

Data Mining and Machine Learning

Assignment Project Exam Help

Types of <https://eduassistpro.github.io/> perceptron

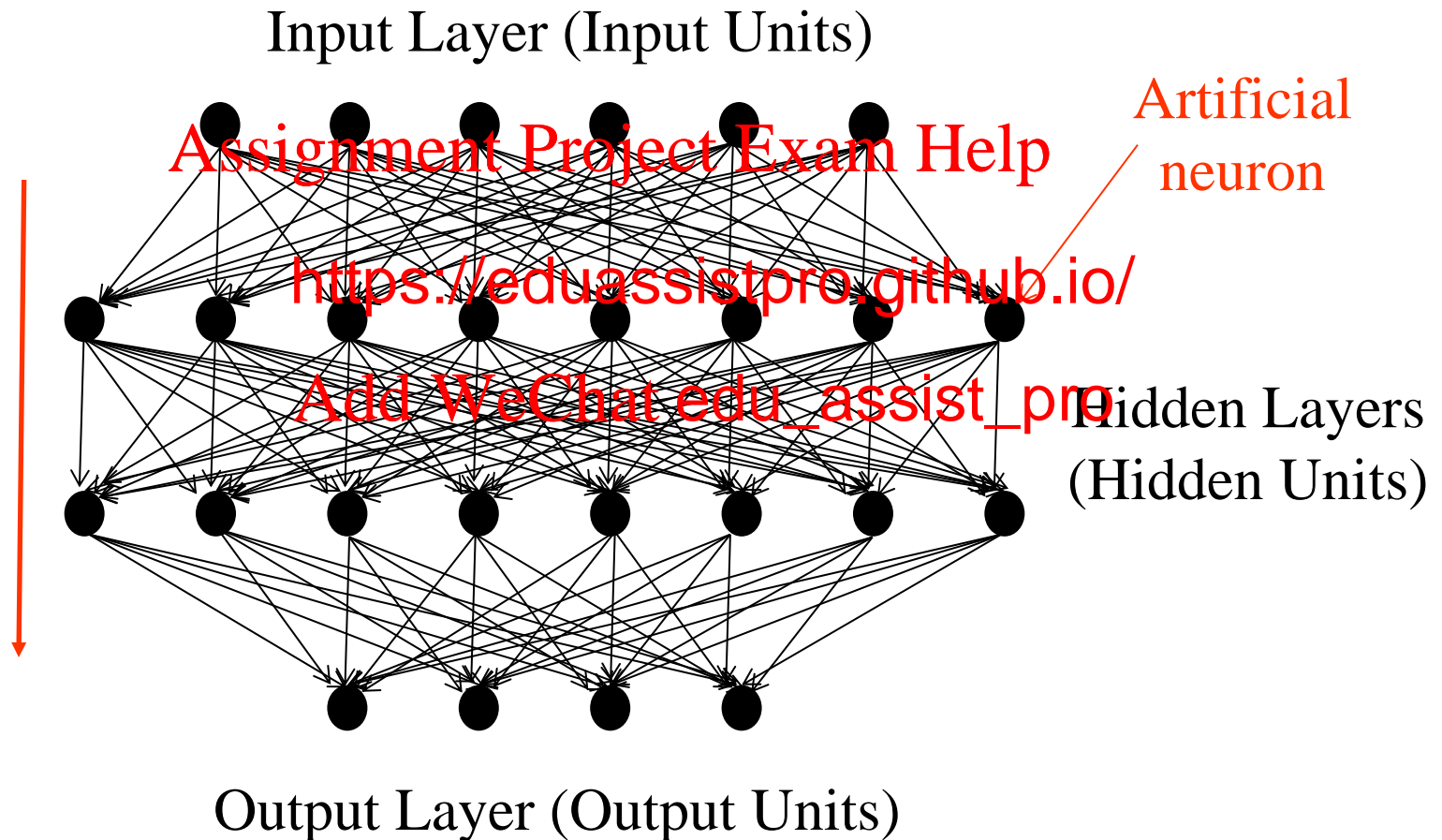
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Feed-forward Neural Networks

Multi-Layer Perceptron - Feed-Forward Neural Network



What can you do with a (D)NN?

