



Problems Machine Learning can Solve



by Ted Thompson

Outline

Repetitive Tasks Really Fast

Generate Synthetic data

Outline

Predict

Cluster/organize

Summarize

Generate Synthetic data



Predict



Predict

Weather

Price

Sentiment

Position

Label

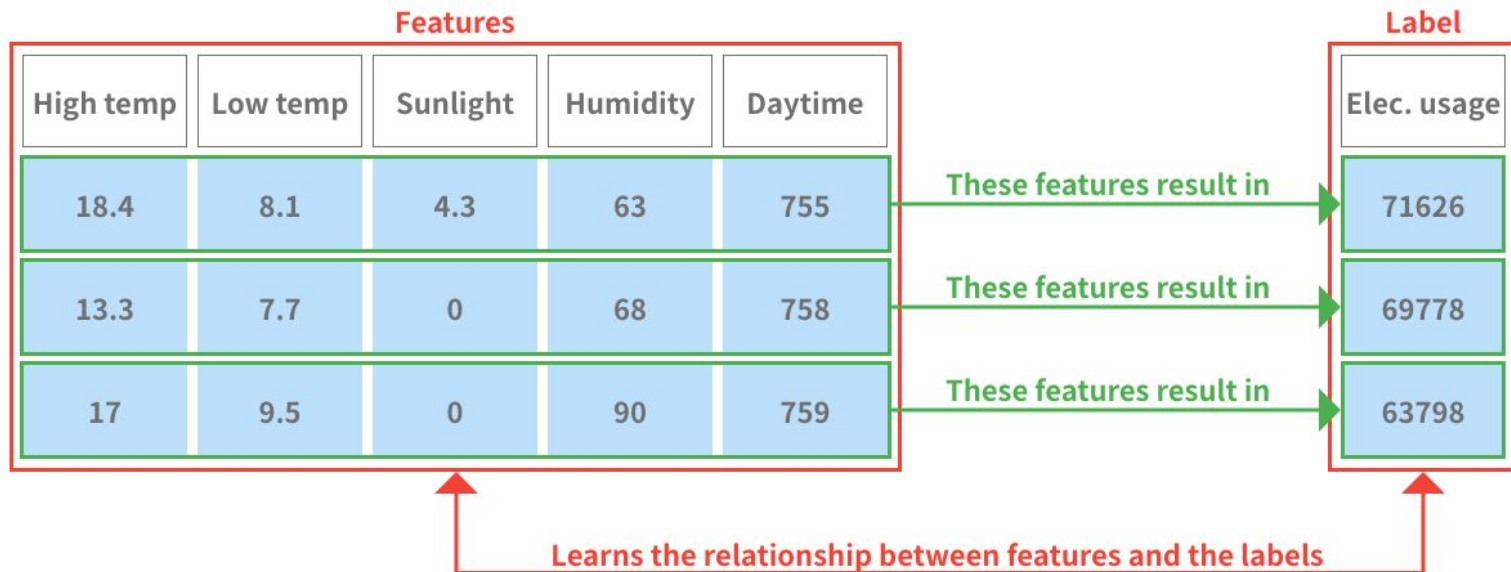
Predict

Label

Classification

