



INSTITUTO TECNOLÓGICO DE TIJUANA  
DEPARTAMENTO DE SISTEMAS Y COMPUTACIÓN  
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**CARRERA:**

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**MATERIA:**

Datos Masivos

**UNIDAD POR EVALUAR:**

Unidad II

**TRABAJO A EVALUAR:**

Homework 3 Pipeline, Matriz of confusion

**NOMBRE DEL ESTUDIANTE**

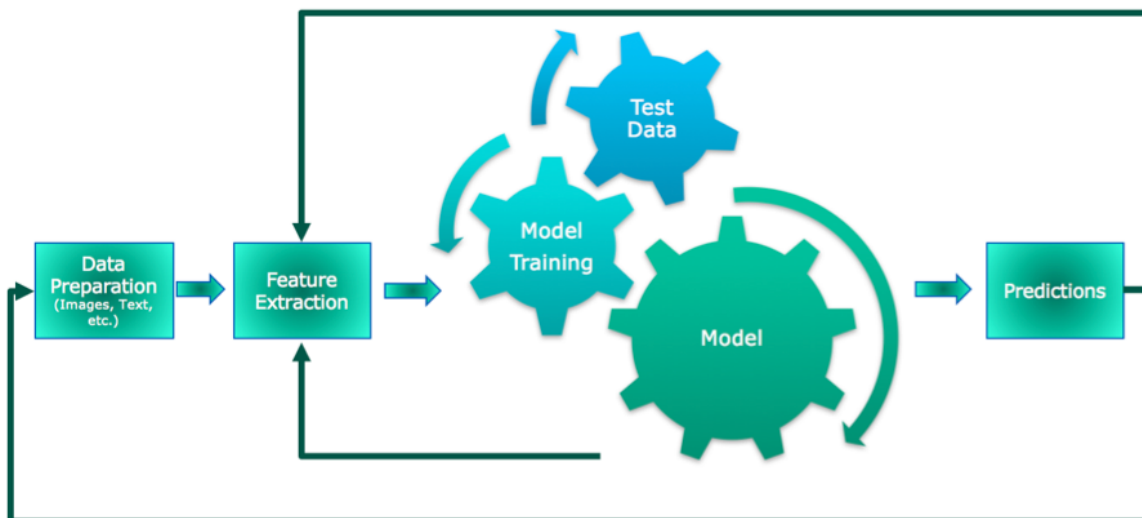
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## Investigate Pipeline, Matriz of confusion

### Pipeline in Machine Learning

A machine learning pipeline is used to help automate machine learning workflows. They operate by enabling a sequence of data to be transformed and correlated together in a model that can be tested and evaluated to achieve an outcome, whether positive or negative. Machine learning (ML) pipelines consist of several steps to train a model. Machine learning pipelines are iterative as every step is repeated to continuously improve the accuracy of the model and achieve a successful algorithm.

### A Standard Machine Learning Pipeline



It's not just about storing data any longer, but capturing, preserving, accessing and transforming it to take advantage of its possibilities and the value it can deliver.

