1819-108-W10-C1-01

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01 April 2019

- The sigmoid function (or logistic)

$$\phi(x) = \frac{1}{1+\exp(-x)}.$$

- The hyperbolic tangent function ("tanh")

$$\phi(x) = \frac{\exp(x)-\exp(-x)}{\exp(x)+\exp(-x)} = \frac{\exp(2x)-1}{\exp(2x)+1}.$$

- The hard threshold function

$$\phi_\beta(x) = \mathbf{1}_{x \geq \beta}.$$

- The Rectified Linear Unit (ReLU) activation function

$$\phi(x) = \max(0, x).$$

Here is a schematic representation of an artificial neuron where $\Sigma = \langle w_j, x \rangle + b_j$.

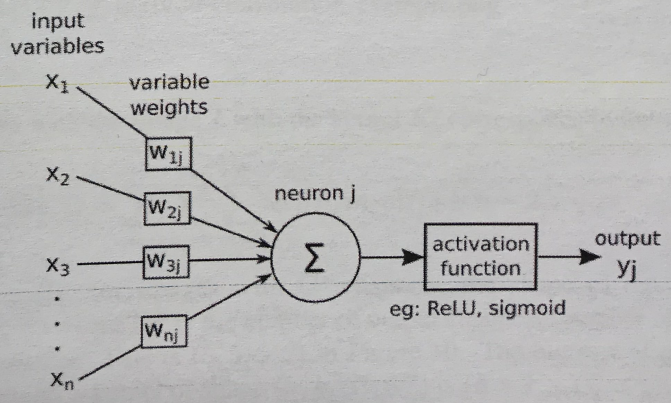

Figure 1: source: andrewjames turner.co.uk

The Figure 2 represents the activation function described above.

- The signoid function (or logistic)

$$\phi(x) = \frac{1}{1 + exp(-x)}.$$

- The hyperbolic tangent function ("tanh")

$$\phi(x) = \frac{exp(x) - exp(-x)}{exp(x) + exp(-x)} = \frac{exp(2x) - 1}{exp(2x) + 1}.$$

- The hard threshold function

$$\phi_\beta(x) = 1_{x \geq \beta}.$$

- The Rectified Linear Unit (ReLU) activation function

$$\phi(x) - max(0, x).$$

Here is a schematic representation of an artificial neuron where $\Sigma = (\omega_j, x + b_j)$.

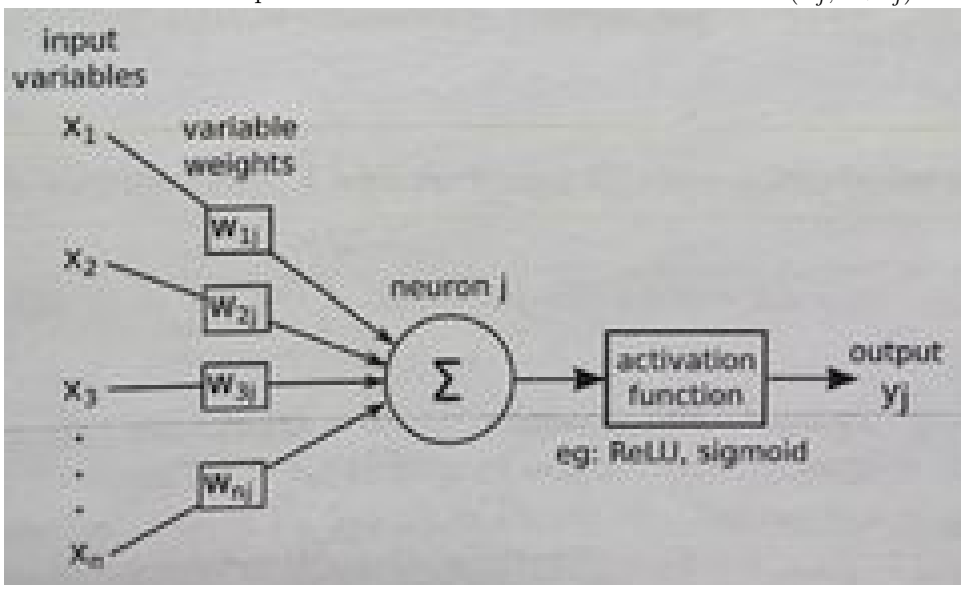

Figure 1: source: andrejames turner.co.uk

The Figure 2 represents the activation function described above.

```
\documentclass{article}
\usepackage[utf8]{inputenc}
\usepackage{graphicx}
\usepackage{rotating}
\usepackage{ragged2e}
\usepackage{setspace}
\usepackage{verbatim}

\title{1819-108-W10-C1-01}
\author{Jānis Konopackis }
\date{01 April 2019}

\begin{document}

\maketitle
\newpage
\includegraphics[scale=0.13, angle =-90]{IMG_1205.jpg}
\newpage
\begin{itemize}
    \item The signoid function (or logistic)
    $$\phi(x) = \frac{1}{1 + exp(-x)}.$$
    \item The hyperbolic tangent function ("tanh")
    $$\phi(x) = \frac{exp(x) - exp(-x)}{exp(x) + exp(-x)} =
    \frac{exp(2x) - 1}{exp(2x) + 1}.$$
    \item The hard threshold function
    $$\phi_\beta(x) = 1_{x \geq\beta}.$$
    \item The Rectified Linear Unit (ReLU) activation function
    $$\phi(x) - max(0, x).$$
\end{itemize}
Here is a schematic representation of an artificial neuron where $\Sigma =
(\omega_j, x + b_j).$
\vspace{1cm}
\includegraphics[scale=1.5]{cutmypic.png}
\begin{center}

    The Figure 2 represents the activation function described above.
\end{center}
\newpage
```