Self-Organizing-Maps

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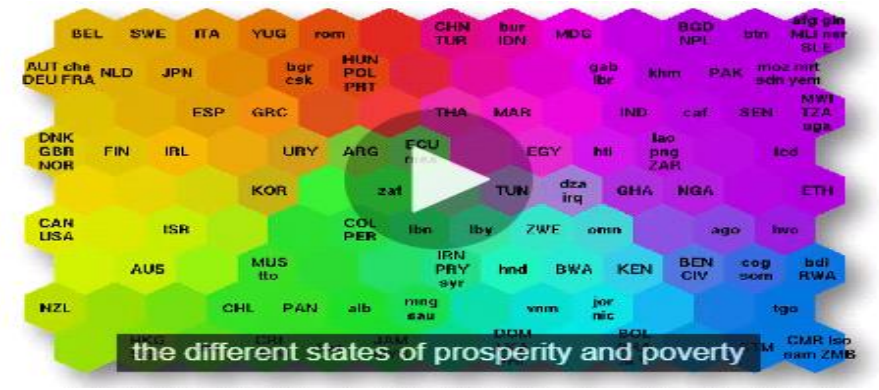
Self -Organizing Maps

- Unsupervised Technique
- Used for Feature Detection
- Used for Dimensionality Reduction

  Suppose we have a dataset having more than 100 columns so in order to reduce the dimension we use Self-Organizing Maps as now 100 columns can now be represented by maps which is only 2-Dimensional.

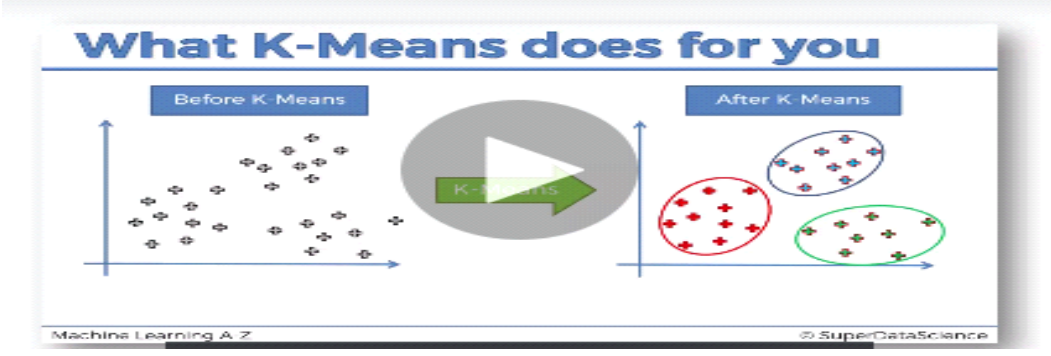


Different countries are put into clusters using Self-Organizing Maps by using different indicators. In this example 200 countries having 39 different columns are clustered by using Self-Organizing maps.

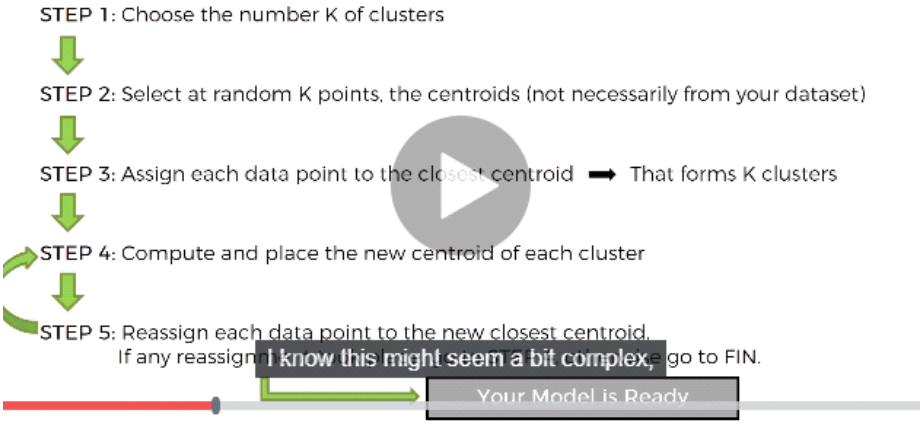
K-Means Clustering

Unsupervised Machine learning algorithm

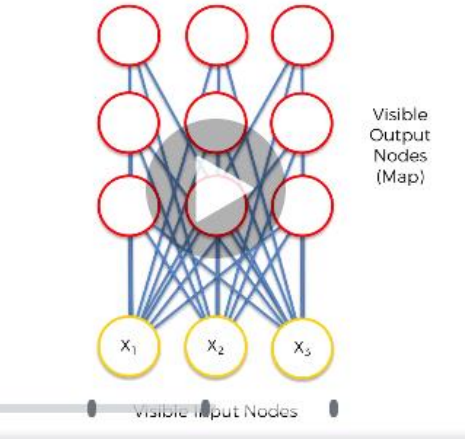
This algorithm allows us to cluster data