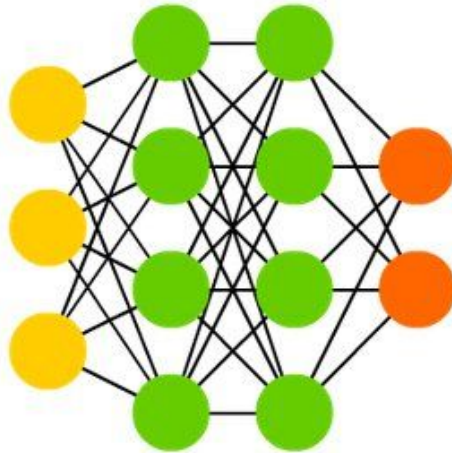
Regression

Predict

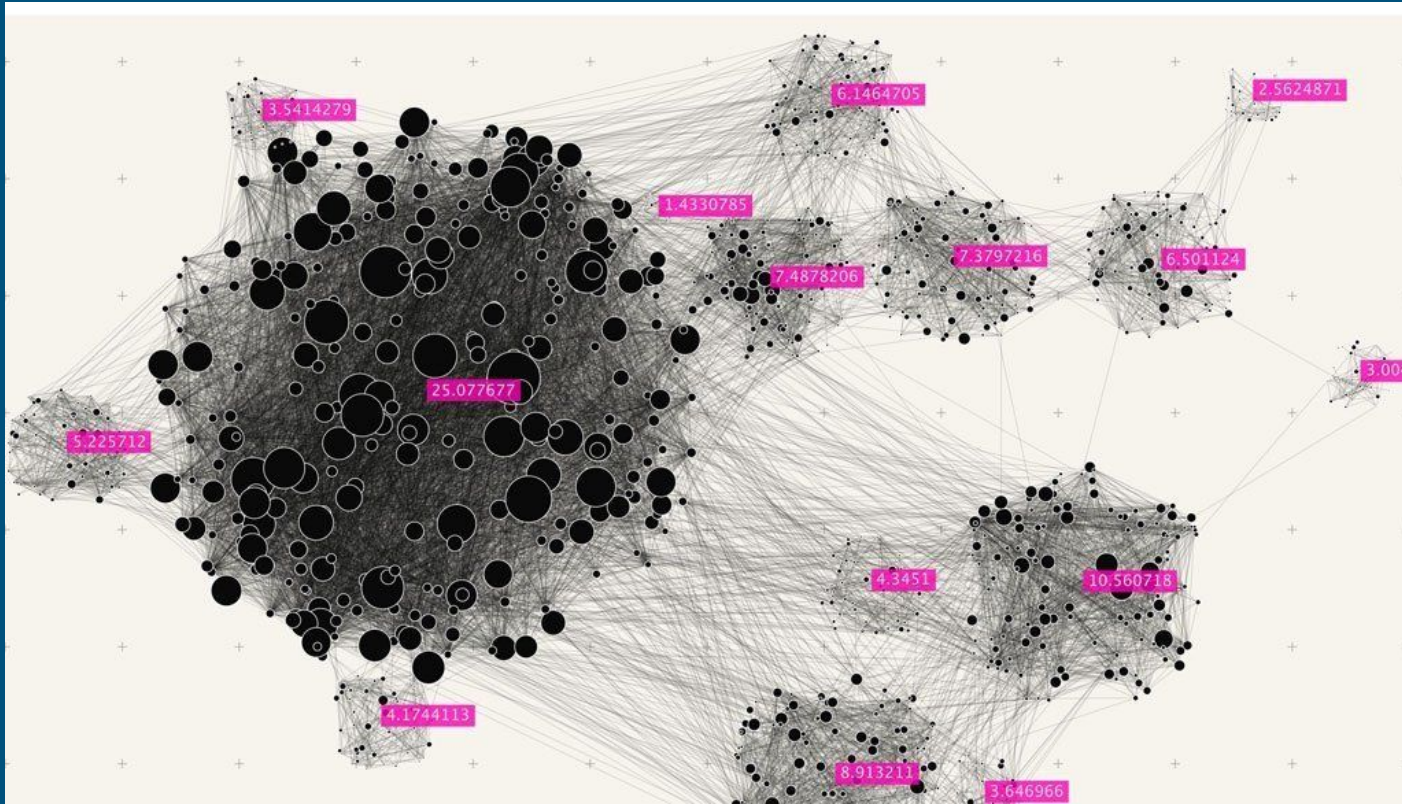


Predict

Deep Feed Forward



Cluster/Organize



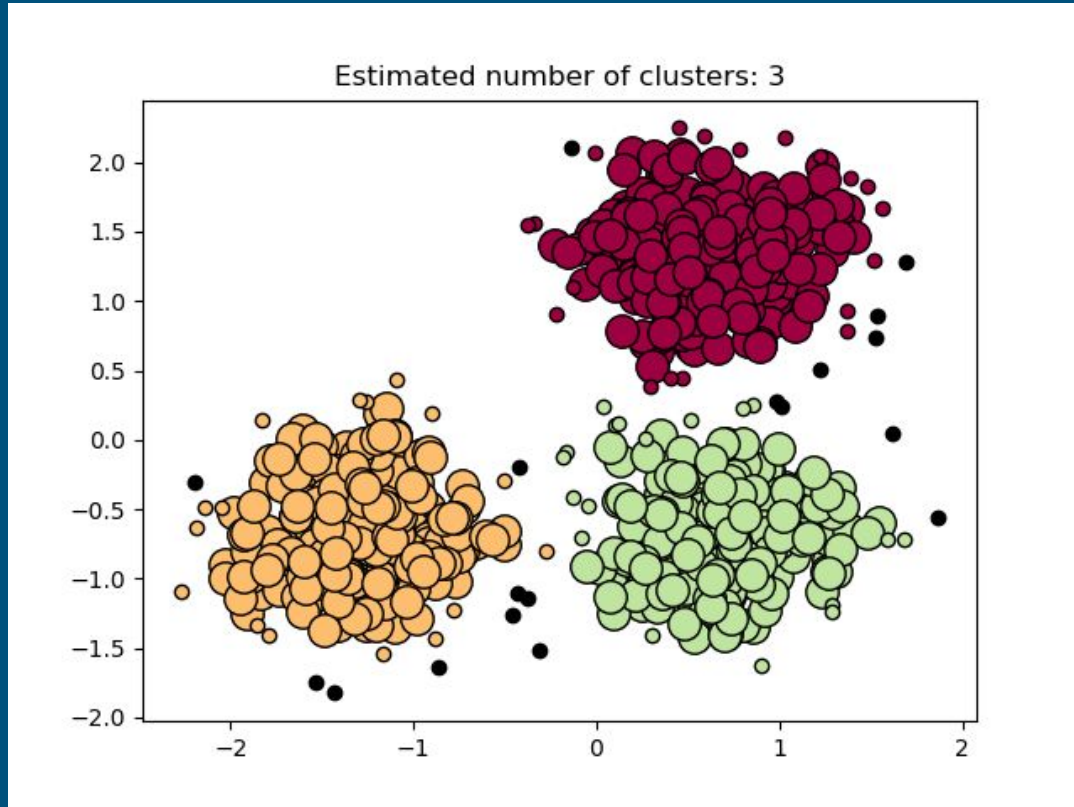
Cluster/Organize

Similarity/Relationship

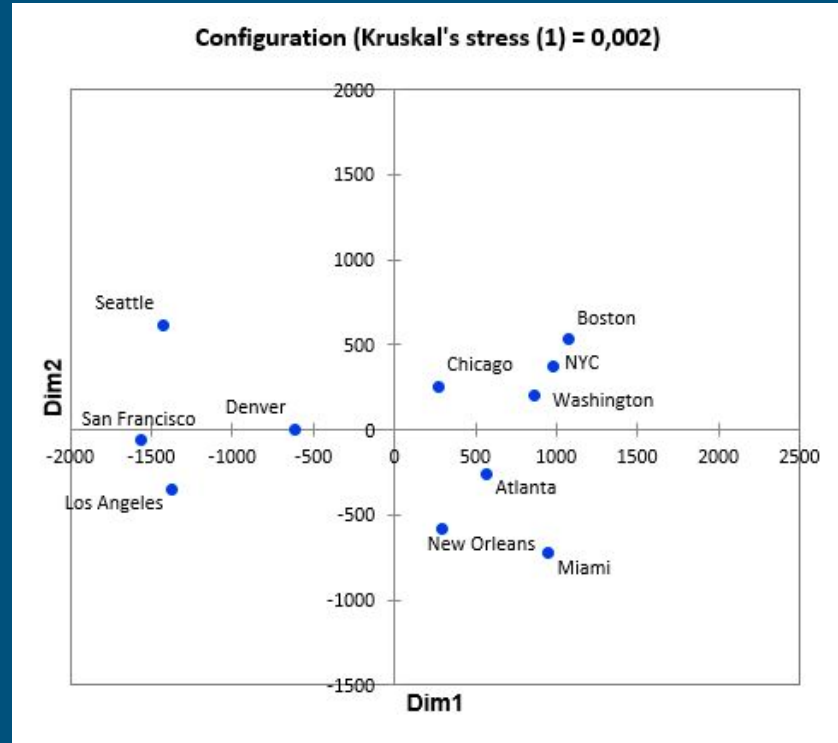
Recommendation Engine

Topic Modelling

