Types of ML

Terms frequently use:

Labeled data: Data consisting of a set of training examples, where each example is a pair consisting of an input and a desired output value (also called the supervisory signal, labels, etc)
Classification: The goal is to predict discrete values, e.g. {1,0}, {True, False}, {spam, not spam}.
Regression: The goal is to predict continuous values, e.g. home prices.

Supervised Learning

- Supervised learning algorithms try to model relationships and dependencies between the target prediction output and the input features such that we can predict the output values for new data based on those relationships which it learned from the previous data sets.

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Predictive Model
we have labeled data
The main types of supervised learning problems include regression and classification problems

List of Common Algorithms
Nearest Neighbor
Naive Bayes
Decision Trees
Linear Regression
Support Vector Machines (SVM)
Neural Networks

Un-supervised Learning

Are the family of machine learning algorithms which are mainly used in pattern detection and descriptive modeling. However, there are no output categories or labels here based on which the algorithm can try to model relationships. These algorithms try to use techniques on the input data to mine for rules, detect patterns, and summarize and group the data points which help in deriving meaningful insights and describe the data better to the users.

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- Descriptive Model
- The main types of unsupervised learning algorithms include Clustering algorithms and Association rule learning algorithms.

List of Common Algorithms

- Clustering, Association Rules
- Anomoly Detection
- Dimensionality Reduction(Feature Extraction, Visualization

Semi-supervised Learning

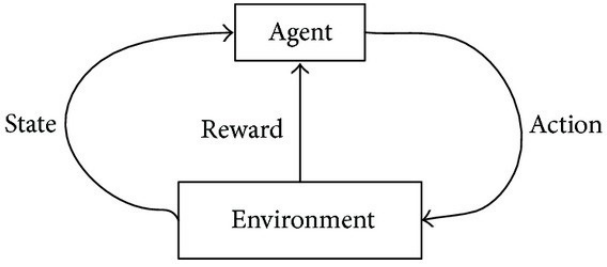
Semi-supervised learning falls in between these two. In many practical situations, the cost to label is quite high, since it requires skilled human experts to do that. So, in the absence of labels in the majority of the observations but present in few, semi-supervised algorithms are the best candidates for the model building. These methods exploit the idea that even though the group memberships of the unlabeled data are unknown, this data carries important information about the group parameters.

In Google Photos...
New Photos -> Unsuperviesd
then supervised for same type

Reinforcement Learning

Reinforcement learning algorithm (called the agent) continuously learns from the environment in an iterative fashion. In the process, the agent learns from its experiences of the environment until it explores the full range of possible states.

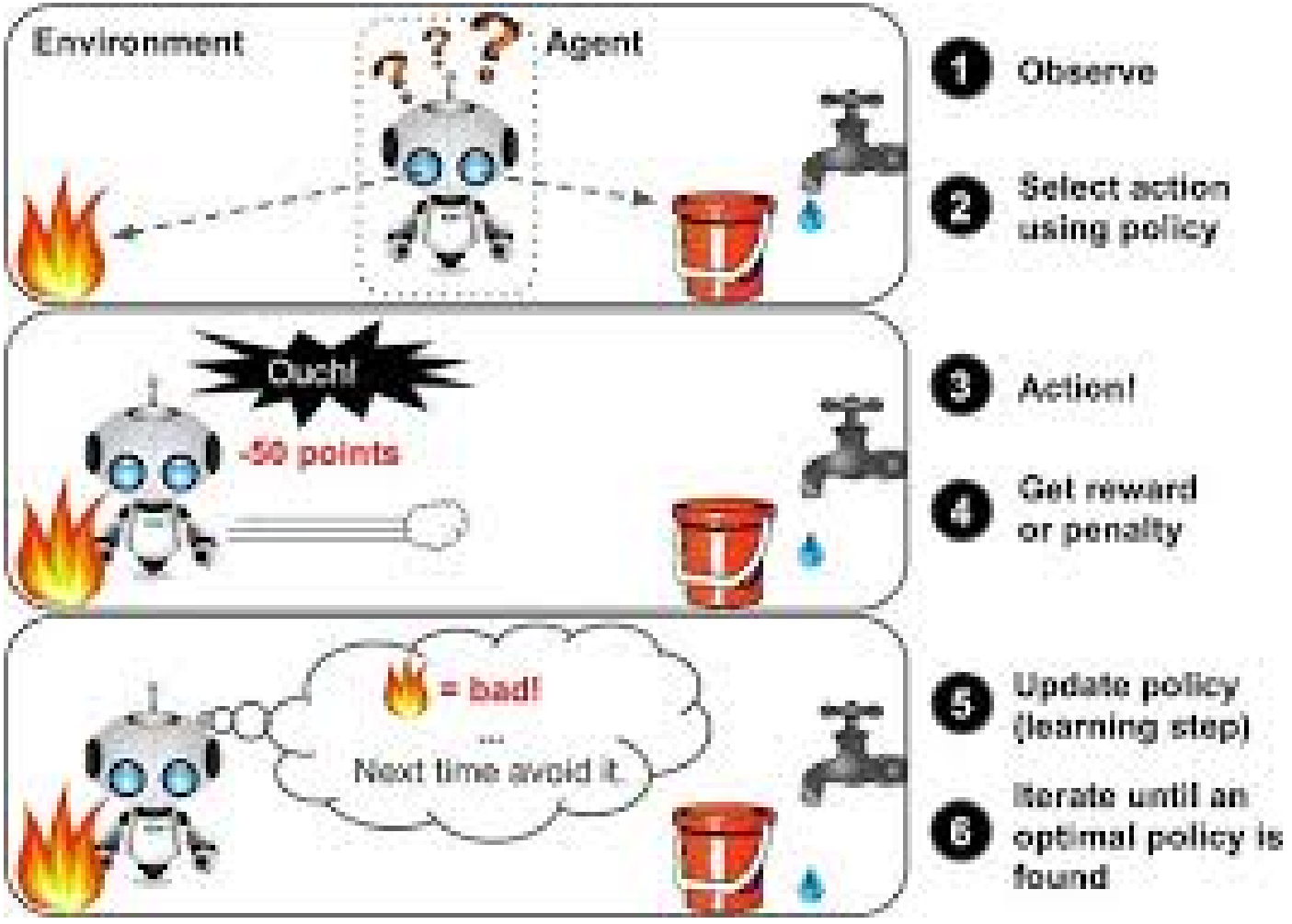
It allows machines and software agents to automatically determine the ideal behavior within a specific context, in order to maximize its performance. Simple reward feedback is required for the agent to learn its behavior; this is known as the reinforcement signal.



In order to produce intelligent programs (also called agents->Algo), reinforcement learning goes through the following steps:

1. Input state is observed by the agent.
2. Decision making function is used to make the agent perform an action.
3. After the action is performed, the agent receives reward or reinforcement from the environment.
4. The state-action pair information about the reward is stored.

Reinforcement Learning



Use cases:

Some applications of the reinforcement learning algorithms are computer played board games (Chess, Go), robotic hands, and self-driving cars.