Trabalho de redes Neurais Artificiais

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A. **Informações sobre o Problema estudado :**

Algoritmo Multi Layer Perceptron utilizando reconhecimento de imagens para classificação.
DataSet : Dice D4, D6, D8, D10, d12, D20
“Beginner set of 16,000 custom images for categorizing polyhedral dice”

*Informações retiradas do README.MD do dataset;

B. **Informações sobre o Preparação de dados :**

~ 85% / 15% (treino / teste)

- todas as imagens de treinamento são 480x480

- todas as imagens de teste d4, d8, d10 e d12 são 480x480

- a maioria das imagens de teste d6 e d20 são 480x480

- uma pequena porcentagem de imagens adicionais de teste d6 e d20 são maiores (1024 pixels de lado) e completamente diferentes do conjunto de treinamento
Taxa de aprendizado = 0.0001
Número de épocas = 15
Tamanho do Lote de Treino = 10
Tamanho do Lote de Teste = 10

C. **Informações sobre arquitetura e treinamento do RNA:**

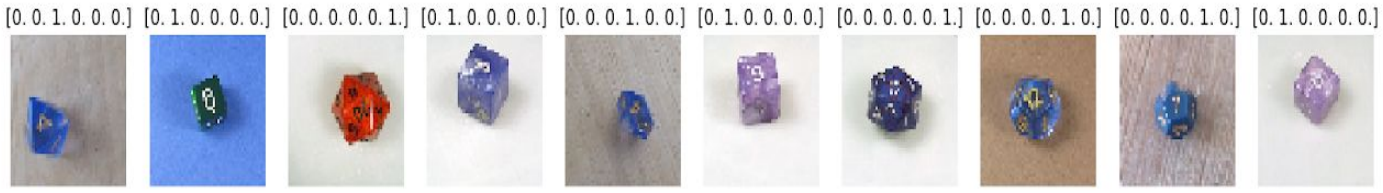
#primeira camada(Flatten) transforma a matriz 48x48
#primeira camada(Dense) tem 512 neuronios
#A segunda camada softmax com 6 nós - isto retorna um vetor com 6 valores de probabilidade que soma 1
#Cada nó contem o valor que indica a probabilidade que a image atual pertence a uma das 6 classes.

