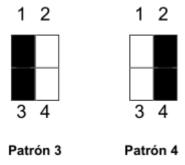
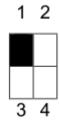
REDES NEURONALES HOJA DE EJERCICIOS 4

1) Ejercicio:

Entrenar la Red con los patrones de entrada:



Luego evalúe con el patrón de entrada:



2) Implemente en un lenguaje de programación el siguiente reconocimiento de números distorsionados, utilizando las redes de tipo Recurrente.

PATRONES DE ENTRENAMIENTO

	1	2	3	4	5	6
1	0	0	0	0	0	1
2	0	0	0	0	0	1
	0	0	0	0	0	1
4 5	0	0	0	0	0	1
5	0	0	0	0	0	1
6	0	0	0	0	0	1
7	0	0	0	0	0	1

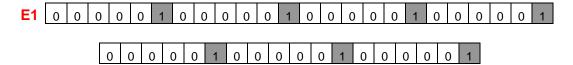
0	0	0	1	0	0
0	0	1	1	0	0
0	1	0	1	0	0
0	0	0	1	0	0
0	0	0	1	0	0
0	0	0	1	0	0
0	0	1	1	1	0

1	1	1	1	1	1
0	0	0	0	0	1
0	0	0	0	0	1
1	1	1	1	1	1
1	0	0	0	0	0
1	0	0	0	0	0
1	1	1	1	1	1

0	1	1	1	1	0
1	0	0	0	0	1
0	0	0	0	1	0
0	0	0	1	0	0
0	0	1	0	0	0
0	1	0	0	0	0
1	1	1	1	1	1

