REDES NEURONALES ARTIFICIALES EXAMEN DE LA UNIDAD 1

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Instrucciones. Cuide la precisión en los resultados. Anexar junto al examen la hoja de cálculos.

1. **A continuación se presentan los pesos de las conexiones de una red neuronal artificial (RNA). (I = Entradas, H = Neuronas de la capa oculta, O = Salida de la RNA, B = Neurona de sesgo)**

|  |  |
| --- | --- |
| **I1>H1** | 3.24981438080398 |
| **I1>H2** | 5.30923599934405 |
| **I2>H1** | 3.25025504991178 |
| **I2>H2** | 5.31143768673604 |
| **H1>O1** | -6.95364520156203 |
| **H2>O1** | 6.46735810745298 |
| **B1>H1** | -4.96015949448697 |
| **B1>H2** | -2.09333198955935 |
| **B2>O1** | -2.88923608790176 |

* + Aplicar operaciones de producto punto en la RNA y considere utilizar las funciones de activación tangencial hiperbólica y/o la función sigmoide.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **I1** | **I2** | **Out H1:** | **Out H2:** | **Out O1:** |
| **1** | **1** | **0.9121052340** | **0.9999999216** | **-0.9920888772** |
| **1** | **0** | **-0.9366898720** | **0.9967860966** | **0.9999999964** |
| **0** | **1** | **-0.9366358184** | **0.9968001950** | **0.9999999964** |
| **0** | **0** | **-0.9999016739** | **-0.9700611820** | **-0.9762180968** |

* + Determinar la tabla de verdad. Para una salida >0.9 el valor es 1, para una salida <0.1 el valor es 0.

|  |  |  |
| --- | --- | --- |
| **l1** | **l2** | **Salida** |
| **1** | **1** | **0** |
| **1** | **0** | **1** |
| **0** | **1** | **1** |
| **0** | **0** | **0** |

1. **A continuación se presentan los pesos de las conexiones de una red neuronal artificial (RNA). (I = Entradas, H = Neuronas de la capa oculta, O = Salida de la RNA, B = Neurona de sesgo)**

|  |  |
| --- | --- |
| **I1>H1** | -0.07 |
| **I2>H1** | 0.22 |
| **B1>H1** | -0.46 |
| **I1>H2** | 0.94 |
| **I2>H2** | 0.46 |
| **B1>H2** | 0.1 |
| **H1>O1** | -0.22 |
| **H2>O1** | 0.58 |
| **B2>O1** | 0.78 |

* + Determinar el valor de beta del método Nguyen-Widrow.

|  |  |  |
| --- | --- | --- |
| **β** | **Beta** | **0.989949494** |

* + Determinar el valor de N (Norma Euclidiana) para las neuronas H1 y H2 del método Nguyen-Widrow.

|  |  |
| --- | --- |
| **H1** | **0.514684369** |
| **H2** | **1.051284928** |

* + Determinar los nuevos pesos del método Nguyen-Widrow.

|  |  |  |  |
| --- | --- | --- | --- |
| **Neu Entrada** | **Neu Salida** | **valor antes** | **Valor después** |
|  |  |  |  |
| **L1** | **H1** | **-0.07** | **-0.134638759** |
| **L2** | **H1** | **0.22** | **0.423150384** |
| **B1** | **H1** | **-0.46** | **-0.884768985** |
| **L1** | **H2** | **0.94** | **0.885157296** |
| **L2** | **H2** | **0.46** | **0.433162081** |
| **B1** | **H1** | **0.1** | **0.09416567** |
| **H1** | **O1** | **-0.22** | **-0.22** |
| **H2** | **O1** | **0.58** | **0.58** |
| **B1** | **O1** | **0.78** | **0.78** |

1. **A continuación se presenta el siguiente patrón para una RNA Hopfield.**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

* + Definir la matriz de conexiones de la RNA Hopfield.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **N1** | **N2** | **N3** | **N4** | **N5** | **N6** | **N7** | **N8** | **N9** |
| **N1** | **0** | **-1** | **1** | **-1** | **1** | **-1** | **1** | **-1** | **1** |
| **N2** | **-1** | **0** | **-1** | **1** | **-1** | **1** | **-1** | **1** | **-1** |
| **N3** | **1** | **-1** | **0** | **-1** | **1** | **-1** | **1** | **-1** | **1** |
| **N4** | **-1** | **1** | **-1** | **0** | **-1** | **1** | **-1** | **1** | **-1** |
| **N5** | **1** | **-1** | **1** | **-1** | **0** | **-1** | **1** | **-1** | **1** |
| **N6** | **-1** | **1** | **-1** | **1** | **-1** | **0** | **-1** | **1** | **-1** |
| **N7** | **1** | **-1** | **1** | **-1** | **1** | **-1** | **0** | **-1** | **1** |
| **N8** | **-1** | **1** | **-1** | **1** | **-1** | **1** | **-1** | **0** | **-1** |
| **N9** | **1** | **-1** | **1** | **-1** | **1** | **-1** | **1** | **-1** | **0** |