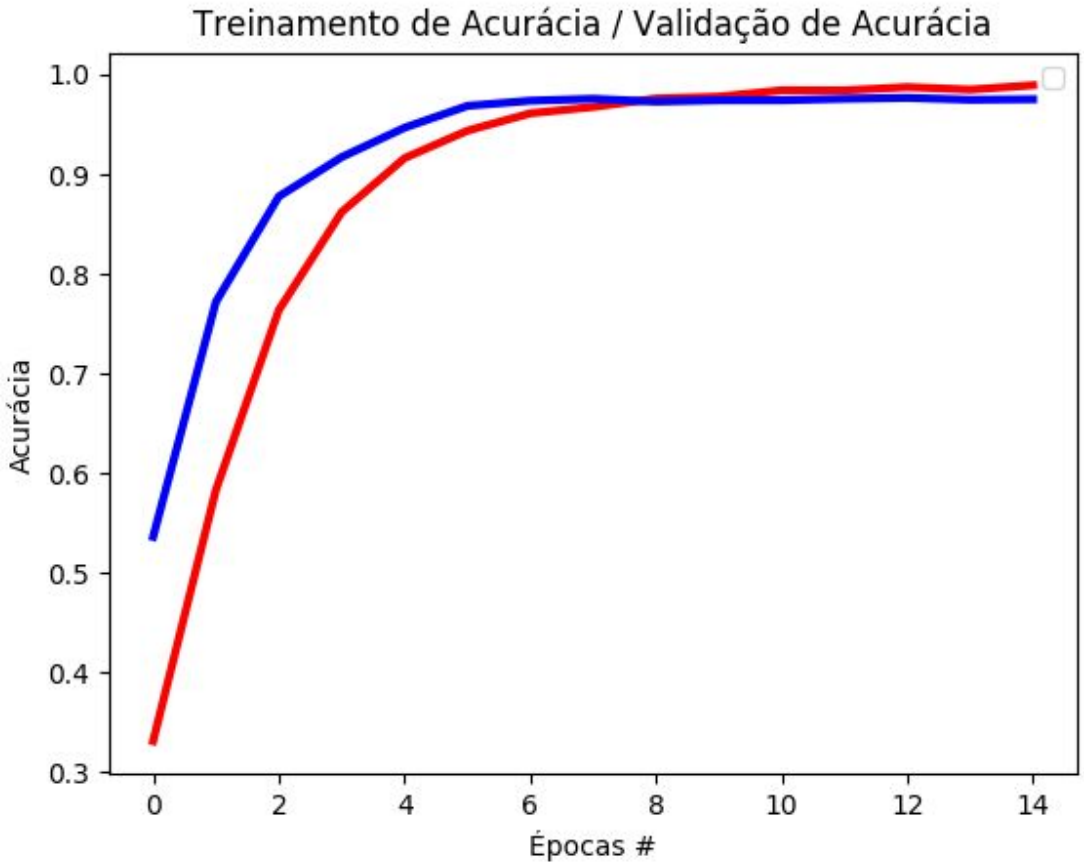
D. **Resultados Obtidos:**

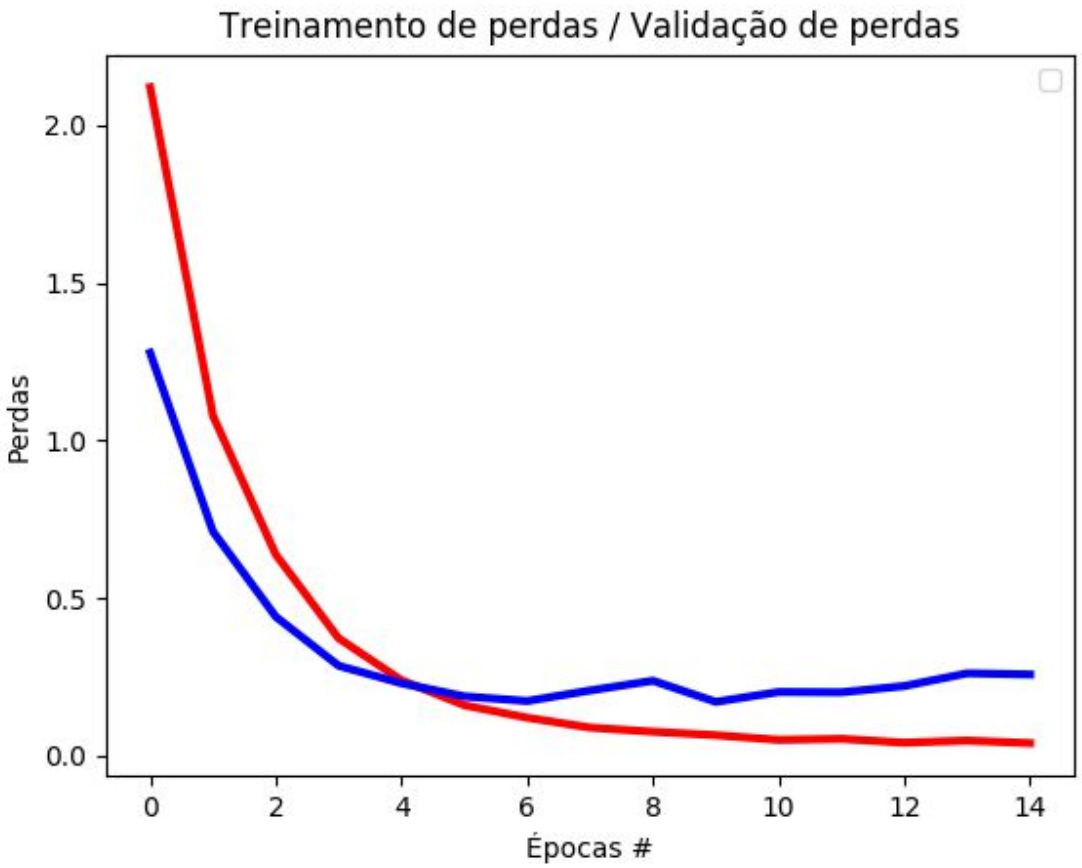
Epoch 1/15
- 130s - loss: 2.1201 - acc: 0.3311 - val_loss: 1.2778 - val_acc: 0.5362
Epoch 2/15
- 136s - loss: 1.0778 - acc: 0.5833 - val_loss: 0.7107 - val_acc: 0.7721
Epoch 3/15

