

Machine learning model deployment with ibm cloud watson studio

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Machine Learning (ML)

- ML is a branch of artificial intelligence:
 - Uses computing based systems to make sense out of data
 - Extracting patterns, fitting data to functions, classifying data, etc
 - ML systems can learn and improve
 - With historical data, time and experience
 - Bridges theoretical computer science and real noise data.

ML in real-life



10 active competitions

Sort By

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Predicting Red Hat Business Value


Classify customer potential

8 months to go - **Featured**

1,202 teams

1,082 members

\$50,000




Bosch Production Line Performance

Reduce manufacturing failures

8 months to go - **Featured**

88 teams

\$20,000



TalkingData Mobile User Demographics


Get to know millions of mobile device users

12 days to go - **Featured**

1,478 teams

2,446 members

\$25,000



Grupo Bimbo Inventory Demand


Maximize sales and minimize returns of bakery goods

7 days to go - **Featured**

1,955 teams

2,714 members

\$25,000



Digit Recognizer

Classify handwritten digits using the famous MNIST data

8 months to go - **Getting Started**

1,028 teams

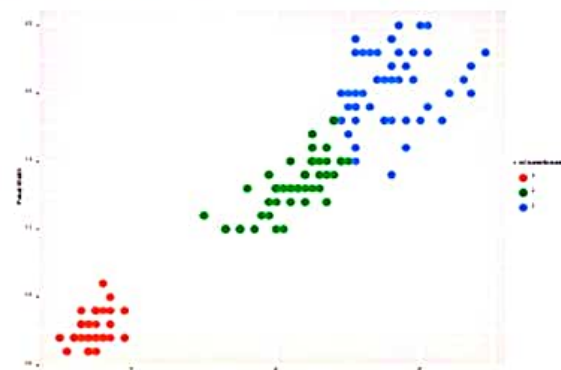
5,712 members

Knowledge

Supervised and Unsupervised Learning

- Unsupervised Learning
 - There are **not predefined and known set of outcomes**
 - Look for **hidden patterns and relations** in the data
 - A typical example: **Clustering**

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
1	5.1	3.5	1.4	0.2
2	4.9	3.0	1.4	0.2
3	4.7	3.2	1.3	0.2
4	4.6	3.1	1.5	0.2
5	5.0	3.6	1.4	0.2
6	5.4	3.9	1.7	0.4
7	4.6	3.4	1.4	0.3
8	5.0	3.4	1.5	0.2
9	4.4	2.9	1.4	0.2
10	4.9	3.1	1.5	0.1



Supervised and Unsupervised Learning

- Supervised Learning
 - For every example in the data there is **always a predefined outcome**
 - Models the **relations between a set of descriptive features and a target** (Fits data to a function)
 - 2 groups of problems:
 - **Classification**
 - **Regression**

Supervised Learning

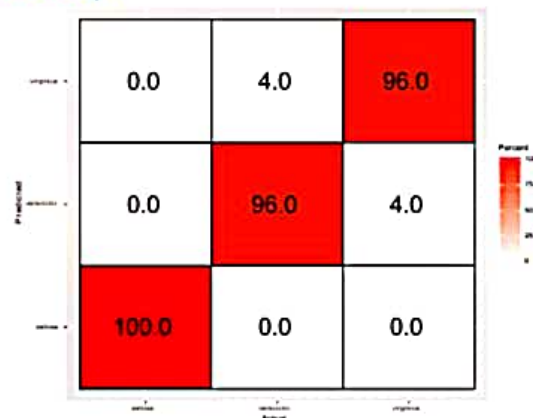
- Classification

- Predicts which class a given sample of data (sample of descriptive features) is part of (**discrete value**).

