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Supervised Machine Learning – Part 2



Mihir Thakkar

Founder and Instructor
hello@codeheroku.com

SESSION OBJECTIVES

- Quick Recap
- Categories of ML Algorithms
- Build a Naive Bayes Classifier

Supervised Machine Learning

Features

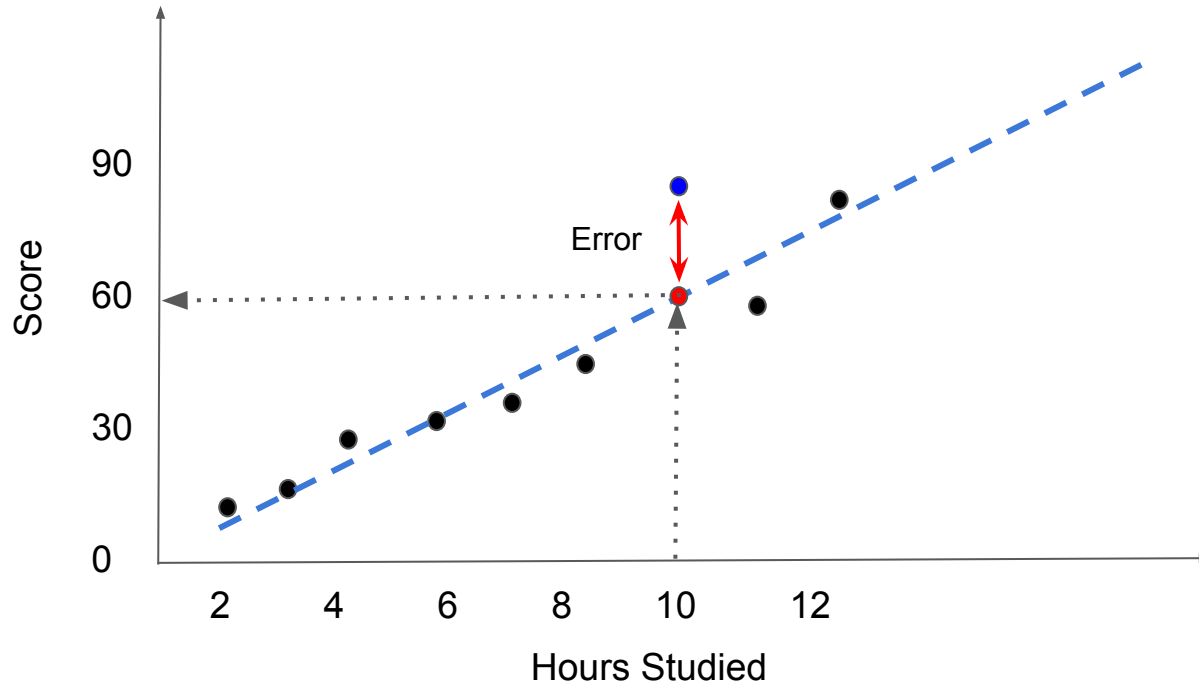
House Size (Sq feet)	Location	Age (years)	Prize (Lakh Rs)
500	Mumbai	2	70
1500	Pune	3	100
2000	Banglore	4	60
1000	Mumbai	2	?
3000	Pune	10	?

} Training Data

} Test Data

Linear Regression

E.g. Predict the score of a student based on number of hours studied



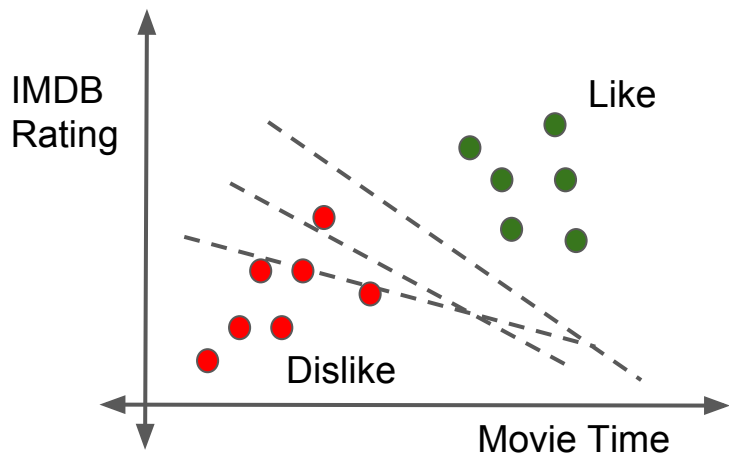
① Create a Model

$$y = M * x + B$$

Predicted Score for
10 hours studied = **60**

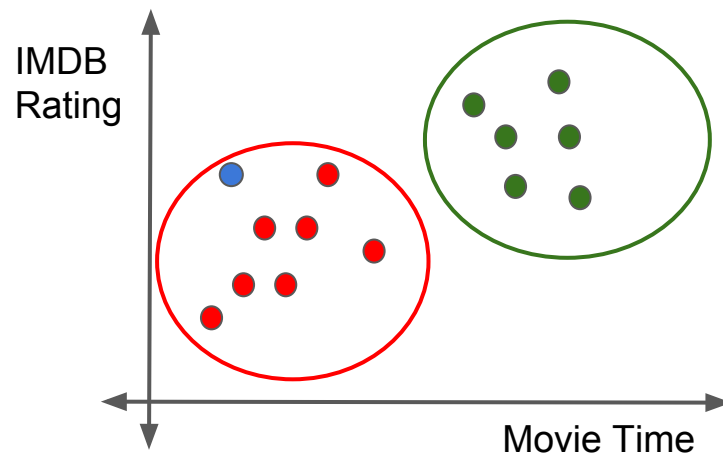
Categories of Machine Learning Algorithms

