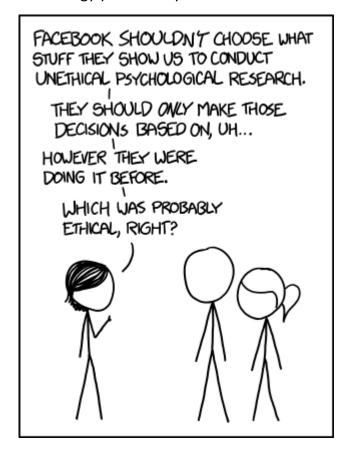# Resources: Artificial Neural Networks (ANN) and the Ethical and Legal Impacts of AI

TidBIT

Acting ethically can be challenging even when you fully understand the code you are working with. The challenges increase exponentially when working with artificial intelligence, especially when you cannot always "see" how a neural network is making its decisions! Though it is not always easy, it is *essential* to think deeply about the potential ethical applications and implications of the technology you develop.

Reference

Munroe, R. *Research ethics*. XKCD webcomic. Retrieved from https://xkcd.com/1390/.

Required Resources

Textbook: *Deep Learning with Keras* ☑ *(http://ezproxy.snhu.edu/login? url=https://ebookcentral.proquest.com/lib/snhu-ebooks/detail.action?docID=4850536)*, Chapter 3

In this chapter from your Shapiro Library textbook, you will review the concepts of convolutional

neural networks (ConvNets) and how they are used to classify images based on psychological experiments done on the visual cortex. The focus for this reading is improving the performance and accuracy of image recognition using deep learning ConvNets, deep learning classifiers (CIFAR-10 and ImageNet datasets), large deep learning networks (VGG16), and very deep networks (InceptionV3). As you read, consider the following:

- How are convolution and pooling applied in convolutional neural nets (CNNs)?
- How do CNNs compare to the neural networks you learned about in the previous unit in their speed and accuracy?

Video: Machine Learning and Human Bias ⤤ (https://www.youtube.com/watch?v=59bMh59JQDo) (2:33)
This video explains the concept of machine learning and how human bias affects biases in the technology we create. As you watch, consider the following:

- How do biases become a part of technology?
- What are the different biases mentioned in the video? Are there other biases that you can think of that were not covered here?

Reading: Human Bias in Machine Learning ⤤ (https://towardsdatascience.com/bias-what-it-means-in-the-big-data-world-6e64893e92a1)
Bias is a part of human nature and can be caused by experiences or environment, but it also exists in machine learning and is referred to as machine bias. This article addresses different types of bias that exist with machine learning algorithms, how and why they occur, and their implications toward society. As you read, consider the following:

- In addition to biases that exist in data, there are cognitive biases that affect human beings. What are some of the cognitive biases mentioned? How might these cognitive biases affect someone developing AI technology?
- What are the different categories of machine bias mentioned in the article? What dangers or inequities might result from each of these types of bias?
- What steps can be taken to counteract machine biases?

Reading: Ethics and Privacy in AI and Big Data: Implementing Responsible Research and Innovation ⤤ (https://ezproxy.snhu.edu/login?url=https://dx.doi.org/10.1109/MSP.2018.2701164)
There are concerns about privacy and ethical issues involved with the combination of big data and artificial intelligence. This article from the Shapiro Library discusses ways to address these issues to ensure that the advantages outweigh the disadvantages using the concept of responsible research and innovation (RRI). As you read, consider the following:

- What are some of the concerns raised by Smart Information Systems (SIS)?
- What different measures have been proposed to address ethical issues arising from AI? How does the GDPR specifically attempt to address these ethical issues?

does the GDPR specifically attempt to address these ethical issues?

- What is RRI and how does it differ from other approaches? How might RRI be implemented?

Reading: Rethinking Data Privacy: The Impact of Machine Learning ⬀
(https://medium.com/luminovo/data-privacy-in-machine-learning-a-technical-deep-dive-f7f0365b1d60)
This article discusses the potential for security breaches in personal information collected from social media applications and businesses. As you read, consider the following:

- What are the different dimensions of data sets? How does this affect the ability of data to be anonymized?
- How does machine learning exacerbate the problem of data privacy?
- What are the current trends to help preserve privacy in the context of machine learning?

Reading: How Facebook Biases Your News Feed ⬀
(https://www.forbes.com/sites/nelsongranados/2016/06/30/how-facebook-biases-your-news-feed/)
This article describes how a particular social media site, Facebook, uses algorithms to personalize its news feed. This blog discusses the pros, cons, and biases involved in using personalization algorithms. The purpose of this reading is to help you understand one example of how a social media feed can be affected by algorithms. It is important to understand that these algorithms are constantly changing, which may solve some issues while creating others. As you read, consider the following:

- What does the author suggest as an unbiased method of curating a news feed? Do you agree that this is an unbiased method?
- What are some of the consequences for how these algorithms might shape our perception of the news? What are the societal and ethical implications of this?

Reading: The Secretive Company That Might End Privacy as We Know It ⬀
(https://ezproxy.snhu.edu/login?url=https://search.ebscohost.com/login.aspx?
direct=true&db=edsbig&AN=edsbig.A611773186&site=eds-live&scope=site)
This reading from the Shapiro Library discusses the ethical and privacy implications of a company called Clearview AI, a facial recognition app. The app has collected approximately three billion publicly available photos and used them to train its algorithms, which then can identify any user uploaded to the app. As you read, consider the following:

- Who developed the app? What were their intentions for how it might be used?
- Whose data is being used for the app? Based on how the data was collected, was Clearview AI given any type of informed consent for the use of their images? Why does this matter?
- How is the app currently being used by private users? By larger entities, such as law enforcement? What ethical implications does this have?
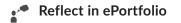
Additional Support (Optional)

Reading: The Secret Sharer: Evaluating and Testing Unintended Memorization in Neural Networks ⤴ (https://arxiv.org/abs/1802.08232?)
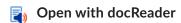
This optional reading from the Shapiro Library discusses how the data sets used to train neural networks often contain sensitive data. This article reviews how this data can be retained by neural networks and used maliciously, and how this can be prevented. As you read, consider the following:

- What type of information does a neural network "memorize"? What are the ethical and privacy implications of this?
- What steps can be taken to mitigate this "memorization"?

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Explore these resources, which will help you learn how to analyze the ethical and legal impacts of artificial intelligence and evaluate the use of Advanced Neural Networks (ANN) to solve programming problems.