Cluster/Organize

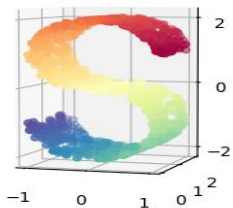


Cluster/Organize

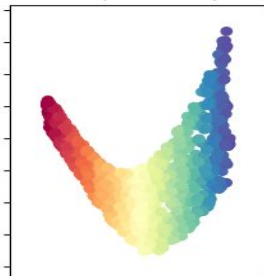


Cluster/Organize

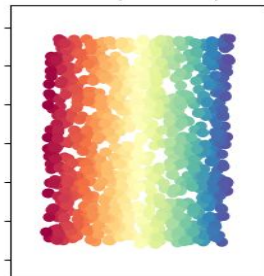
Manifold Learning with 1000 points, 10 neighbors



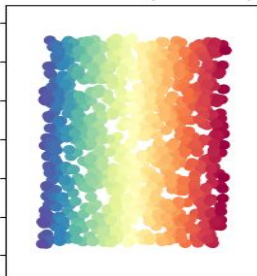
LLE (0.098 sec)



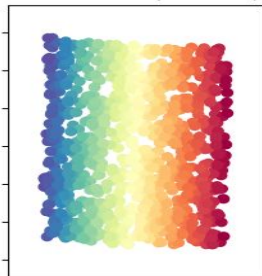
