Universidade de São Paulo
Instituto de Física de São Carlos
Analysis and Pattern Recognition

Projeto 4(SOMs)

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1 Introdução

Nesse projeto foi realizado a implementação da estrutura SOMs (Self Organizing Maps). O córtex apresentado possui no total 64 neurônios (8x8) com pesos distribuidos aleatoriamente para cada um.

2 Imagens Abordadas

Para o treinamento do córtex foi utilizado imagens obtidas da internet que contem algumas letras do alfabeto. Essas letras estão nas figuras abaixo.

Figura 1: Letra E

Figura 2: Letra F

Figura 3: Letra I

Figura 4: Letra J

Figura 5: Letra L

Figura 6: Letra M

Figura 7: Letra T

Figura 8: Letra X

Figura 9: Letra Z

3 Parte A

Nessa primeira parte foi analisada a resposta de dois neuronios opostos (2x2 e 6x6) de um mesmo córtex apresentados a imagem da letra E mostrada anteriormente. Os neurônios foram vistos logo após os treinos 4, 8, 12.

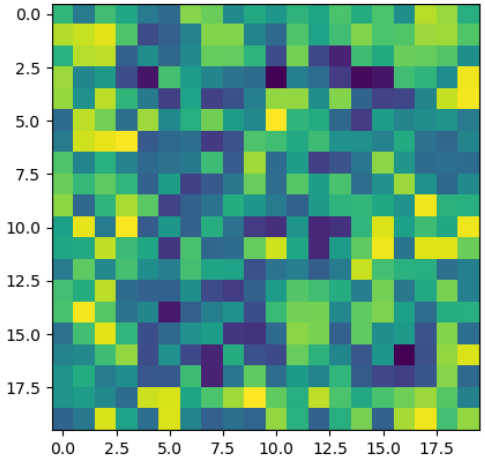

Figura 10: 2x2, Treino 4

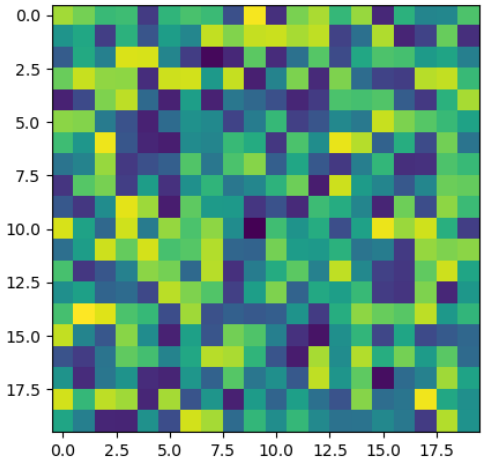

Figura 11: 6x6, Treino 4

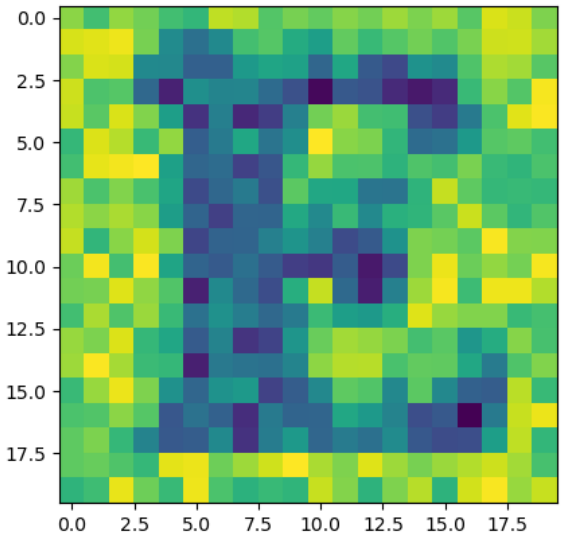

Figura 12: 2x2, Treino 8

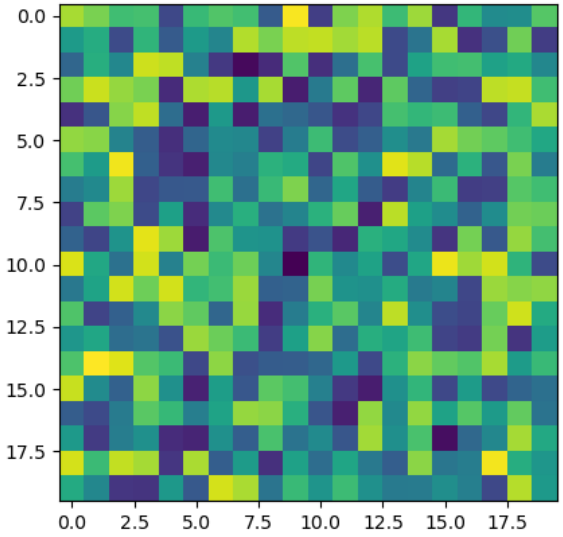

Figura 13: 6x6, Treino 8

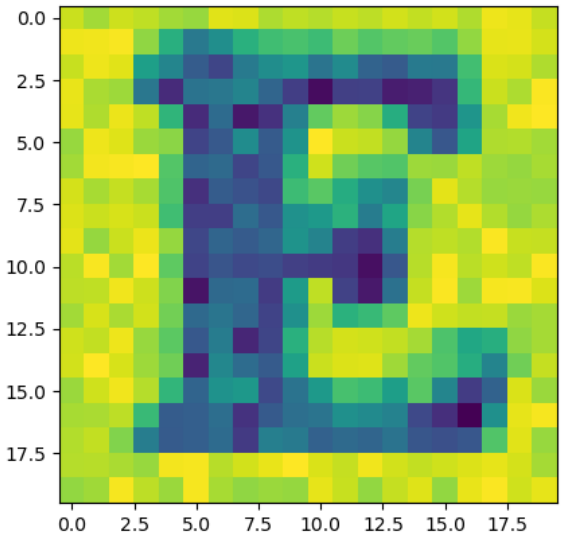

Figura 14: 2x2, Treino 12

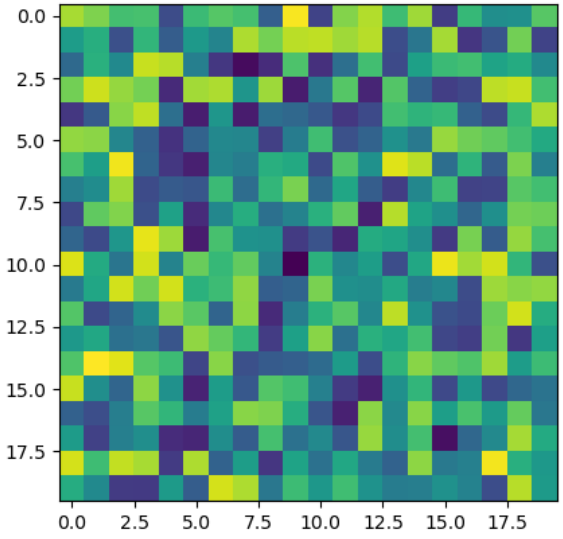

Figura 15: 6x6, Treino 12

4 Parte B

Para essa parte foram trabalhados dois córtex, cada um foi treinado com um conjunto de letras do alfabeto (com um total de n treinos para cada letra). Para fazer as partições foi usado os neurônios 2x2, 2x4, 2x6, 4x2, 4x4, 4x6, 6x2. 6x4, 6x6.

4.1 Córtex João

Em João, foram feitos 1000 treinos para cada letra. Sendo elas E,F,I,J.