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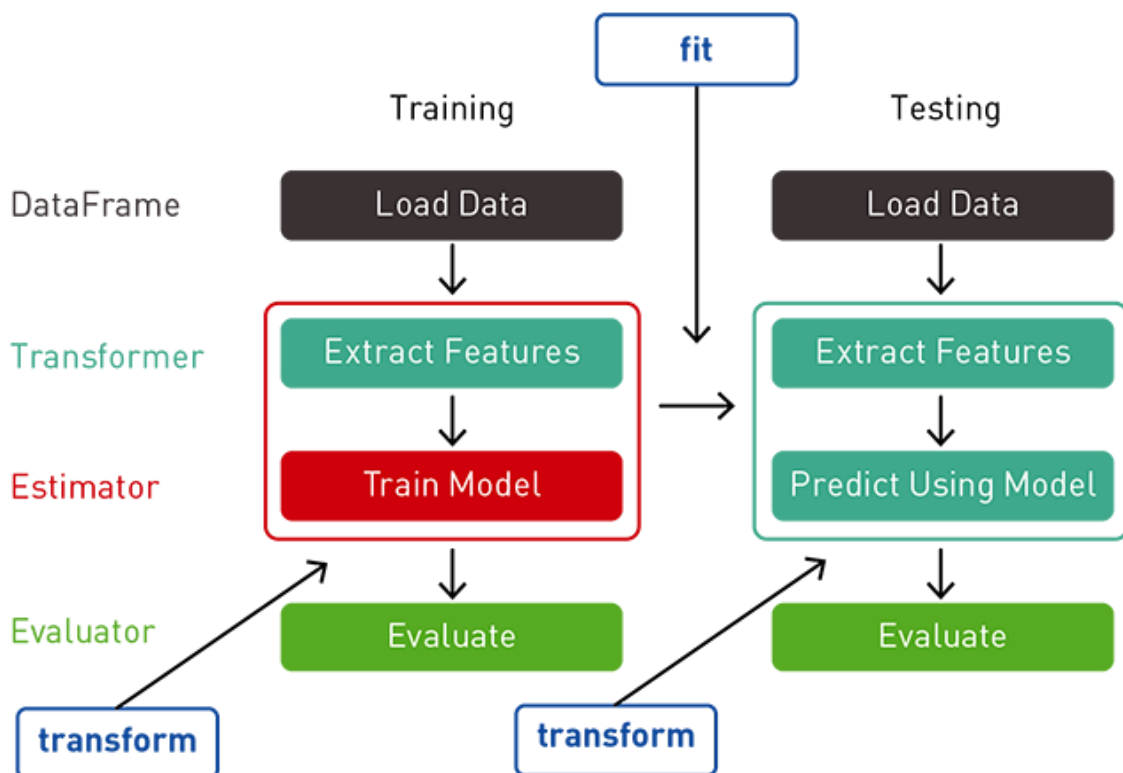
- The learning algorithm finds patterns in the training data that map the input data attributes to the target
- model can have many dependencies and to store all the components to make sure all features available both offline and online for deployment
- A pipeline consists of a sequence of components which are a compilation of computations.

## Challenges Associated with ML Pipelines

A typical machine learning pipeline would consist of the following processes:

- Data collection
- Data cleaning
- Feature extraction (labelling and dimensionality reduction)
- Model validation
- Visualisation

## Spark ML Workflow





Data collection and cleaning are the primary tasks of any machine learning engineer who wants to make meaning out of data. But getting data and especially getting the right data is an uphill task in itself. Data quality and its accessibility are two main challenges one will come across in the initial stages of building a pipeline. The captured data should be pulled and put together and the benefits of collection should outweigh the costs of collection and analysis.

## Confusion matrix

In the field of machine learning and specifically the problem of statistical classification, a confusion matrix, also known as an error matrix, is a specific table layout that allows visualization of the performance of an algorithm, typically a supervised learning one (in unsupervised learning it is usually called a matching matrix). Each row of the matrix represents the instances in a predicted class while each column represents the instances in an actual class (or vice versa).

## Example

If a classification system has been trained to distinguish between cats and dogs, a confusion matrix will summarize the results of testing the algorithm for further inspection. Assuming a sample of 13 animals — 8 cats and 5 dogs — the resulting confusion matrix could look like the table below:

		Actual class	
		Cat	Dog
Predicted class	Cat	<b>5</b>	2
	Dog	3	<b>3</b>

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In this confusion matrix, of the 8 actual cats, the system predicted that three were dogs, and of the five dogs, it predicted that two were cats. All correct predictions are located in the diagonal of the table (highlighted in bold), so it is easy to visually inspect the table for prediction errors, as they will be represented by values outside the diagonal.



In abstract terms, the confusion matrix is as follows:

		Actual class	
		P	N
Predicted class	P	TP	FP
	N	FN	TN

where: P = positive; N = Negative; TP = True Positive; FP = False Positive; TN = True Negative; FN = False Negative.