingly important issue in data science.
- If data is being collected about us all the time, does that mean we consent to all it's potential uses?
- GDPR would now suggest that direct consent is needed if the data is to be processed in a new way.
- What about data stored in mathematical models – users have rights over how there data is used here too.
- Consent is at the heart of any data science activity that involves people and their data.

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## 11. GDPR & A.I.

- GDPR presents some unique challenges to A.I.
- One important issues is related to the training of intelligent algorithms. These learn from vast quantities of historical data.
- The data is used to build what we called models.
- Under GDPR these models are derivatives of user data, thus users have rights over them.
- This can raises ethical questions.

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## 12. Security, Privacy, Anonymity



Task 12

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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.



Task 13

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## 14. Ethical Consequences



Task 14

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## 15. Code of Ethics

Why develop a data science code of ethics?

Dr Julia Ann  
Owen  
Birmingham  
2018

Windows taskbar icons: Edge, File Explorer, Microsoft Store, OneDrive, Mail, Photos, Settings, Task View, Search, and system tray icons.

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## 15. Code of Ethics

- UK Government developed Data Ethics framework

UK Government  
Data Ethics Framework  
2018

Windows taskbar icons: Edge, File Explorer, Microsoft Store, OneDrive, Mail, Photos, Settings, Task View, Search, and system tray icons.

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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

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17. Resources



SAS GLOBAL FORUM 2019

Statistical Personality of Data Science

Data  
Information  
Knowledge  
Wisdom

Statistical Personality of Data Science

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