**4-2 Project One**

**Neural Networks**

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A Neural Network is a collection of algorithms that are designed to interpret a relationship in a set of data that is similarly to how a human brain might interpret data. A neural network is constructed of three layers, an input layer, a hidden layer, and an output layer. These three layers work together by taking the initial data stored in the input layer and processing it through the hidden layer where the data is computed in nodes. Finally, after the data is processed in the hidden layer the output layer takes the processed data and produces results in the output layer to classify an object. (Ognjanovski, 2019)

A picture containing text, clipart

Description automatically generated

Figure 1: Neural Network Layer Process

Neural Networks can be used to personalize a variety of end user experiences from a variety of walks of life. For example, a business like a gym could take information about their customer base frequency and family size to determine where and when to send advertising to attract new business or bring customers back in to renew subscriptions. A neural network can take data and produce fairly accurate results. Another prime example of this is how a business like Facebook takes a user’s data and produces targeted advertising based on a user’s history. Facebook’s neural network takes the information you provide on your profile paired with, Metadata from uploads, the contact you interact with, and information others share about you such as phots they tag you in to generate advertising that would more closely align with a user’s interests. So, if a user interacts with a lot of content related to gaming Facebook would target ads to match this potentially for new games or gaming accessories. (Todorovski, 2021) With using personal data there are ethical concerns that are raised on how this data is used, how it’s stored, and the results it generates.

When Ai comes into making decisions using personal data to determine insurance rates or credit worthiness especially when using classification method like a black box system. A black box classification system allows a user to see that input data and output results but obscures the process used to sort, classify, and make sense of the data. (Guidotti, Monreale, & Pedreschi, 12019)This has caused issues in the past for big companies such as Apple. Apple was accused of discrimination against Women with its credit worthiness by offering larger credit limits to male partners in married couples. Though Apple may have tried to pass the blame onto the bank that held the credit applications and the algorithm they used to determine credit worthiness, this does reflect poorly on the ethics of Apple as they’re brand represented on the credit card. (Vigdor, 2019) Though Ai is a powerful tool, hidden bias’s need to be kept in check or else discrimination and other harmful ethical impacts will run rampant. Additionally with using personal data there are laws and regulation in place to help protect people.

The General Data Protection Regulation or GDRP is a set of laws and regulations created in the European union that protects the personal data of people both inside and outside of Europe. With seven total principals in the GDRP, transparency, purpose limitation, data minimization, and accuracy being the most important to affect the personalization a neural network can bring. Transparency, or how an organization provides how they are using one’s data implies that a company needs to be clear when and how they’re using a personal data. Next, Purpose limitation is about how a company takes personal data for pre-specified purposes and may not archived or reused for any future use besides the explicit specified purpose. Data minimization is explained as collecting only the data gathered for the pre-determined purposes and a company may not gather more without expressed consent to be used with the expressed purpose. Finally, Accuracy is defined as being that a company is required to keep current and accurate, inaccuracies are required to be resolved immediately. These principals help to create a fair and accurate picture when using a person’s personal data with an Ai to create a personalized experience. (Wolford, 2020)

Using neural networks as a classifier to personalize the user experience can come with some legal concerns. Such as how long they’re storing the data. Under the GDRP principal Storage limitation, a business is only allowed to store data as long as it is applicable to the purposes explicit to business need. With legal repercussions such as fines, up to four percent of the company’s total annual turnover. If an economic impact wasn’t enough there additionally runs the risk of damaging a company’s reputational or impact them commercially by losing their customer base. (Ketch, 2021) In 2019, Google was among the first companies to be hit with a GDPR penalty with a 55 million dollar fine. The National Commission on Informatics and Liberty an Independent French administrative regulatory body stated that google had a “lack of transparency, inadequate information and lack of valid consent regarding the ads personalization.” (Hudgins, 2019) For companies like Facebook or Google with already having such a history of collecting data I don’t think they have an easy out for collecting or using a person’s personal data. Though for newer companies, that may be considering this as an option there are alternatives. With some alternative social networking applications offering the choice to stay completely anonymous and not collecting any personal information. (Moreau, 2021)

Currently the GDRP tackles trends in artificial intelligence and machine learning aimed at preserving privacy. By requesting to collect and giving users an easy way to withdraw their consent it seems most companies are following along with this trend. Additionally for an AI to be GDRP compliant the design, development and use of AI must ensure that there are no unlawful biases or discrimination. This helps to keep the data provided by an AI ethical and prevents any legal or reputational risk to a company. With organizations like The National Commission on Informatics and Liberty among others providing review and the GDRP providing governance, people can feel more secure with their personal information and their relationship with AI. (Ved, 2019)

# References

Guidotti, R., Monreale, A., & Pedreschi, D. (12019, JANUARY 22). *ERCIM NEWS*. Retrieved from The AI Black Box Explanation Problem: https://ercim-news.ercim.eu/en116/special/the-ai-black-box-explanation-problem#:~:text=Black%20box%20AI%20systems%20for%20automated%20decision%20making%2C,health%20status%2C%20etc.%2C%20without%20exposing%20the%20reasons%20why.

Hudgins, V. (2019, December 26). *www.gdpr.associates*. Retrieved from 4 Companies That Were on the GDPR’s 2019 Naughty List: https://www.gdpr.associates/4-companies-that-were-on-the-gdprs-2019-naughty-list/

Ketch. (2021, September 19). *blog.ketch.com*. Retrieved from What Happens If You Break The GDPR Law?: https://blog.ketch.com/what-happens-if-you-break-the-gdpr-law#:~:text=%20Consequences%20Of%20A%20GDPR%20Violation%20%201,a%20good%20look%20for%20any%20company.%20More%20

Moreau, E. (2021, June 9). *LifeWire*. Retrieved from 4 Anonymous Social Networking Apps to Check Out: https://www.lifewire.com/top-anonymous-social-networking-apps-3485942

Ognjanovski, G. (2019, January 14). *Towards Data Science*. Retrieved from Everything you need to know about Neural Networks and Backpropagation — Machine Learning Easy and Fun: https://towardsdatascience.com/everything-you-need-to-know-about-neural-networks-and-backpropagation-machine-learning-made-easy-e5285bc2be3a

Todorovski, P. (2021, November 22). *privacyaffairs.com/*. Retrieved from How Facebook Collects and Uses Your Personal Data and How to Stop It: https://www.privacyaffairs.com/facebook-data-collection/#:~:text=This%20includes%20data%20that%20you%20share%20with%20Facebook,...%208%20Things%20others%20provide%20about%20you.%20

Ved, A. (2019, february 28). *TechGDPR*. Retrieved from How to develop Artificial Intelligence that is GDPR-friendly: https://techgdpr.com/blog/develop-artificial-intelligence-ai-gdpr-friendly/#:~:text=To%20become%20GDPR%20compliant%2C%20the%20design%2C%20development%20and,machine%20learning%20models%20is%20to%20build%20transparent%20models.

Vigdor, N. (2019, November 10). *nytimes*. Retrieved from Apple Card Investigated After Gender Discrimination Complaints: https://www.nytimes.com/2019/11/10/business/Apple-credit-card-investigation.html

Wolford, B. (2020). *GDRP.EU*. Retrieved from What is the GDPR? Europe’s new data privacy and security law includes hundreds of pages’ worth of new requirements for organizations around the world. This GDPR overview will help you understand the law and determine what parts of it apply to you.: https://gdpr.eu/what-is-gdpr/