- Approximate arbitrary non-linear mappings between the inputs and targets
- Learn low-dimensional representations of data (Auto-encoders)
- Learn to allocate data to classification networks)

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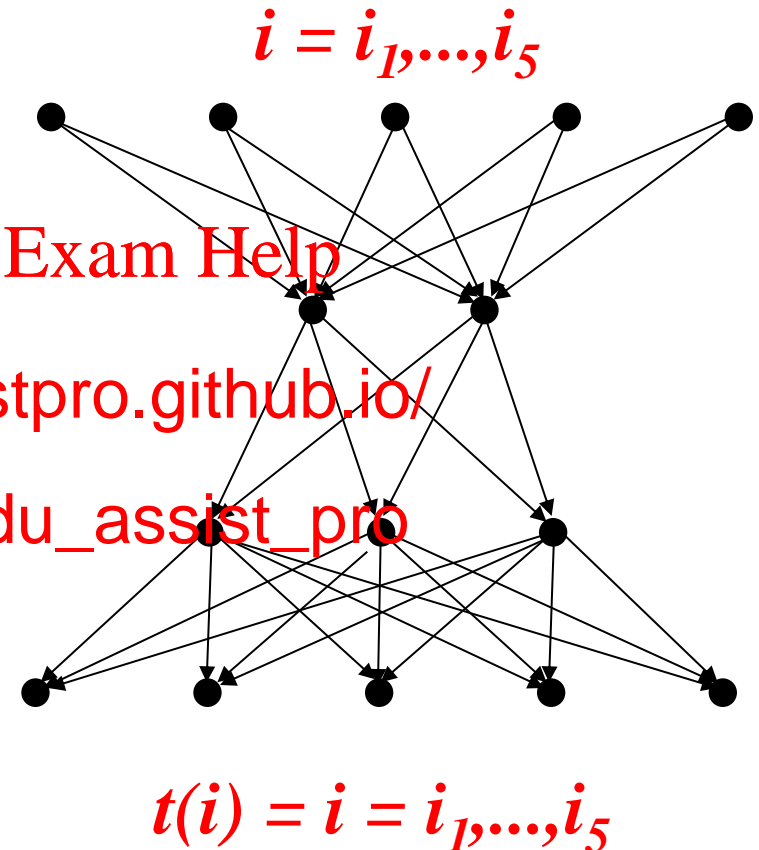
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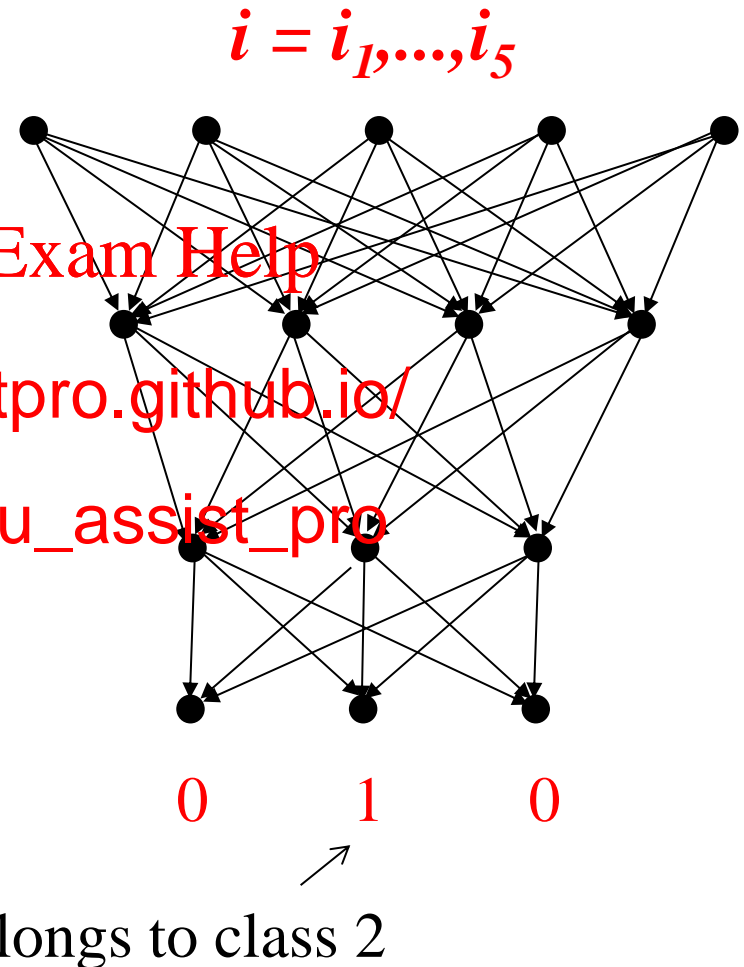
Auto-encoder (D)NNs