1	1	1	1	1	1	_	1	1	1	1	_
1	1	1	1	1	1	0	1	1	1	1	0
0	0	0	0	0	1	0	0	0	0	0	1
1	1	1	1	1	1	0	0	1	1	1	0
0	0	0	0	0	1	0	0	0	0	0	1
0	0	0	0	0	1	1	0	0	0	0	1
1	1	1	1	1	1	0	1	1	1	1	0
1	_	0	^	_	1	_	^	^	1	1	· Λ
1	0	0	0	0	1	0	0	0	0	1	0
1	0	0	0	0	1	0	1	0	0	1	0
1	1	1	1	1	1	1	0	0	0	1	0
0	0	0	0	0	1	1	1	1	1	1	1
0	0	0	0	0	1	0	0	0	0	1	0
0	0	0	0	0	1	0	0	0	0	1	0
1	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	0	0	1	0	0	0	0	0
1	0	0	0	0	0	1	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	0
0	0	0	0	0	1	0	0	0	0	0	1
0	0	0	0	0	1	0	0	0	0	0	1
1	1	1	1	1	1	1	1	1	1	1	0
1	1	1	1	1	1	0	1	1	1	1	0
1	0	0	0	0	0	1	0	0	0	0	1
1	0	0	0	0	0	1	0	0	0	0	0
1	1	1	1	1	1	1	0	1	1	1	0
1	0	0	0	0	1	1	0	0	0	0	1
1	0	0	0	0	1	1	0	0	0	0	1
1	1	1	1	1	1	0	1	1	1	1	0
1	1	1	1	1	1	1	1	1	1	1	1
0	1	1		1	1	1	1 0	1	1	1	1
			1								
0	0	0	1	0	1 1 1	0	0	0	0	0	1
0 0 0	0	0	1 0 0	0	1 1 1	0 0 0 0	0 0 0	0	0 0 0	0	1
0 0 0 0	0 0 0 0	0 0 0 0	1 0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 1 1 0	1 1 0 0
0 0 0	0 0 0	0 0 0	1 0 0 0	0 0 0	1 1 1	0 0 0 0	0 0 0	0 0 0	0 0 0	0 0 1 1	1 1 0 0
0 0 0 0	0 0 0 0	0 0 0 0	1 0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 1 1 0	1 1 0 0
0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0	1 1 1 1 1	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 1 1	0 0 1 1 0	1 0 0 0
0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 0 0 0 0 0 0	0 0 0 0 0 0	1 1 1 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 1 1 1 0	0 0 1 1 0 0	1 0 0 0 0 0
0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 0 0 0 0 0 0	0 0 0 0 0 0	1 1 1 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 1 1 1 0 0	0 0 1 1 0 0	1 0 0 0 0 0
0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 0	0 0 0 0 0 0 1 0	0 0 0 0 0 0	0 0 0 1 1 1 0 0	0 0 1 1 0 0 0	1 0 0 0 0 0 1 1 0
0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 0 0 0 1 0 0	0 0 0 0 0 0 0 1 0 0	1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0	0 0 0 0 0 0 0 1 0 0	0 0 0 1 1 1 0 0 0	0 0 1 1 0 0 0	1 0 0 0 0 0 1 1 1
0 0 0 0 0 0	0 0 0 0 0 0 0 1 0 0	0 0 0 0 0 0 0 1 0 0	1 0 0 0 0 0 0 0 1 0 0 0	0 0 0 0 0 0 0 1 0 0 0	1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 0	0 0 0 0 0 0 0 0 1 0 0 0	0 0 0 0 0 0	0 0 0 1 1 1 0 0 1 0	0 0 1 1 0 0 0	1 0 0 0 0 0 1 1 0
0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 1 0 0 1	0 0 0 0 0 0 0 0 1 0 0	1 0 0 0 0 0 0 0 0 1 0 0 0	0 0 0 0 0 0 0 0 1 0 0 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 1 0 1	0 0 0 0 0 0 0 1 0 0 0	0 0 0 0 0 0 0 1 0 0 0 1	0 0 0 1 1 1 0 0 0 1 1	0 0 1 1 0 0 0 1 0 0 1 0	1 1 0 0 0 0 1 1 1 0 0
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0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 1 0 0 1 1 0 0 1	0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1	1 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 1 0 1 1 0	0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 1 1	0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 1 1	0 0 0 1 1 1 0 0 0 1 1 0 0 1 0	0 0 1 1 0 0 0 1 0 0 1 0 0 1 1 0 0 0	1 1 0 0 0 0 0 1 1 1 0 1 1 1 0
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0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 0 1	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	1 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0	0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0	0 0 0 0 1 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	0 0 1 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0	1 1 0 0 0 0 1 1 1 0 0 1 1 1 1 1 1 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 0 1	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 0	0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0	1 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	0 0 0 0 1 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	0 0 1 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0	1 1 0 0 0 0 1 1 1 0 0 1 1 1 1 1 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 0 1	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 0	1 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0	0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0	0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0	0 0 0 0 1 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	0 0 1 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0	1 1 0 0 0 0 1 1 1 0 0 1 1 1 1 1 1 0

Se sugiere utilizar el patrón de la siguiente manera caso el numero 1 (uno):



PATRONES PARA SER RECONOCIDOS

0 0 0 0 1 0	1 1 1 1 1 0 0	0 0 0 0 0 0	0 0 0 0 0 0
0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 1 1 0	0 0 0 0 0 0	0 0 0 0
0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0 0 1 0	0 0 0 0 0	0 0 0
0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0	1 0 0 1 0	0 0 0	0 0
0 0 0 0 1	0 0 1 0	0	0
	0 1 0	0	0
0 1 1 1 1 1 0 0 1 1 1 1 0	1 0	0	_
	0	_	0
0 0 0 0 0 1 1 0 0 0 0 1			_
0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0	U I	0	0
1 0 0 0 0 0 0 1 0 0 0 1 1 1 1	1	0	0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0
	0	0	0
0 1 1 1 1 1 0 1 1 1	1	0	0
0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0	1	0	0
0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0
0 0 0 0 1 0 0 0 1 1 1 1 1	1	0	0
	0	0	0
	0	0	0
0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0	1	0	0
1 0 0 0 0 1 0 1 0 0 1 0 0 1 0	1	0	0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	0	0
	1	0	0
0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0
	1	0	0
1 1 0 0 0 0 1 0 0 0 0 1 0 0	0	0	0
1 0 0 0 0 0 1 1 1 1 1	1	0	0
1 1 1 1 1 1 1 1 0 <td>1</td> <td>0</td> <td>0</td>	1	0	0
0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0	0	0	0
1 1 1 1 1 1 0 0 0 0	0	0	0
	1	0	0
1 0 0 0 0 0 1 1 0 0 0 1	0	0	0
1 0 <td>1</td> <td>0</td> <td>0</td>	1	0	0
1 0 0 0 0 1 1 0 0 0 0 1 1 1 1 1	1	0	0
1 0 0 0 0 1 1 0 0 0 0 1	0	0	0
	0	0	0

