## Naïve Bayes

Terminology:

* Probabilistic Experimental: Occurrence outcome not known
* Sample space – Set of possible outcomes
* Event – any subset of sample space
* Elementary event – A subset of sample space containing only one element
* Probability: Likelihood that an event will occur

Basic theory:

* P(E) is sum of probabilities of elementary events whose outcomes are in E
* Die:
  + Sample space {1, 2, 3, 4, 5, 6}
  + P(odd number) = 1/6 + 1/6 + 1/6 = 3/6 = ½

Conditional Probability:

* If E and F independent, probabiitie they both happen is product
  + P(E, F) = P(E) \* P(F)
* If not independent, (and P(F) != 0), then the probability of E, conditional on F is:
  + P(E|F) = P(E, F) / P(F)
* If E and F are independent then:
  + P(E|F) = P(E, F) / P(F) = P(E) \* P(F) / P(F) = P(E) (didn’t matter what happened to F)

Bayes Theorem:

* How to get probability of event E conditional on F, when we only have probability of F, conditional on E occurring
* P(E|F) = P(F|E) \* P(E) / P(F)