LTSA (0.13 sec)



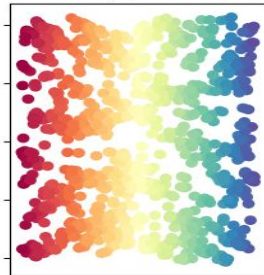
Hessian LLE (0.21 sec)



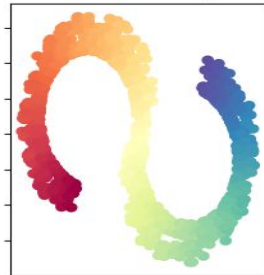
Modified LLE (0.18 sec)



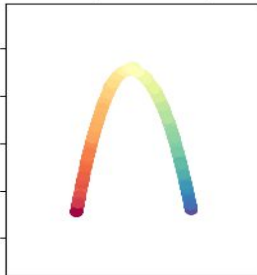
Isomap (0.38 sec)



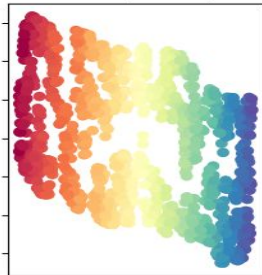
MDS (1.4 sec)



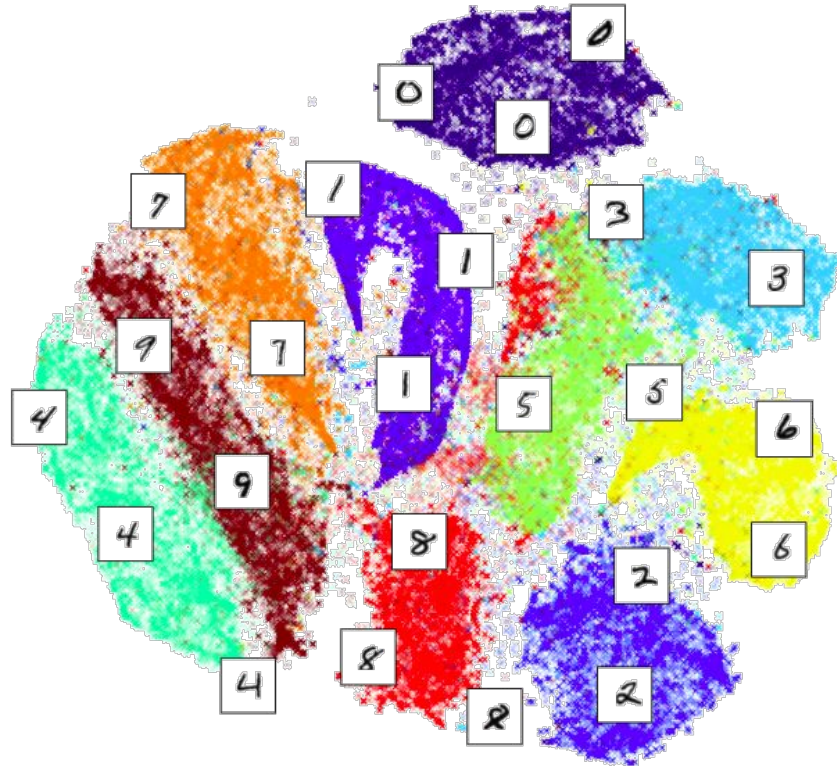
SE (0.069 sec)