1	1	1	1	1	1		1	1	1	1	1	1		0	1	1	1	0	0
0	0	0	0	0	1		0	0	0	0	0	1		0	0	0	1	0	0
0	0	0	0	0	1		0	0	0	0	1	1		0	0	1	1	0	0
0	0	0	0	0	1		0	0	0	0	1	0		0	0	0	1	0	0
0	1	0	0	0	1		0	0	0	1	1	0		0	0	0	1	0	0
0	0	0	0	0	1		0	0	0	1	0	0		0	0	0	0	0	0
0	0	0	0	0	1		0	0	0	1	0	0		0	0	0	0	0	0
1	1	1	1	1	1	1	0	1	1	1	1	0		1	1	1	1	0	0
1	0	0	0	0	1		1	0	0	0	0	1		1	0	0	1	0	0
1	0	0	0	0	1		1	0	0	0	0	1		1	1	1	1	0	0
0	1	1	1	1	1		1	1	1	1	1	1		1	0	0	1	0	0
1	0	0	0	0	1		1	0	0	0	0	1		1	1	1	1	0	0
1	0	0	0	0	1		1	0	0	0	0	1		0	0	0	0	0	0
1	1	1	1	1	1		0	1	1	1	1	0		0	0	0	0	0	0
						, 1			_				, 						
1	1	1	1	1	1		0	1	1	1	1	0		1	1	1	1	0	0
1	0	0	0	1	1		1	1	0	0	1	1		1	0	0	1	0	0
1	0	0	0	1	1		1	1	0	0	1	1		1	1	1	1	0	0
1	1	1	1	1	1		0	1	1	1	1	1		0	0	0	1	0	0
0								_	_	_	1	_		_	_	^	4	_	
	0	0	0	1	1		0	0	0	0	0	1		0	0	0	1	0	0
0	0	0	0	1	1		1	1	0	0	1	1		0	0	0	0	0	0
1	Ť	_	Ť				_	_	Ť	Ť	_	1		_				Ť	
	0	0	0	1	1		1	1	0	0	1	1		0	0	0	0	0	0
1	0	0	0	1	1		1	1	0	0	1	1 0		0	0	0	0	0	0
1	0 1	0 1	0 1	1 1	1 1		0	1 1 1	0 1	0 1	1 1 1	1 1 0		0 0	0 0	0 0	0 0	0 0	0 0
1	0 1 1 1	0 1 1 1	0 1 1 1	1 1 1 1	1 1 1		1 0 0	1 1 1 1	0 1 1 0	0 1 1 0	1 1 1 1	1 0 0 1		0 0 1 1	0 0	0 0	0 0	0 0 0	0 0
1 1 1	0 1 1 1 1 1	0 1 1 1 0	0 1 1 1 0	1 1 1 1 1	1 1 1 1 1		0 1 1	1 1 1 0	0 1 1 0 0	0 1 1 0 0	1 1 1 0	1 1 0 0		0 0 1 1 1 1	0 0 0 0 0	0 0 1 0 0	0 0 1 1 1 1	0 0 0 0	0 0 0 0
1 1 1 1	0 1 1 1 1 1 1	0 1 1 1 0 0	0 1 1 1 0 0	1 1 1 1 1 1	1 1 1 1 1 1		1 0 0 1 1	1 1 1 1 0 0	0 1 1 0 0	0 1 1 0 0	1 1 1 1 0	1 1 0 0		0 0 1 1 1	0 0 1 0 0	0 0 1 0 0	0 0 1 1 1 1 1	0 0 0 0 0	0 0 0 0 0

Opine acerca de los resultados