- 144s - loss: 0.6373 - acc: 0.7638 - val_loss: 0.4402 - val_acc: 0.8777
Epoch 4/15
- 148s - loss: 0.3715 - acc: 0.8621 - val_loss: 0.2847 - val_acc: 0.9172
Epoch 5/15
- 149s - loss: 0.2388 - acc: 0.9161 - val_loss: 0.2291 - val_acc: 0.9467
Epoch 6/15
- 153s - loss: 0.1593 - acc: 0.9437 - val_loss: 0.1875 - val_acc: 0.9686
Epoch 7/15
- 150s - loss: 0.1198 - acc: 0.9612 - val_loss: 0.1728 - val_acc: 0.9738
Epoch 8/15
- 155s - loss: 0.0884 - acc: 0.9675 - val_loss: 0.2063 - val_acc: 0.9757
Epoch 9/15
- 155s - loss: 0.0753 - acc: 0.9760 - val_loss: 0.2372 - val_acc: 0.9729
Epoch 10/15
- 157s - loss: 0.0643 - acc: 0.9779 - val_loss: 0.1701 - val_acc: 0.9743
Epoch 11/15
- 154s - loss: 0.0494 - acc: 0.9843 - val_loss: 0.2015 - val_acc: 0.9743
Epoch 12/15
- 156s - loss: 0.0536 - acc: 0.9840 - val_loss: 0.2005 - val_acc: 0.9757
Epoch 13/15
- 157s - loss: 0.0406 - acc: 0.9875 - val_loss: 0.2203 - val_acc: 0.9767
Epoch 14/15
- 158s - loss: 0.0472 - acc: 0.9850 - val_loss: 0.2608 - val_acc: 0.9748
Epoch 15/15
- 154s - loss: 0.0392 - acc: 0.9894 - val_loss: 0.2571 - val_acc: 0.9753

Demonstração do dataset por classe : D4, D6, D8, D10, d12, D20




Treinamento de Acurácia / Validação de Acurácia
Acurácia
Épocas #
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
2
4
6
8
10
12
14



EXECUÇÃO (TEMPO GASTO) DO ALGORITMO E ACURÁCIA/PERDA OBTIDA

```
Use tf.where in 2.0, which has the same broadcast rule as np.where
Epoch 1/15
2019-07-10 01:30:57.324309: I tensorflow/core/platform/cpu_feature_guard.cc:145] This TensorFlow binary is optimized with Intel(R) MKL
ations:  SSE4.1 SSE4.2 AVX
To enable them in non-MKL-DNN operations, rebuild TensorFlow with the appropriate compiler flags.
2019-07-10 01:30:57.367334: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU Frequency: 2194960000 Hz
2019-07-10 01:30:57.367510: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x55f03b08b8c0 executing computations on pla
2019-07-10 01:30:57.367532: I tensorflow/compiler/xla/service/service.cc:175]   StreamExecutor device (0): <undefined>, <undefined>
2019-07-10 01:30:57.367664: I tensorflow/core/common_runtime/process_util.cc:115] Creating new thread pool with default inter op setti
2019-07-10 01:30:58.235628: W tensorflow/compiler/jit/mark_for_compilation_pass.cc:1412] (One-time warning): Not using XLA:CPU for clu
If you want XLA:CPU, either set that envvar, or use experimental_jit_scope to enable XLA:CPU.  To confirm that XLA is active, pass --v
TF_XLA_FLAGS) or set the envvar XLA_FLAGS=--xla_hlo_profile.
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30814 thread 1 bound to OS proc set 2
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30817 thread 3 bound to OS proc set 6
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30816 thread 2 bound to OS proc set 4
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30818 thread 4 bound to OS proc set 1
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30819 thread 5 bound to OS proc set 3
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30820 thread 6 bound to OS proc set 5
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30821 thread 7 bound to OS proc set 7
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30822 thread 8 bound to OS proc set 0
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30815 thread 9 bound to OS proc set 2
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30824 thread 11 bound to OS proc set 6
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30823 thread 10 bound to OS proc set 4
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30826 thread 13 bound to OS proc set 3
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30825 thread 12 bound to OS proc set 1
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30828 thread 15 bound to OS proc set 7
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30827 thread 14 bound to OS proc set 5
OMP: Info #250: KMP_AFFINITY: pid 30769 tid 30829 thread 16 bound to OS proc set 0
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