① Discriminative



E.g. Linear Regression

② Generative



E.g. Naive Bayes Classifier

Naive Bayes Algorithm

$$P(S) = 0.5$$

Survive

1st Class = 0.6 Male = 0.5

2nd Class = 0.3 Female = 0.4

Will a Male
with 1st Class \Rightarrow
Survive?

$$0.6 \times 0.5 \times 0.5 \\ = \underline{\underline{0.15}}$$

$$P(NS) = 0.5$$

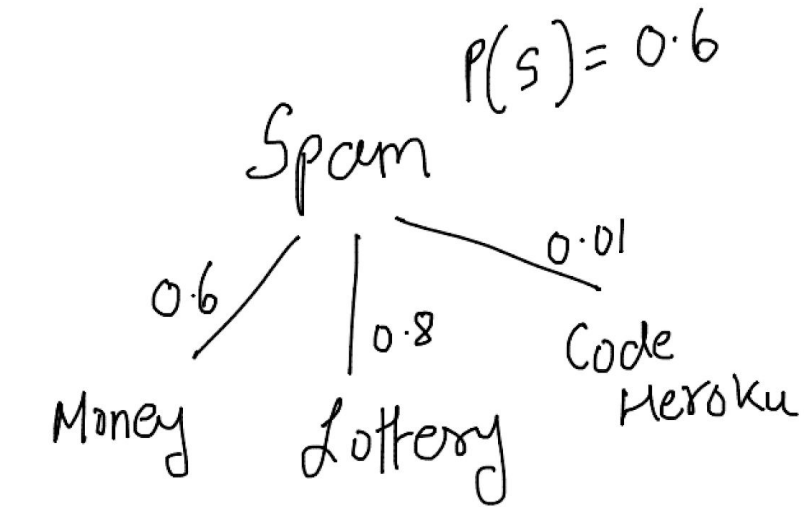
Not Survive

1st Class = 0.4 Male = 0.5

2nd Class = 0.7 Female = 0.6

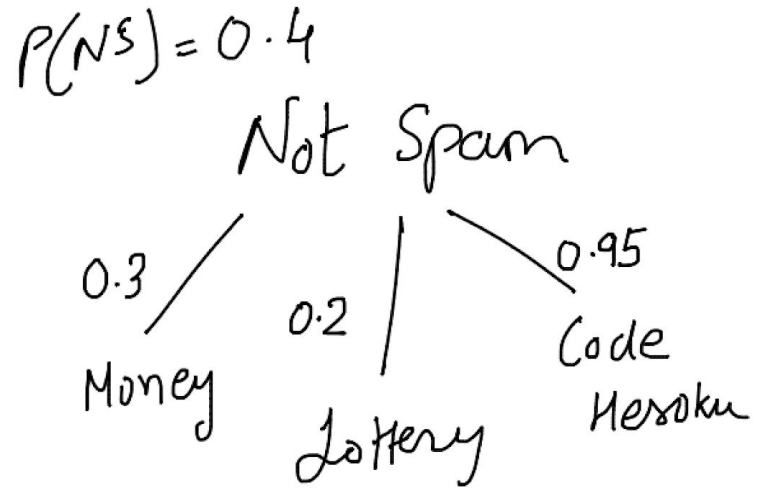
$$0.4 \times 0.5 \times 0.5 \\ = 0.1$$

Naive Bayes Algorithm



Code Heroku }
Money }

$$0.6 \times 0.01 \times 0.6$$
$$= 0.0036$$



$$0.3 \times 0.95 \times 0.4$$
$$= \underline{\underline{0.114}}$$

Why is Naive Bayes,
called Naive?

Advantages of Naive Bayes

- Simple and Easy to Implement
- Executes Quickly
- Scales for Real-time Use Cases and Massive Data Sets

QUIZ

Naive Bayes Algorithm is best suitable for cases where:

1. Speed of algorithm is critical
2. Accuracy of classification is critical

Setup Environment

<http://www.codeheroku.com/post?name=Python%20Libraries%20Installation>

```
pip install numpy matplotlib pandas scikit-learn scipy
```

<http://www.codeheroku.com/static/workshop/code/supervised-ml/naive-bayes.zip>

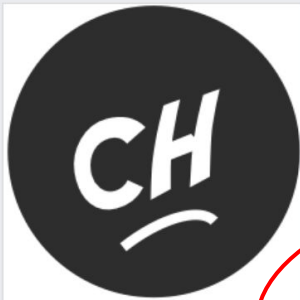
Ham or Spam Email Classification

<http://www.codeheroku.com/static/workshop/hw/supervised-ml/spam.csv>

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