# **Shallow Neural Networks**

Diagram

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## **Neural Networks Over-view**

A picture containing scatter chart

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Text

Description automatically generated with medium confidenceText

Description automatically generated with low confidence

## **Neural Network Representation**

## **Computing a Neural Network’s Output**

Diagram, schematic

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Diagram

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Diagram

Description automatically generated with medium confidenceA picture containing text, whiteboard

Description automatically generated

Diagram, schematic

Description automatically generated

A picture containing text

Description automatically generated

## **Vectorizing Across Multiple Examples**

Diagram

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The above for loop implementation should be Vectorized.

Diagram, schematic

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Description automatically generated with medium confidence

## **Explanation for Vectorized Implementation**

Let’s see how the above equation is the correct implementation of vectorizing multiple examples.Text

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Diagram, schematic

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## **Activation Functions**

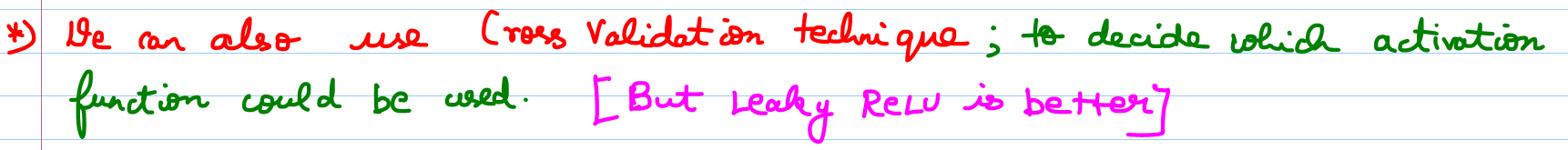
Diagram

Description automatically generated Graphical user interface, text, application

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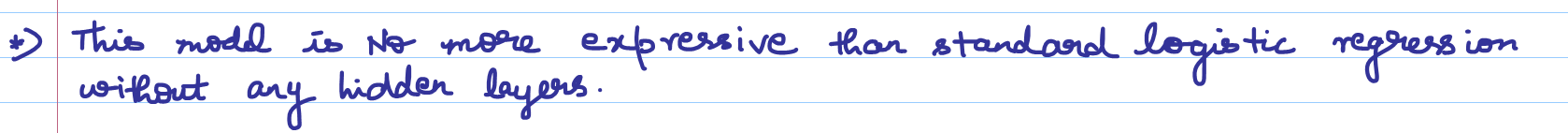
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Diagram

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## **Why do you need Non-Linear Activation Functions ???**

If you use a linear activation function or alternatively, if you don't have an activation function, then no matter how many layers your neural network has, all it's doing is just computing a linear activation function.A picture containing text, clock

Description automatically generated

Linear hidden layer is more or less useless because the composition of two linear functions is itself a linear function.

Where we use a Linear Activation function ???  
Doing Machine Learning on Regression Problem.   
Eg: House Price Prediction  
Diagram, schematic

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From stack-overflow

A screenshot of a computer

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Chart

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## **Derivatives of the activation functions**

### **sigmoid activation function**

Chart

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Application

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### **tanh activation function**

Diagram, schematic

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Diagram

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A picture containing diagram

Description automatically generatedGraphical user interface, text, application

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### **ReLU and Leaky ReLU activation function**

Diagram

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## **Gradient Descent for Neural Networks**

References:

<https://stackoverflow.com/questions/9782071/why-must-a-nonlinear-activation-function-be-used-in-a-backpropagation-neural-net>

<https://towardsdatascience.com/derivative-of-the-sigmoid-function-536880cf918e>

<https://blogs.cuit.columbia.edu/zp2130/derivative_of_tanh_function/>

<https://www.intmath.com/differentiation/6-derivatives-products-quotients.php>