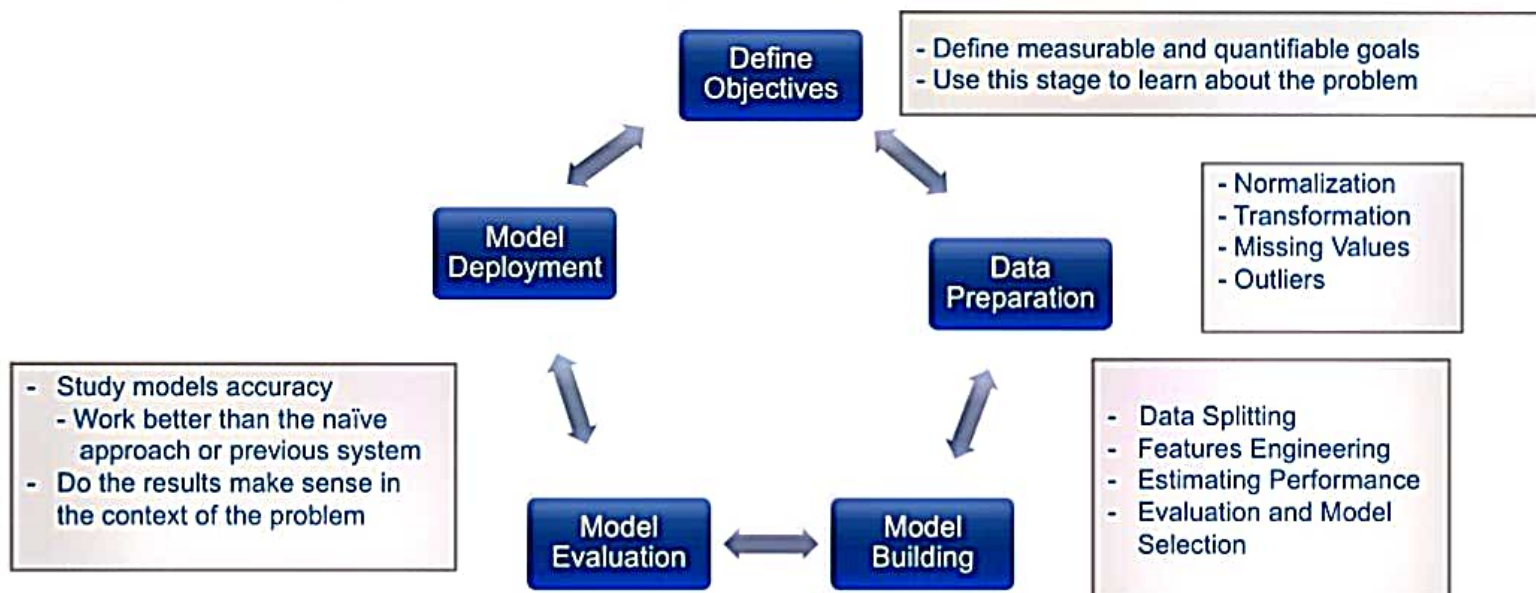
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5.0	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.3	setosa

- Regression

- Predicts continuous values.



Machine Learning as a Process



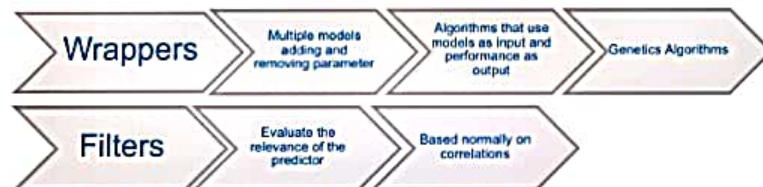
ML as a Process: Data Preparation

- Needed for several reasons
 - Some Models have strict data requirements
 - Scale of the data, data point intervals, etc
 - Some characteristics of the data may impact dramatically on the model performance
- Time on data preparation should not be underestimated



ML as a Process: Feature engineering

- Determine the predictors (features) to be used is one of the most critical questions
- Some times we need to add predictors
- Reduce Number:
 - Fewer predictors more interpretable model and less costly
 - Most of the models are affected by high dimensionality, specially for non-informative predictors



- Binning predictors

ML as a Process: Model Building

- Data Splitting
 - Allocate data to different tasks
 - model training
 - performance evaluation
 - Define Training, Validation and Test sets
- Feature Selection (Review the decision made previously)
- Estimating Performance
 - Visualization of results – discovery interesting areas of the problem space
 - Statistics and performance measures
- Evaluation and Model selection
 - The 'no free lunch' theorem no a priory assumptions can be made
 - Avoid use of favorite models if NEEDED

