Machine Learning:

Machine learning is a subset of artificial intelligence (AI) that focuses on the development of algorithms and statistical models that enable computers to perform tasks without being explicitly programmed for them. In other words, it's about creating systems that can learn from data and improve over time.

Real-life example:

Suppose you have an email application that automatically filters spam emails. Initially, you might manually code rules to identify spam, like flagging emails with certain keywords or from specific addresses. However, with machine learning, the system can learn from examples of spam and non-spam emails provided by users. Over time, it becomes more accurate at distinguishing between the two, without needing explicit programming for every possible scenario.

Deep Learning:

Deep learning is a subset of machine learning that focuses on neural networks, which are algorithms inspired by the structure and function of the human brain. Deep learning algorithms attempt to mimic the way humans learn and process information by creating layers of interconnected nodes (neurons) that process input data. Deep learning has gained significant attention due to its ability to handle large volumes of unstructured data and its success in tasks such as image and speech recognition.

Real-life example:

Consider a facial recognition system used for security purposes. In deep learning, a convolutional neural network (CNN) could be employed. Initially, the CNN is trained on a vast dataset of labeled images, learning to identify various facial features and patterns. Once trained, the system can accurately recognize faces in real-time, even in varying lighting conditions or different angles, by analyzing the features extracted at different layers of the neural network. Over time, as more data is fed into the system, it continues to improve its accuracy at recognizing faces, demonstrating the learning aspect of deep learning.