ACTIVIDAD #1
Tipo actividad: Pre-reading

Pre-reading: Socialize keywords about the reading below:

Key words:

- **Machine Learning:** Meaning: The field of study that focuses on developing algorithms and models that enable computers to learn from data and make predictions or decisions without being explicitly programmed.
- **Algorithm: Meaning:** A step-by-step procedure or set of rules followed by a computer to solve a particular problem or accomplish a specific task.
- **Supervised Learning:** Meaning: A type of machine learning where the algorithm is trained on a labeled dataset, meaning it learns from input-output pairs, making predictions or decisions based on known outcomes.
- **Unsupervised Learning:** Meaning: A type of machine learning where the algorithm is given data without explicit instructions on what to do with it, and it discovers patterns, relationships, or structures within the data.

- **Reinforcement Learning:** Meaning: A machine learning paradigm where an algorithm learns by interacting with its environment, receiving feedback in the form of rewards or penalties, and adjusting its actions to maximize positive outcomes.
- **Automation: Meaning:** The use of machines, algorithms, or technology to perform tasks or processes without human intervention, often associated with efficiency and reduced manual effort.
- **Recommendations:** Meaning: The act of suggesting or advising specific products, services, or actions based on previous user behavior or preferences, commonly employed in personalized content delivery.
- **Insights:** Meaning: Deep understanding or valuable information gained through the analysis of large datasets, often used in the context of business intelligence or research.
- **Detection:** Meaning: The process of identifying or recognizing anomalies, patterns, or deviations in data, often used for identifying irregularities or potential issues.

4. Reading:

The Basics of Machine Learning

Now that we have a machine learning definition in place, let's look at some of the very basics of this fascinating field. To keep things accessible for all, we'll not delve too deeply into the mechanics behind the concept. However, we will include useful links and courses to more detailed reading where appropriate.

A good place to start is with an explanation of how machine learning algorithms work. There is a fairly famous quote that does exactly that. It comes from Tom Mitchell, an American professor and expert in machine learning. He explains the machine learning meaning in the following terms:

'A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E.'

Let's break that down a little more with an example. Let's say you want a machine learning program to predict weather patterns in a particular area (task T). You can feed past weather pattern data (experience E) through your algorithm. If your algorithm is successful in learning, it will be able to more accurately predict weather patterns (performance measure P). Of course, there isn't just one type of algorithm you can use to apply to everything. In reality, there are thousands of highly specialized tools and programs developed for all kinds of real-world problems.

The main types of machine learning algorithms

Now that we've answered 'what is machine learning?' in basic terms, let's take a look at some of the different types of machine learning algorithms. As we've mentioned, there is a whole host of different ones out there. Here, we'll cover some of the machine learning basics.

Many problems that ML sets out to solve require a bespoke approach. As such, the types of instructions needed for each will be very different. However, there are generally four main categories that these algorithms fall into:

Supervised learning

With this method of machine learning, you train the algorithm using a labelled set of data to learn from. So, there are already some known answers, and it can determine whether new data matches it. As it produces results, it can evaluate them based on information you've already provided. The more data you give it initially, the more it knows about unseen data.

Unsupervised learning

In this type of machine learning algorithm, the programme is trained with data that isn't labeled. It doesn't know what the data represents. Instead, the computer detects patterns, finds rules within it, and summarizes where there are relationships in the data.

Semi-supervised learning

As you might expect, this type of algorithm uses elements of both of the above. The data you provide to teach the machine will have some labels, which is used to help process larger sets of unlabelled data.

Reinforcement learning

This method of machine learning is focused on continuous learning and reward using unlabelled data. A useful way of thinking about this concept is with video games. If a computer wins a game, it receives positive feedback.
It can then continue refining the moves it takes to win the game to become more effective. Often, this means replaying it many thousands or millions of times and getting feedback on each.

What is machine learning used for?