- During training, for each input pattern i , $t(i) = i$
- What's the point?
- By including hidden layers with a small number of units (a “bottleneck”) the network learns a low-dimensional representation of the data



“Classification” Networks

- Suppose each pattern belongs to one of N classes
- For each input pattern i , let c_i be the class
- Let $t(i)$ be the vector with whose c_i coordinate is 1 and all other coordinates are 0

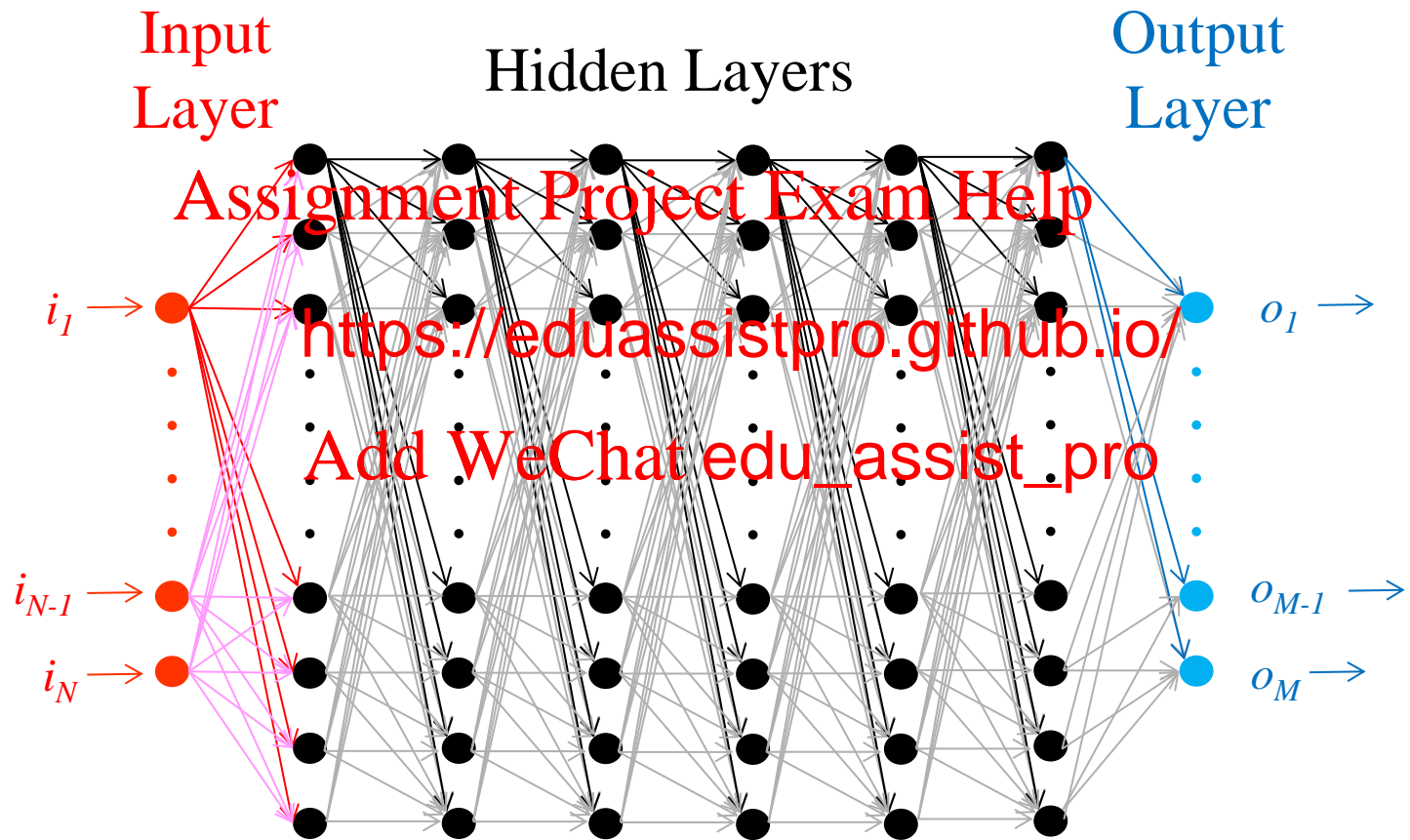


Deep neural networks (DNNs)

