Overview of Machine Learning

What is Machine Learning:

Machine learning is a technological mechanism in which machines such as computers can utilize numerous repeated sequential steps for its best usage of data that is available.

Machine Learning Importance:

Of course, the field of machine learning can be utilized in so many ways. For instance, the brains that humans have is the literal key to how patterns are recognized; this is called pattern recognition. However, in the world of STEM, this practical and logical method is how consistent and compatible data is entered into a database. As a result, this permits more efficiency for discovering solutions for problem-solving, creating meaningful predictions, and predicting and classifying data that might be hidden. Additionally, given that there are a number of algorithms to use specifically designed through machine learning, accuracy plays a key role as they can truly depict what information is useful and useless from the given data points.

Artificial Intelligence & Machine Learning:

Artificial intelligence can be considered as simulations of how humans might perform a multitude of tasks that are usually delegated to only mankind. As such, this ever-developing field does relate to machine learning in the sense that they both are quite reliant on how data is utilized for programming for technological machines such as robots and computers. However, both types of programs have differing methods in terms of learning as AI needs to have these preset rules which can be modified and enhanced throughout a program's "growing process" whereas ML is more of attempting trials based on the programs written and could be improved based on self-learning.

Modern Machine Learning Applications:

There are numerous applications which machine learning is a vital component for. For example, one of them is fraud detection for the finance industry, so essentially many algorithms are utilized and implemented to attempt to block and prevent fraudulent activities, if not, then at least the activities would be minimized as much as possible. Another example would be predictive testing for genetics and genomics if someone were to be infected and/or diagnosed with a life-threatening disease who normally cannot be affected through a normal cause such as family genetics. These would not be utilized with traditional programming because machine learning is more automatic than manual, plus, technology is evolving each and every single day.

Data Importance in Machine Learning:

An observation in terms of data, is a sample data point (or a row) whereas a feature is a column which are both variables for a given data table. For instance, a value that is considered to be quantitative (or numeric) data and additionally, a value that is known as qualitative (or categorical) data are considered features that are also observations based on the data that is being studied. These types of data are crucial for machine learning because numeric values can provide the user with some mathematical inferencing and/or prediction as to how many successes and failures an algorithm will allow but in contrast, qualitative data is indicative of how and why tasks might result in based on the methods used. Additionally, there would be various types of features and observations that could potentially drive for vitality in data collection to use for these ever-growing and evolving machine learning algorithms and/or techniques.

Machine Learning for Future Research:

As a student who is majoring in data science, machine learning is clearly an important aspect for my major since data is clearly incorporated in this field for today's research and goes even beyond industries which are usually deeply involved in technology like cybersecurity and IT. Over (and beyond) this course, I would profoundly like to learn more about ML for not only my personal and professional future, but also so I can potentially benefit mankind in ways which we might not realize just yet with both supervised and unsupervised learning algorithms. I knew I desired to study machine learning as soon as I chose my major almost a year and a half ago, since I thought that (and AI, of course) were the most intriguing topics related to data science. I was even more inspired to learn about ML after I read my professor's blog posts (back when she used to post them) online on her thoughts of machine learning and how programming languages like R and Python have been in competition to see which language is superior for ML usage.

References:

Mazidi, K. J. (2018, July 13). *Why R?* Karenmazidi.blogspot.

      http://karenmazidi.blogspot.com/2018/07/why-r.html.

(2019, May 17). *Accuracy (error rate).* https://deepai.org/machine-learning-glossary

      -and-terms/accuracy-error-rate.

(2022, October 07). *Pattern Recognition and Machine Learning: Overview,*

      Importance, and Application. https://www.simplilearn.com/pattern-recognition-and

      -ml-article.

(2023, January 11). *Top 10 Machine Learning Applications and Examples in 2023.*

      https://www.simplilearn.com/tutorials/machine-learning-tutorial/machine

      -learning-applications.

(2022, July 04). *Top 10+ Awesome Machine Learning Applications in 2023.*

      https://www.projectpro.io/article/10-awesome-machine-learning-applications

      -of-today/364.

(2021, January 27). *What is the Relationship Between Machine Learning and*

      Artificial Intelligence? https://pandio.com/what-is-the-relationship-between

      -machine-learning-and-artificial-intelligence/.

What Is Predictive Genetic Testing. http://www.genesinlife.org/testing-services/testing

-genetic-conditions/predictive-testing.