**MACHINE LEARNING**çizgi film, Animasyon, ekran görüntüsü, kırpıntı çizim içeren bir resim

Açıklama otomatik olarak oluşturuldumetin, daire, logo, yazı tipi içeren bir resim

Açıklama otomatik olarak oluşturuldu

Tom Michell – one of the founders of ML

**Definition** : If it’s performance on T, as measured by P, improves with E, then it is learning.

* Task 🡪 recommending a song
* Experience (data) 🡪
* Performance measure

**Learning Approaches**

1. Supervised Learning: learning with **labeled** data (training set). -> **classification** and **regression**
2. Unsupervised Learning: discovering patterns in **unlabeled** data. -> **clustering**
3. Semi-Supervised Learning: labeled and unlabeled data.
4. Reinforcement Learning: kearning based on **feedback**

**Supervised Learning**

\* uses **classification** and **regression** algorithms (Linear, Nonlinear classifier)

Regression: predict salary from age / credit amount

Classification: predict class of data / receive credit or not

\* datayı önceden bilinen classlara ayırıyor. 2 class=binary classifier, 3=multiclass

– K-nearest neighbours, Support vector machines, Neural networks, Decision trees, Naive bayes

**K-Nearest Neighbours (K-NN)**

-similarity between nighbours -value of k is very important

Uses euclidian distance to find nearest neighbours

Euclidian distance küçükse, daha benzerdir

approachs used euclidian distance: Majority(4 out of 5), Weighted distance

**Linear Regression**

Just works in binary classification – 2 choice (not works in multiclass)

**Logistic Regression** (actually it is CLASSIFICATION method)

Gradient descent

In loss function(bowl), start at some point and gradually descent the error values,

so we obtain 0 slope point=global minimum point=convergence

“Kayıp fonksiyonunda (kase), bir noktadan başlayın ve hata değerlerini kademeli olarak azaltın,

böylece 0 eğim noktası = minimum nokta elde ederiz”

regression sonunda yapılıyor

**Tree Classifiers (Decision Trees)**

No need to 2d data, no need to turn into numerical features

Just uses categorical features

Not builds function

\*C4.5 entropy

Overfitting – fits all training data – makine ezberlemesi - train setini çok iyi öğrenmiş, test verilerini iyi sınıflandıramıyor

Underfitting – training seti bile classify edemiyor

**Unsupervised Learning**

\* uses **clustering** algorithms (cannot classify)

– K means, Gaussian mixtures, Hierarchical clus., Spectral clus.

Feature engineering: all futures are not useful, they eliminate them.