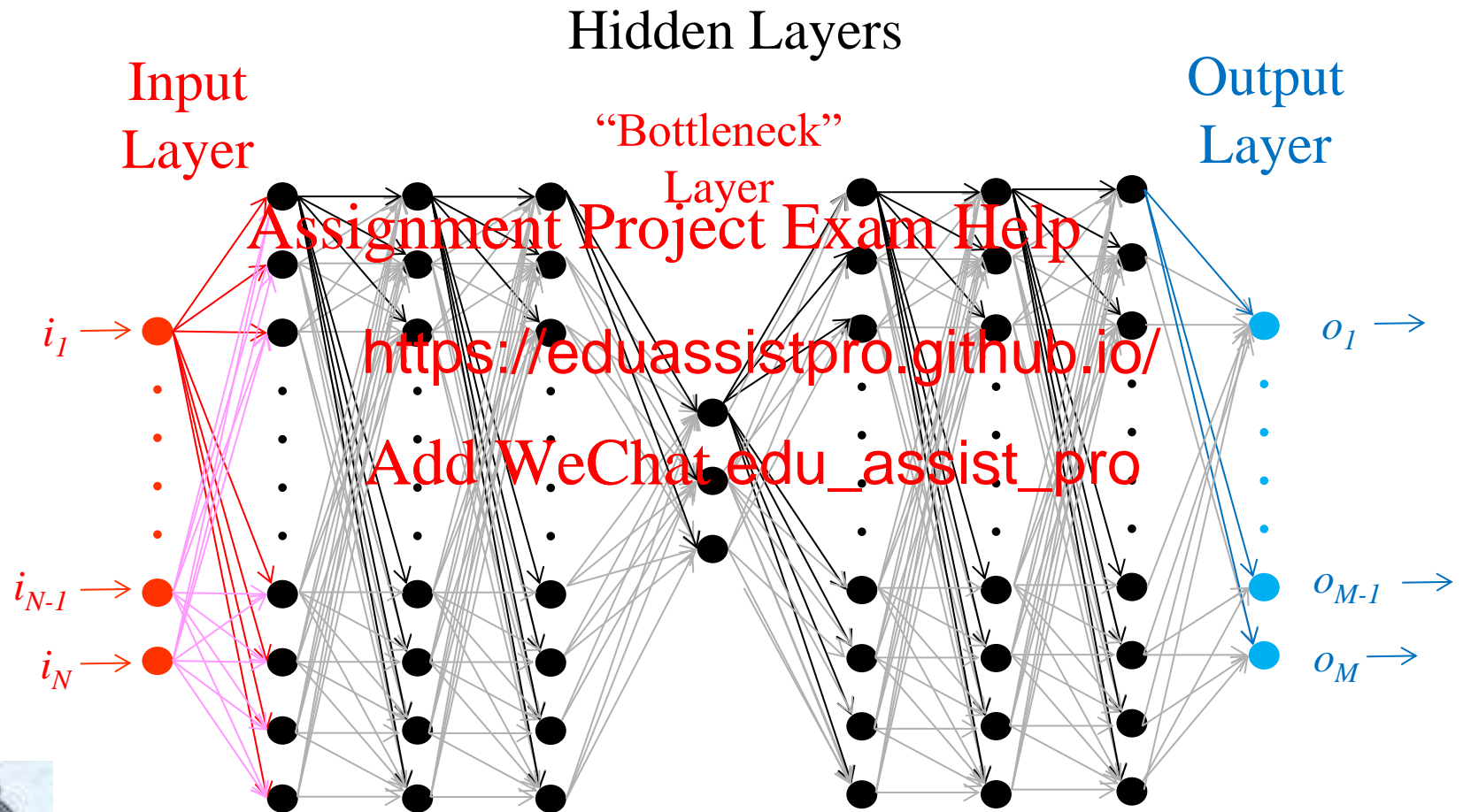
- “Deep” refers to the number of hidden layers
- In the past typically only NNs with few (1 or 2) hidden layers were considered:
 - Computational difficulty for multiple hidden layers
- Since ~2000
 - Faster computers (in particular GPUs)
 - Larger training data sets
 - Better parameter estimation algorithms



A “deep” neural network (DNN)



“Bottleneck” DNN



THE END

- ..of lectures.. **Assignment Project Exam Help**

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