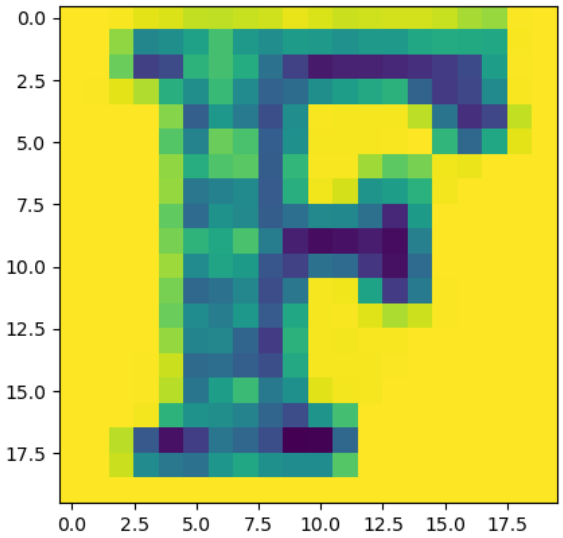

Figura 16: 2x2

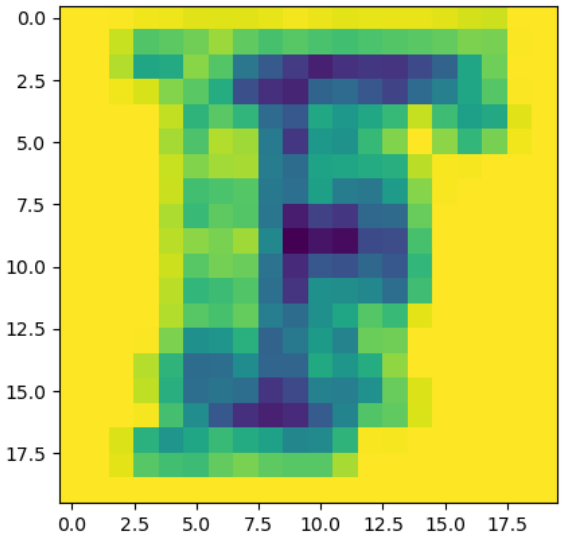

Figura 17: 2x4

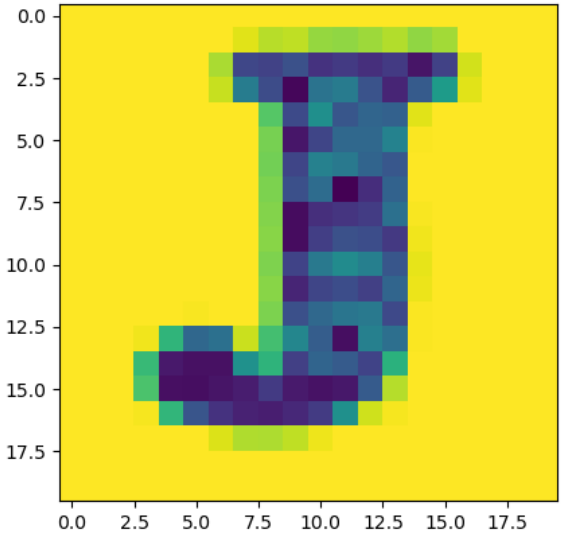

Figura 18: 2x6

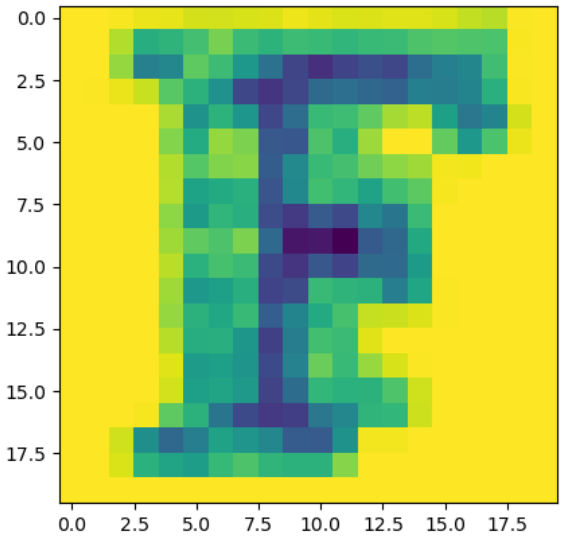

Figura 19: 4x2

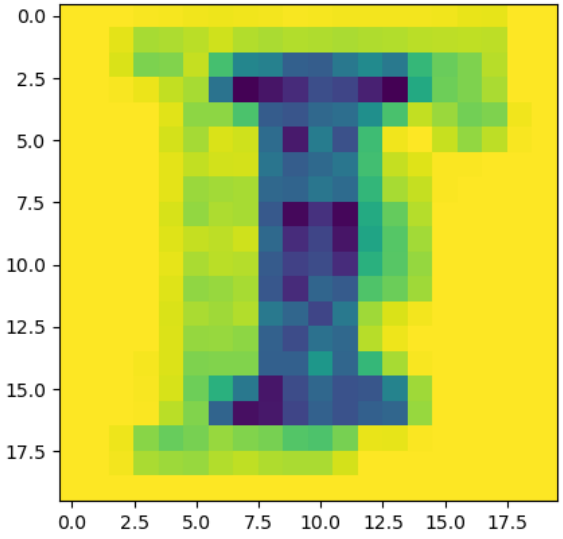

Figura 20: 4x4

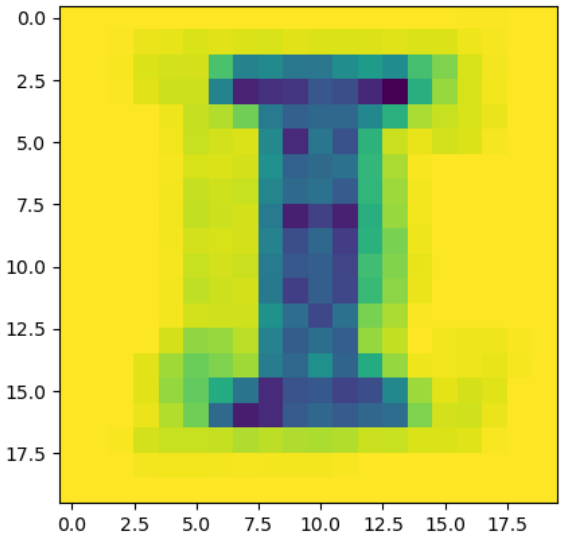

Figura 21: 4x6

