ENSEMBLE LEARNING  
*End to End Understanding*



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# Introduction

The concept of building a model is not a new topic. Many people who enter Data Science might feel like they are about to work on something entirely new. We build models every day.

Let's say we are trying to be fit by controlling our diet. That is the example we will be taking all along this detailed walkthrough. Your mother might suggest reducing the quantity of food you eat, but make sure that you eat breakfast, lunch and dinner. You might have friends that say that intermittent fasting is the best way to go about it. Another friend might suggest a keto diet to optimise the number of macronutrients your body is getting. So, in theory, all of these are the possible models that might work for your use case. The question is, are you going to trust one model? Perhaps a better approach might be some combination of these suggestions that work best for you.

That's it. That is the concept of ensemble models.

It is important to note that only the best models don't need to be used in an ensemble model. Instead, it should work for the problem at hand that we are trying to solve.

Some of the best models that are implemented on Kaggle are ensemble models. It makes people uneasy when they do not know much about this topic. Read this blog. Read it all the way through, and whether you are a business user or a tech person or even just curious, you will understand models end to end. Do not hesitate to reach out to [us](https://www.dezyre.com/contact-us) if you want to learn how to become a Data Scientist or perfect the tools that a Data Scientist uses **in the** **real world**.

# 1 What is Ensemble Learning?

Ensemble Learning is the process where various models are combined to get better results.

The concepts that we will discuss are easy to grasp. From the introduction, we have an intuition about Ensemble models. The core idea is that the result obtained from a combination of models can be more accurate than any single member in the group.

Let's go over the previous example. We were discussing what the best method to get fit by controlling our diet is. Essentially, all of the suggested methods are ways to optimise calorie intake. Each method has different yet effective ways of getting good results. Combining the processes in the right way will help get the most out of the entire exercise.

Imagine a model to be a person who analyses patterns and suggests what you can do next. In the example we have taken, each person can be considered a model who, based on their previous experience, indicates the best way to get fit. Models can also be called learners. Each learner is considered "weak" on their own. However, when multiple weak learners are combined in some form or the other, it forms a robust model. This strong model is what we will be calling an ensemble model. This in no way means that each model is not adequate. Instead, each model might perform well on some data and less accurately on others. When the models are combined, they cancel out each other's weakness. This is the premise of ensemble models.

# 2 Why use Ensemble Learning?

In short, we use ensemble models because they tend to give better results. It's unfair to put the pressure of getting the best possible result on a single model. Even if the model provides good results on a particular dataset, we might see varied performance on other datasets.

Go back to college. You have some great teachers and some who are not. Now, let's say that you are trying to optimise your marks in discrete mathematics. There are three teachers – one who teaches the best and has the best video lectures, one who hints to the class the questions that might come in the upcoming exams and one who gives the best notes. Choosing any one of these teachers has advantages and disadvantages. The most optimal approach is to apply an ensemble method to this scenario and mix the offerings by all three teachers to optimise your marks in discrete mathematics.

All right, it's been fun understanding the ins and outs of ensemble modelling. Let's get to business now. Even though I am not a fan of jargons, it is the language the world prefers and understands. To be able to talk about Data Science, we will go through the ensemble models in particular. Remember, if you would like to work on *solved* end to end Data Science Projects, you can reach out to us for this or anything else [here](https://www.dezyre.com/contact-us).

# 3 Types of Ensemble Methods

## 3.1 Max Voting

## 3.2 Averaging

## 3.3 Weighted Average

## 3.4 Bagging

## 3.5 Boosting

## 3.6 Stacking

## 3.7 Blending

# 4. Can Ensemble Learning be used for both regression and classification problems?

# 5. How do these ensemble learning techniques help improve the performance of the machine learning model?

# 6 Key Takeaways