STEPS FOR K-Means Clustering :-

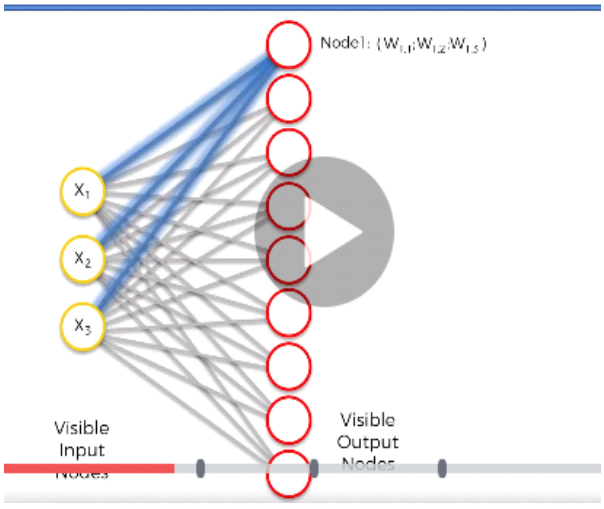


How do SOM works?

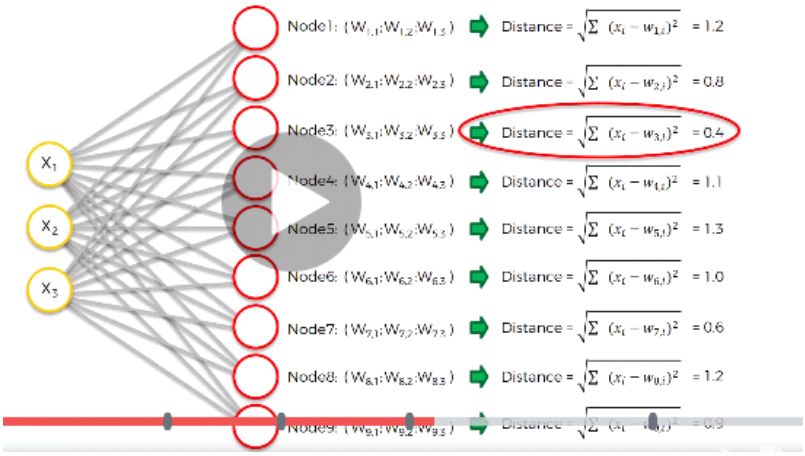


3 input nodes(3 columns) is assigned to 9 output nodes. We are converting 3-Dimensional to 2-Dimensional.

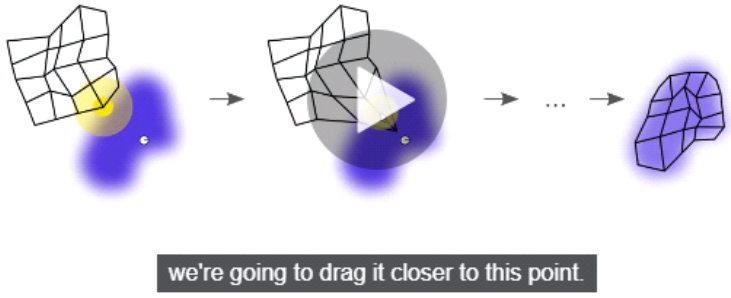
There is no activation function in SOM.
Weights are characteristics of nodes itself.



Distance of each node is calculated to see which node resembles the most with the input node.



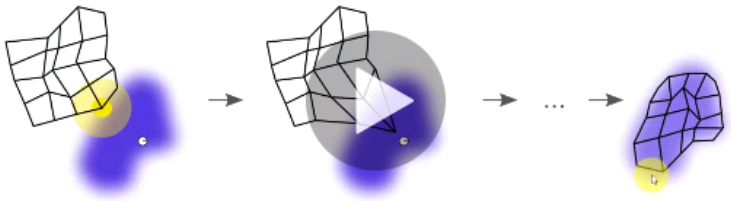
Closet Node to the first row is Node 3 in our example.
Node 3 is BMU.(Best Matching unit).
Now weights are updated.



Nodes closer to BMU has its weight updated. Nodes which fall under the radius of the BMU have their weights updated.
The closer the node are to BMU the heavier the nodes are updated.

For Each row ,BMU is found out and nodes inside the radius of the BMU are updated .

After each epoch the radius of each BMU shrinks.



in a more precise and a more laser-specific manner

Important to know:

- SOMs retain topology of the input set
- SOMs reveal correlations that are not easily identified
- SOMs classify data without supervision
- No target vector -> no backpropagation
- No lateral connections between output nodes