NEW APPROACHES IN PHENOTYPE PREDICTION – MACHINE LEARNING TECHNIQUES

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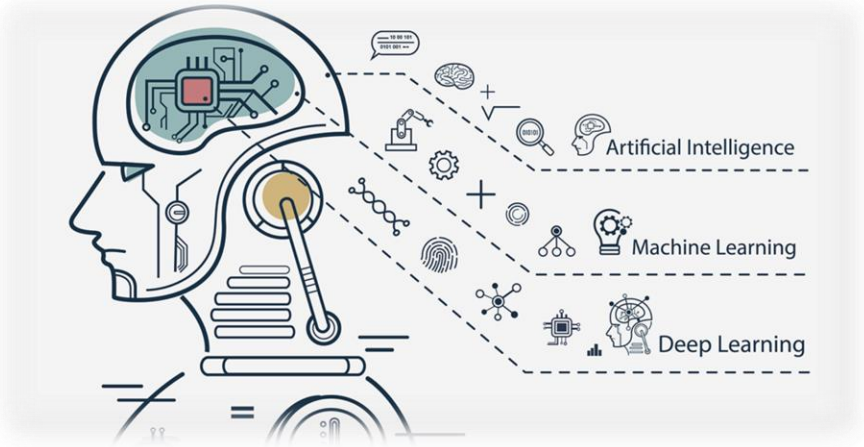
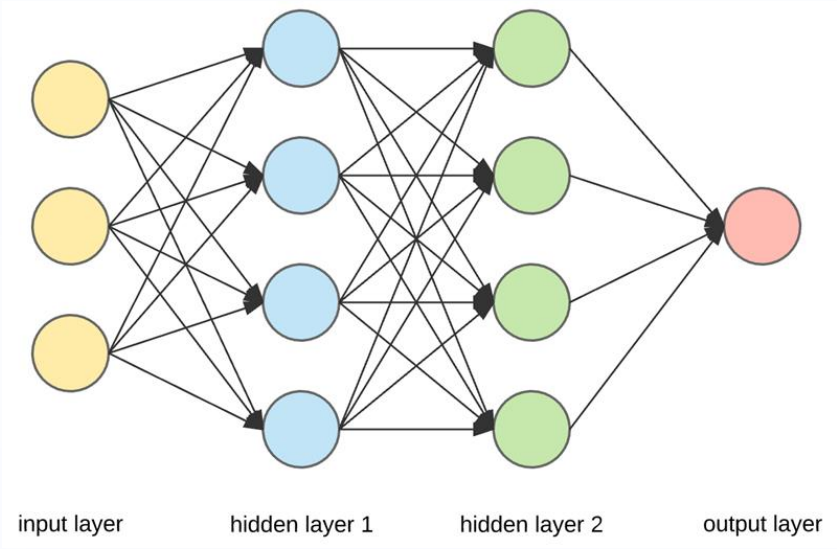
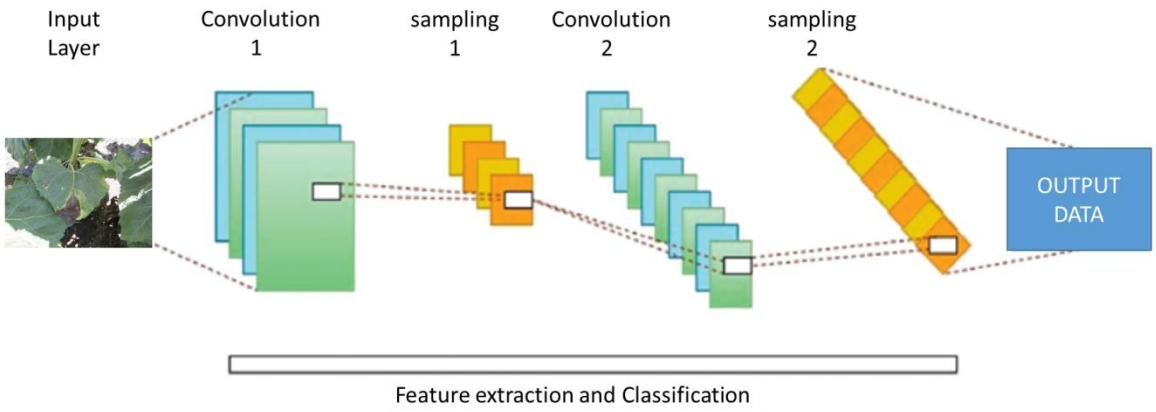




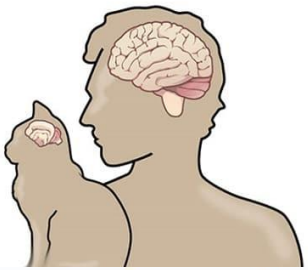
Basic concept of artificial neural network (ANN)

Major types:

- Single-Layer Perceptron (SLP)
- Multi-Layer Perceptron (MLP)
- Radial-Basis Function (RBF) networks
- Kohonen's Self-Organising Map (SOM) networks
- Probabilistic Neural Network (PNN)
- Convolutional Neural Network (CNN).



Convolutional neural network



Inspired by neurons in human and animal brains

CNN application:

- Image classification
- Object detection
- Plant stress identification and classification
- Disease recognition and classification
- Prediction of phenotypes from genotypes

Main advantages of CNN:

- Automatic identification of features
- Without human supervision
- High accuracy (from 87% to 99%)
- Matching or even beating human performance.


THANK YOU FOR ATTENTION