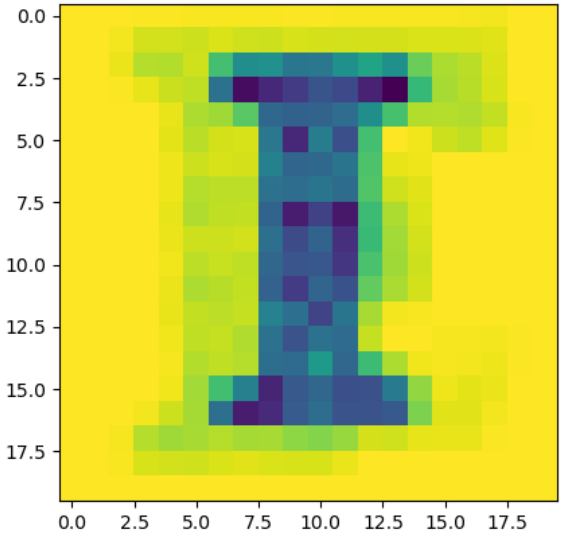

Figura 22: 6x2

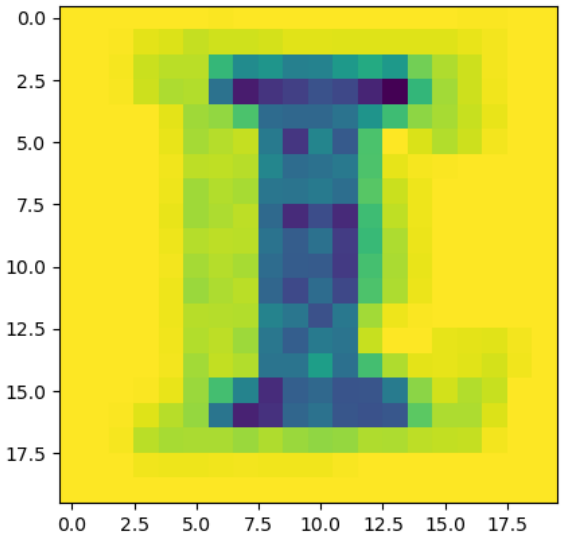

Figura 23: 6x4

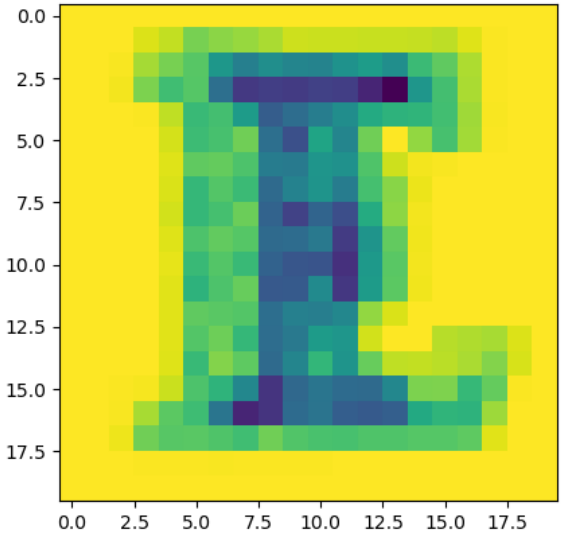

Figura 24: 6x6

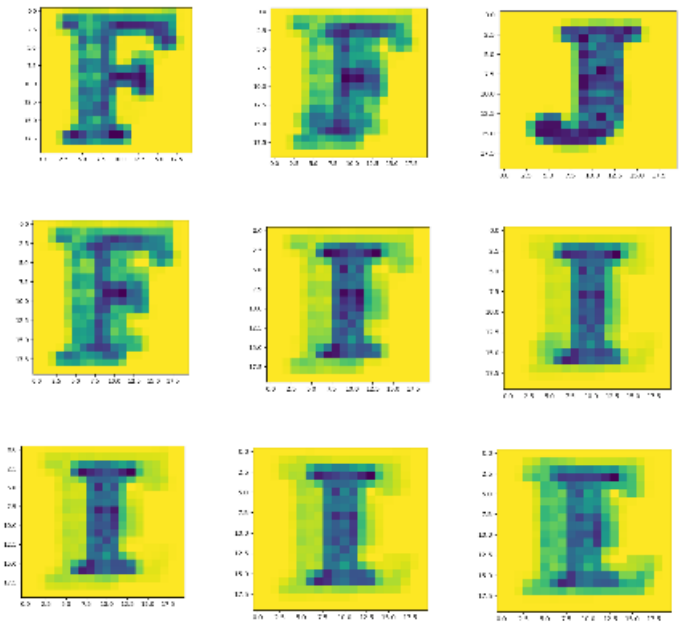

Figura 25: Partições

4.2 Córtex Maria

Em Maria, foram realizados 2000 treinos parra cada letra. Sendo elas L, M, T, X, Z.

