MODULE 13

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**Machine Learning:** A subset of artificial intelligence (AI) in which a computer algorithm can modify its own behavior

**Artificial Intelligence:** A computer system able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages

**Amazon SageMaker:** Provides every developer and data scientist with the ability to build, train, and deploy ML models quickly

**Deep Learning:** An AI learning process; the process of the AI scanning the artificial neural network

**AWS DeepRacer:** A fully autonomous, 1/18th-scale race car driven by reinforcement learning, a 3D racing simulator, and a global racing league

**AWS DeepLens:** A fully programmable video camera, with tutorials, code, and pretrained models designed to expand ML skills

**Neural network:** A model or algorithm that is designed to make decisions in a way similar to a human brain

For businesses, ML and AI can mean getting a head start on business intelligence and future-proofing a company. It can also be used to improve security, data analytics, and income projections. There are multiple methods to approaching ML.

* **Supervised ML:** Supervised ML starts with training data that includes the required output to adjust the ML algorithm. Supervised ML algorithms are divided into two categories, ****classification**** and ****regression:****
  + ****Classification:**** Classification algorithms examine an input and choose a response from specific preset choices. For example, an algorithm might be trained to classify emails as spam or not spam.
  + **Regression:** Regression algorithms are trained to assign a value, or a number, to an input. For example, a weather prediction regression might be trained to give a predicted temperature for a given date in the future.
* **Unsupervised ML:** Unsupervised machine learning starts with training data that does not include the desired output. Unsupervised machine learning algorithms can examine input and group related items together into groups called clusters. The clusters are not predefined or labeled, but are inferred by the algorithm during the training process.
* **Semisupervised ML**:Semisupervised ML algorithms combine some features of supervised ML with some features of unsupervised ML. Usually semisupervised ML algorithms start training with a relatively small amount of labeled data and then analyze large amounts of unlabeled data to improve accuracy.
* **Reinforcement ML:** With reinforcement learning, the algorithm receives feedback to guide it to the best outcome. Reinforcement learning allows the algorithm to develop complex behaviors by refining the output through trial and error. An example of reinforcement machine learning in action is an autonomous robot that learns to stay within a driving lane by receiving a reward for proceeding in the right direction or staying inside lane markers.

In its simplest form, machine learning is finding patterns in data and making predictions on future data based on those patterns. Then, it measures the accuracy of those predictions and repeats this thousands or millions of times to more accurately predict things like weather, media recommendations, and sports outcomes.