TYPES:

Frequentist probability:

Rate at which event occurs.

Bayesian probability:

Quantitative level of certainty.

DISTRIBUTIONS:

UNIFORM DISTRIBUTION:

$$P(x = x_i) = 1/k.$$

$$U(x : a, b) = 0 \quad \forall\ x \notin [a,b]$$

$$U(x : a, b) = \frac{1}{b-a} \quad \forall\ x \in [a,b]$$

BERNOULLI DISTRIBUTION:

$$P(x = 1) = \phi$$

$$P(x = 0) = 1 - \phi$$

$$P(x = x) = \phi^{x} (1-\phi)^{1-x}$$

$$E_x[x] = \phi$$

$$Var_x(x) = \phi(1-\phi)$$

GAUSSIAN DISTRIBUTION:

$$N(x : \mu, \sigma^2) = \sqrt{\frac{1}{2\pi\sigma^2}} \; e^{\left(-(x-\mu)^2/2\sigma^2\right)}$$

$$N(x : \mu, \Sigma) = \frac{1}{\sqrt{(2\pi)^n \det(\Sigma)}} \; e^{-\frac{1}{2}(x-\mu)^T \Sigma^{-1} (x-\mu)}$$

VARIANCE:

$$Var(f(x)) = E[(f(x) - E(f(x))^2]$$

$$E(f(x)) = \int p(x) f(x) dx$$

COVARIANCE:

$$Cov(f(x), g(y)) = E[f(x) - E(f(x))] [g(y) - E(g(y))]$$

→ +ve → both ↑ together

→ -ve → opposite high/low

→ high → away from mean.

independent → cov = 0

else → may or may not be 0.