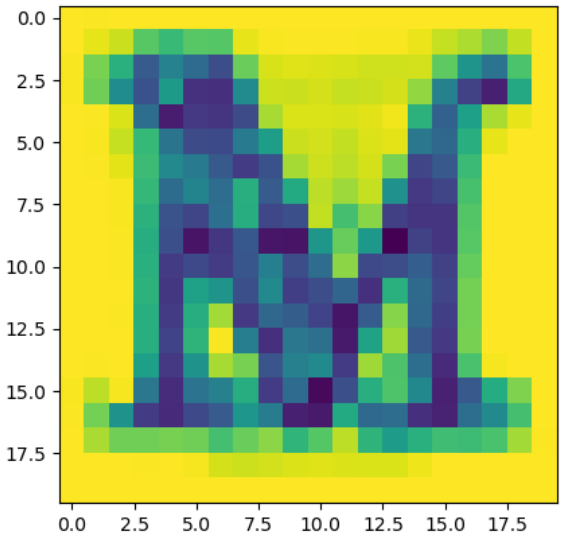

Figura 26: 2x2

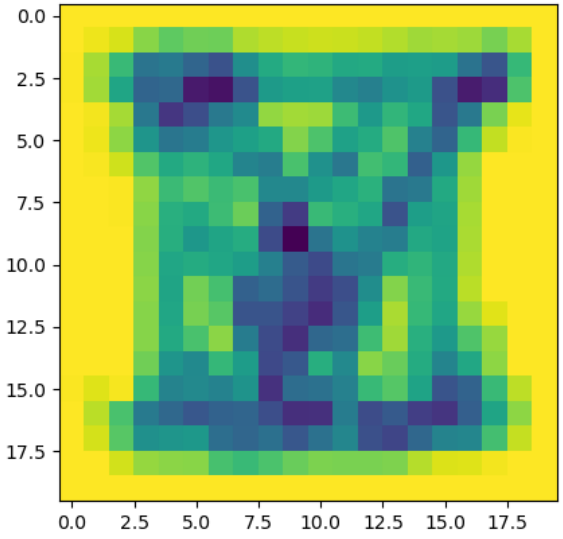

Figura 27: 2x4

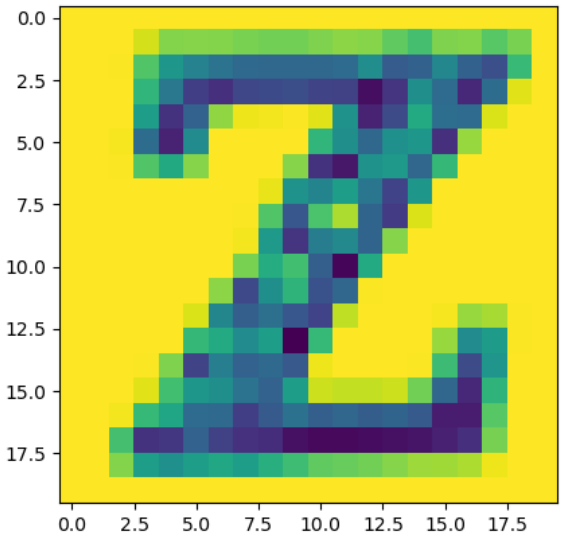

Figura 28: 2x6

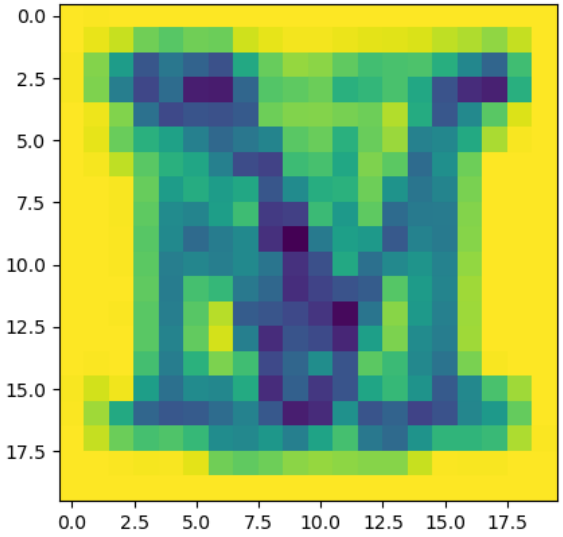

Figura 29: 4x2

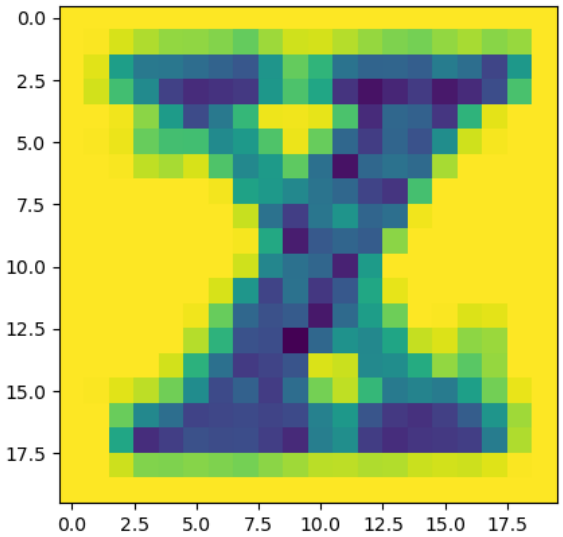

