**Machine learning**

**Supervised Learning**

1. **Regression**

Regression analysis is powerful statistical method that allow us to examine the relationship between two or more variables of interest. There are many types of regression analysis, at their core they all examine the influence of one or more independent variables on a dependent variable.

**Regression analysis provides detailed insights that can be applied to further improve products and services.**

Regression analysis is a reliable method of identify which variables have impact on a topic of interest. The process of performing a regression allows you to confidently determines which factors matter most, which factors can be ignored, and how these factors influence each other.

**DEPENDENT VARIABLE:**

This is the main factor that you’re trying to understand or predict

**INDEPENDENT VARIABLE:**

These are the factors that you hypothesize have an impact on your dependent variable.

1. **TYPES OF REGRESSION**:
2. Linear Regression
3. Ridge Regression
4. Lasso Regression
5. Elastic Regression
6. Decision Tree Regressor
7. Random Forest Regressor
8. Support Vector Machines(Support Vector Regressor)
9. **APPLICATIONS OF REGRESSION:**
10. **Predictive Analytics:** [Predictive analytics](https://www.newgenapps.com/technology/predictive-analytics) i.e. forecasting future opportunities and risks is the most prominent application of regression analysis in business. Demand analysis, for instance, predicts the number of items which a consumer will probably purchase. However, demand is not the only dependent variable when it comes to business. Regression analysis can go far beyond forecasting impact on direct revenue. For example, we can forecast the number of shoppers who will pass in front of a particular billboard and use that data to estimate the maximum to bid for an advertisement. Insurance companies heavily rely on regression analysis to estimate the credit standing of policyholders and a possible number of claims in a given time period
11. **Operation Efficiency:** Regression models can also be used to optimize business processes. A factory manager, for example, can create a statistical model to understand the impact of oven temperature on the shelf life of the cookies baked in those ovens. In a call center, we can analyze the relationship between wait times of callers and number of complaints. Data-driven decision making eliminates guesswork, hypothesis and corporate politics from decision making. This improves the business performance by highlighting the areas that have the maximum impact on the operational efficiency and revenues.
12. **Support Decision:** Businesses today are overloaded with data on finances, operations and customer purchases. Increasingly, executives are now leaning on data analytics to make informed business decisions thus eliminating the intuition and gut feel. Regression analysis can bring a scientific angle to the management of any businesses. By reducing the tremendous amount of raw data into actionable information, regression analysis leads the way to smarter and more accurate decisions. This does not mean that regression analysis is an end to managers creative thinking. This technique acts as a perfect tool to test a hypothesis before diving into execution.
13. **Correcting Errors**: Regression is not only great for lending empirical support to management decisions but also for identifying errors in judgment. For example, a retail store manager may believe that extending shopping hours will greatly increase sales. Regression analysis, however, may indicate that the increase in revenue might not be sufficient to support the rise in operating expenses due to longer working hours (such as additional employee labor charges). Hence, regression analysis can provide quantitative support for decisions and prevent mistakes due to manager's intuitions.
14. **New Insights:** Over time businesses have gathered a large volume of unorganized data that has the potential to yield valuable insights. However, this data is useless without proper analysis. Regression analysis techniques can find a relationship between different variables by uncovering patterns that were previously unnoticed. For example, analysis of data from point of sales systems and purchase accounts may highlight market patterns like increase in demand on certain days of the week or at certain times of the year. You can maintain optimal stock and personnel before a spike in demand arises by acknowledging these insights.