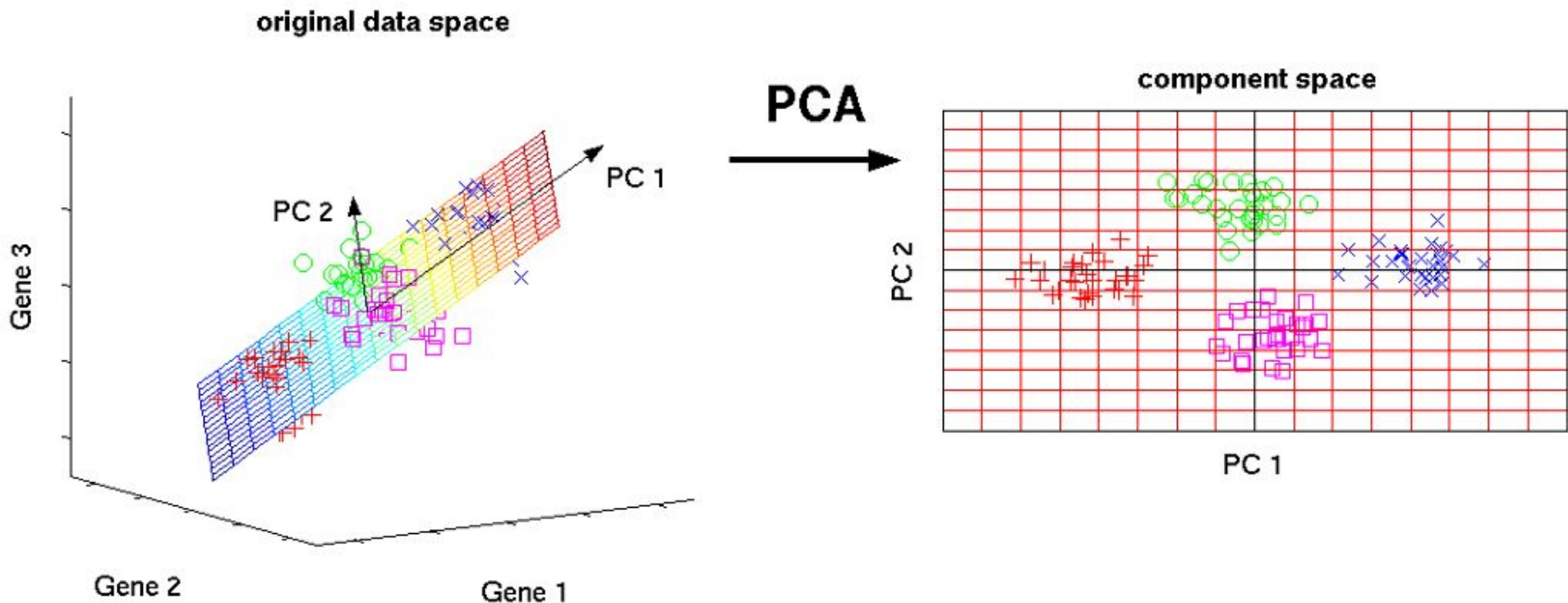
t-SNE (6.8 sec)