Figura 30: 4x4

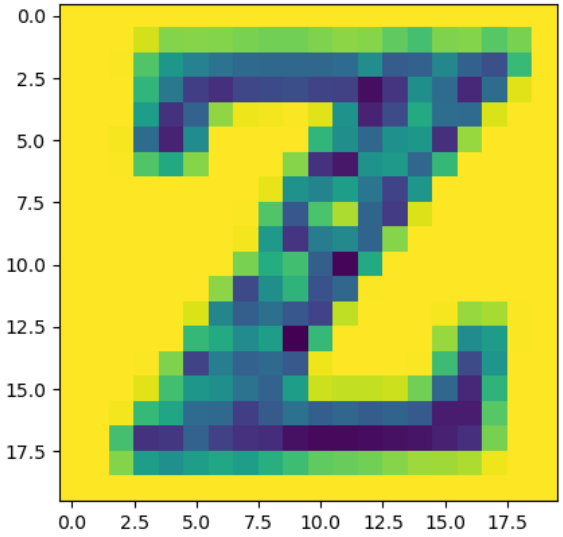

Figura 31: 4x6

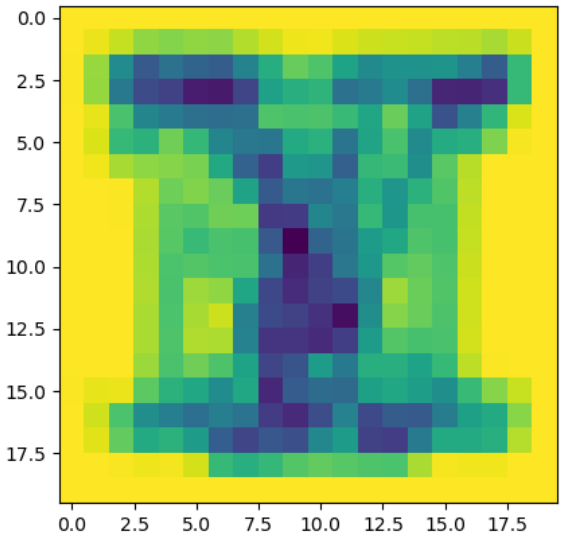

Figura 32: 6x2

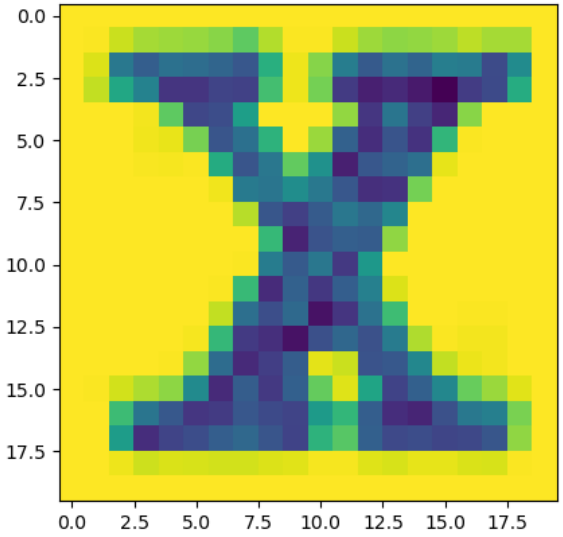

Figura 33: 6x4

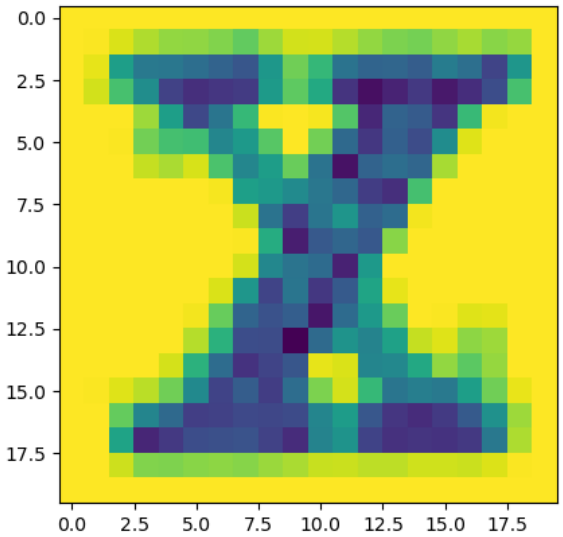

Figura 34: 6x6

