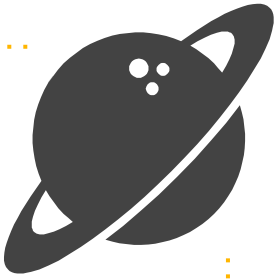
Predictive Analytics

what it is??



I am ...

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Line Up ...

1. Predictive Analytics
2. How to do that??
3. Data Science Pipeline
4. Some Examples
5. Demo

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Predictive Analytics

What it is??

What is a model??

- A representation of system using general rules and concepts
- A representation of a system that allows for investigation of the properties of the system and in some cases, prediction of future outcomes
- In Machine Learning, we built a model that gains some experience E, on task T with a performance P

Some Examples of Machine Learning models are : Predictive Model, Preventive Model, Multi class classification model, Regression Model, Segmentation Model, etc.

Predictive Modeling is the art to predict the future outcomes using data mining and probability.

Predictive Model

- Each model is based on a number of predictors which are responsible for predicting the outcome
- Once the data is collected then a statistical model is formulated
- The model can be a simple linear equation or a complex network of neurons often called as neural nets
- Some of the examples of Predictive Model are Linear Regression, Bayesian Models, Classification Models, Clustering Models, Decision Tree Models, etc.
- More complex models includes complex networks like neural nets

Predictive Analytics

Let's start predicting . . . . .

Analytics ???

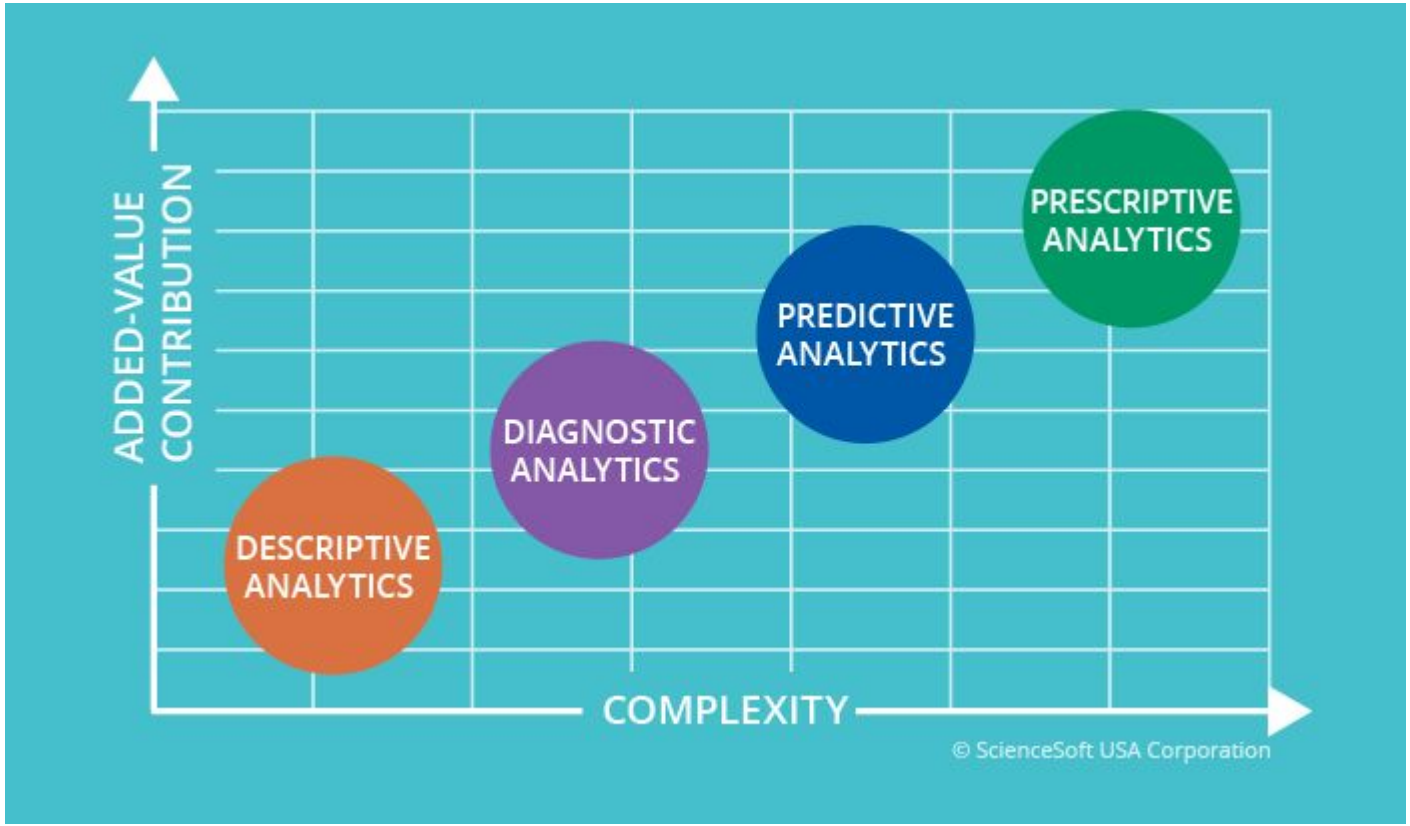
Analytics is an encompassing and multidimensional field that uses mathematics, statistics, predictive modeling and machine-learning techniques to find meaningful patterns and knowledge in recorded data.