You probably come into contact with machine learning algorithms on a daily basis without realizing it. What's more, we've only just started to scratch the surface of what machine learning and deep learning can do.

If you're wondering what machine learning is used for, we've highlighted just a few the creative ways you might encounter the technology:

Automation. Perhaps the most high-profile machine learning use is in the automation of tasks humans usually perform. The ability for a computer to think and act without being programmed has incredible potential.

Recommendations. Based on previous input data, machine learning can recommend products and services that users or customers might like. This is perhaps one of the most common forms of machine learning you'll see in your day-to-day life.

Insights. Machine learning algorithms can process and analyse huge sets of data. Often used in the field of big data, such insights can help businesses understand their customers and healthcare professionals understand their patients.

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Detection. The way that machine learning works makes it ideal for spotting anomalies in patterns. As algorithms learn what 'normal' is, they become more adept at detecting when things go wrong.

These are just a small sample of the types of areas where machine learning is being used. Excitingly, it's a field that's still relatively young. As computing power increases and algorithms become more complex, we'll see many more uses for machine learning.

Examples of machine learning

To give a clearer picture of how machine learning is being used today, let's explore some real-life instances of the technology at work. Some of these machine learning examples are ones you may have encountered directly, while others may impact you in ways you've never noticed.

Search engines

Search engines like Google use machine learning in a variety of different ways. By watching how users respond to the results displayed when you make a search, algorithms can refine which pages are displayed. The Google RankBrain algorithm assesses what users might be looking for when they make a search.

Understanding this type of algorithm plays an essential part in things like Search Engine Optimisation (SEO) and other forms of digital marketing. It also means you get useful, relevant and high-quality results when you search online.

Speech recognition

Virtual personal assistants have been around for a while now. With services like Siri, Alexa, and Google Now, you can ask questions, set reminders, and even control various elements of your home. All of these use speech recognition and language analysis powered by machine learning.

By using deep learning algorithms and neural networks, these digital assistants can perform a whole host of functions. Often, the more data they gather from people speaking, the more accurate they become.

Fraud detection

As many of our financial services move to digital platforms, the risk of fraud and scams increases. To combat such issues, machine learning algorithms have been devised. These programs work on large data sets to find correlations in user behaviour that could lead to fraud. They look at wide-scale patterns to identify anything out of the ordinary.

A good example of machine learning at work in reducing fraud is Danske Bank. Previously, their labor-intensive means of examining fraud created 1,200 false positives a day. They were only detecting 40% of fraud. By introducing a deep learning solution, they saved time, reduced false positives by 60%, and increased true positives by 50%.

Medical diagnosis

Another field that is producing massive amounts of data is that of healthcare. Individual patients, as well as groups of people, are creating information about diagnostics, treatments, and conditions. These big data sets can help build predictive models on a range of illnesses and their treatments.

IBM's Watson for Genomics, for example, uses AI and ML to allow clinicians to provide personalized care to cancer patients. This type of precise approach to medicine can mean more effective treatments for more people. As far as machine learning applications go, this is one of the most valuable.

Customer support

Compared to some of the other uses for machine learning on the list, this might seem a little mundane. However, it's still a great example of ML in action. By using algorithms to assess interactions between customers and companies, it's possible to create things like chatbots and virtual assistants.

These services respond to queries and simulate real conversations, improving customer experience. They can help to ensure clients receive the help they need while saving organizations time and money. Plus, the more data the chatbot or assistant receives, the more accurately it can help customers.

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Adapted from:

https://www.futurelearn.com/info/blog/what-is-machine-learning-a-beginners-guide

5. Based on the previous reading, answer the following questions in Kahoot!

- *URL for teachers:*

https://create.kahoot.it/details/b69ae92d-4d49-470b-92f2-6cd0d6a93ebf

- *URL for students:*

https://play.kahoot.it/v2/lobby?quizId=b69ae92d-4d49-470b-92f2-6cd0d6a93ebf

Students type the code given by the teacher.