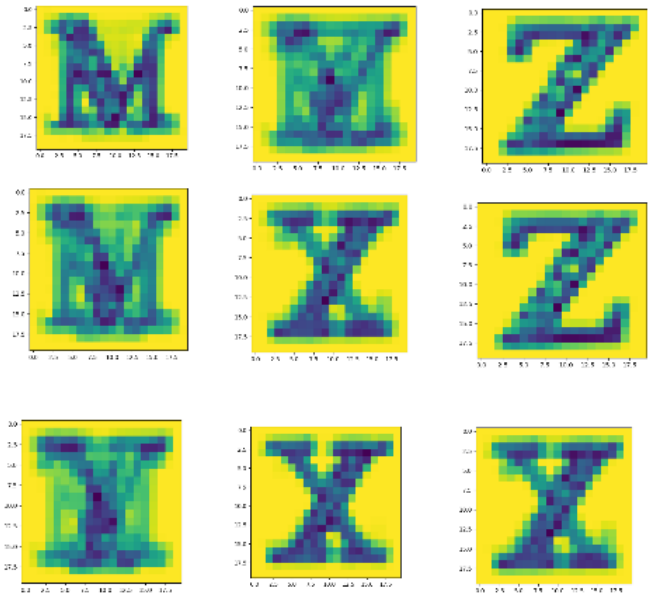

Figura 35: Partições

5 Referências

[1] Costa, Luciano Fontura. Costa's Didatics Texts 25.

[2] Silva, Éverton Luís Mendes. Programa utilizado para fazer a estrutura SOMs. https://github.com/evertonmendes/Analysis-and-Pattern-Recognition