Cluster/Organize

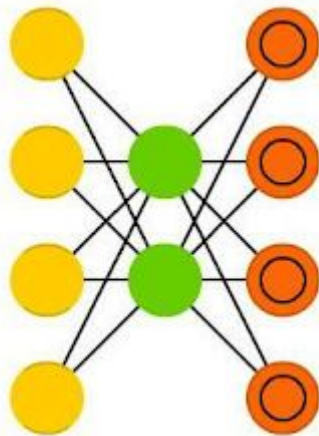


Summarize



Summarize

Auto Encoder (AE)



Generate Synthetic data



Generate Synthetic data

Images

Video

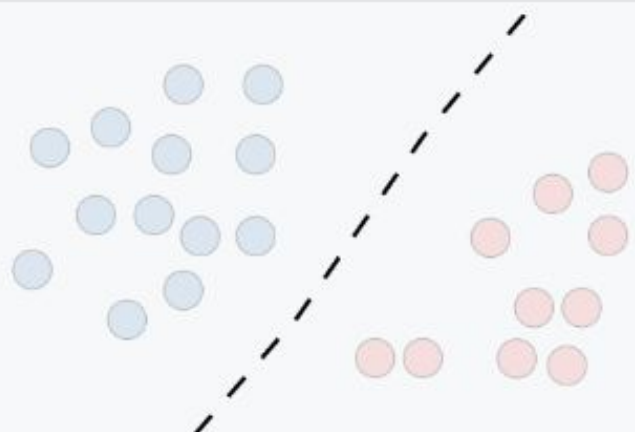

Sound (Voices, Music)

Art

Signals

Numbers

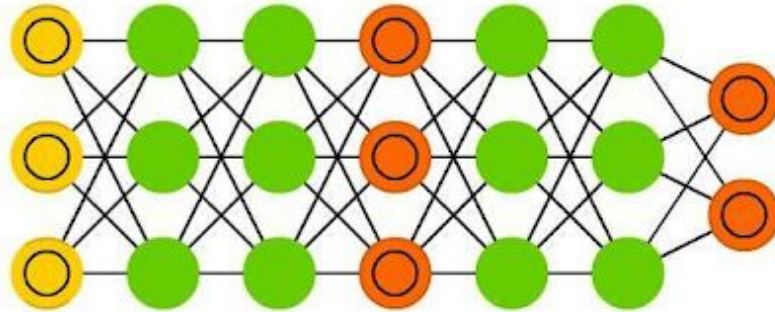
Discriminative Model

	Discriminative model	Generative model
Goal	Directly estimate $P(y x)$	Estimate $P(x y)$ to then deduce $P(y x)$
What's learned	Decision boundary	Probability distributions of the data
Illustration		
Examples	Regressions, SVMs	GDA, Naive Bayes

Generative Model

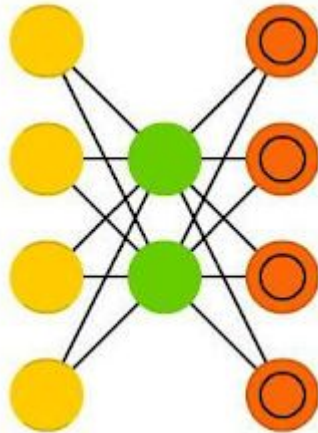
Generate Synthetic data

Generative Adversarial Network (GAN)



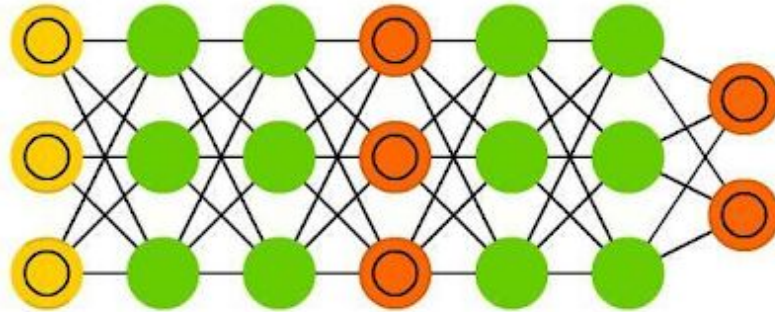
Generate Synthetic data

Auto Encoder (AE)



Generate Synthetic data

Generative Adversarial Network (GAN)



The End.