Through Analytics we wish to know -

- What happened?
- How or why did it happen?
- What is happening now?
- What is likely to happen next ?

Types

Descriptive Analytics	Describe "what" happened in past. These are generally pre-canned reports, dashboards and MIS, operational reports etc. E.g. Profit per store, per region, sales through various channels.
Diagnostic Analytics	Look into "why" something happened. These are more advanced reports to further "slice and dice" drill down past data. It answers the questions raised by Descriptive Analytics. E.g. why did the sales go down in particular region?
Predictive Analytics	Determines what might happen in "future". This needs larger data set expertise and tool set. E.g. Which channels are likely to perform better in next quarter based on past data.
Prescriptive Analytics	Identifies the "actions" required in order to influence particular outcome. This is the more advance and complex form of analytics. E.g. Which customer segment shall be targeted next quarter to improve profitability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Predictive Analytics

A form of advanced analytics that uses both new and historical data to forecast activity, behavior and trends. It involves applying statistical analysis techniques, analytical queries and automated machine learning algorithms to data sets to create predictive models that place a numerical value -- or score -- on the likelihood of a particular event happening.

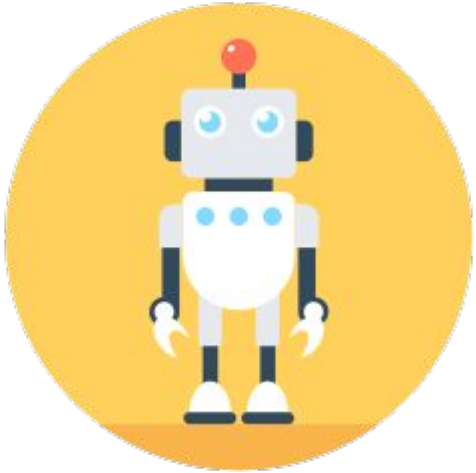
Predictive Analytics Methodologies

Predictive Analytics Relies on Strategies like :

Logistic Regression	Time Series Analysis	Decision Tree
A statistical analysis method used to predict a data value based on a prior data set	An illustration of data point at successive time point.	A graph that uses a branching method to illustrate every possible outcome of a decision.

How to do that ??

What is Machine Learning?



Machine learning is a method of data analysis that automates analytical model building.

Using algorithms that iteratively learn from data, machine learning allows computers to find hidden insights without being explicitly programmed where to look.

Machine Learning based Approach

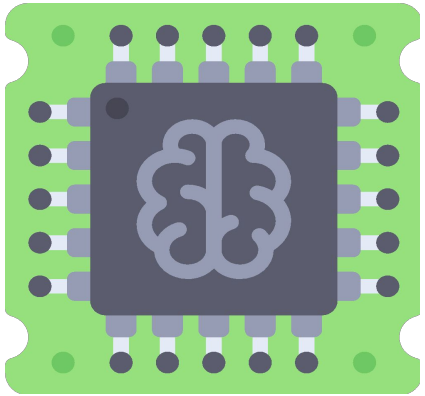
The ML based approach is similar to how humans learn

How Humans Learn

Human beings learn to identify patterns when they're exposed to a phenomenon for a prolonged period of time

Human beings learn from "**Experience**"

What is Machine Learning?



A computer program/system that can learn from "Experience"

Experience	⟷	Data
Experience	⟷	User Clicks/Views
Experience	⟷	User past Q and A
Experience	⟷	User past Travel Data

Rules are updated automatically based on data

Typical ML workflow

ML problems generally fall under a broad set of categories

Pick your problem

Represent your data

Apply an Algorithm

Classification

Regression

Recommendation

Clustering

Each type of problem has its own basic workflow

Typical ML workflow

Pick your problem

Represent your data

Apply an Algorithm

Data might be in the form of Unstructured text, Images, Videos.

Use meaningful numeric attributes to represent them.

Typical ML workflow

Pick your problem

Represent your data

Apply an Algorithm

Use an algorithm to find patterns from the historical data

Rules are meant to quantify relationships between variables

The rules together form something called a Model

A Model can be

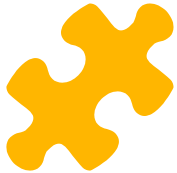
- a mathematical equation
- a set of rules (if-then-else statements)

Data Science Pipeline

The data science workflow or pipeline refers to standard activity that a data scientist refers from acquiring data to delivering final result.

1. Data Ingestion
2. Identify Nature of Dataset
3. EDA
    1. Data Visualization
    2. Clustering
    3. Statistical Analysis
    4. Anomaly Detection
    5. Cleaning

Data Science Pipeline



4. Mapping Algorithm to the Dataset
    1. Problem Identification
    2. Modeling
    3. Model Validation and fine tuning
5. Model building using Machine Learning Algorithm
6. Scaling and big data

Some Examples

Not just limited to …

- Fraud Detection
- Word Completion
- Email spam Filtering
- Financial Modeling
- Credit coring and next-best offers
- New pricing models
- Recommendation System
- Text Sentiment Analysis
- Predicting customer Churn

DEMO....

Thanks!

Any questions?

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