**Summary: Statistics and Probability**

**Probability**

Probability is a number between 0 and 1 that expresses how probable an event is.

**Random Variables**

Represent outcomes of random processes.

**Discrete Distribution**

Probability of each event is described by a function p(X) where the sum of all probabilities is 1. An example is the uniform distribution where each outcome has equal probability.

**Continuous Distribution**

Described by a probability density function p(x). For a given interval [t1,t2] the probability is calculated using an integral of p(x) over that interval.

**Mean**

Average value of a random variable's outcomes.

**Variance**

Measures how spread out the values are from the mean.

**Standard Deviation**

Square root of the variance, representing the average distance from the mean.

**Mode**

Most frequently occurring value.

**Median**

Middle value in a dataset.

**Quartiles**

Divide data into four parts. The first quartile (Q1) is the 25th percentile, and the third quartile (Q3) is the 75th percentile. The interquartile range (IQR) is Q3−Q1.

**Covariance**

Measures how two variables change together.

**Correlation**

Normalized measure of covariance, ranging from -1 to 1, indicating the strength and direction of a relationship between variables.

This is a short summary of what I have learned in Statistics and Probability Task.