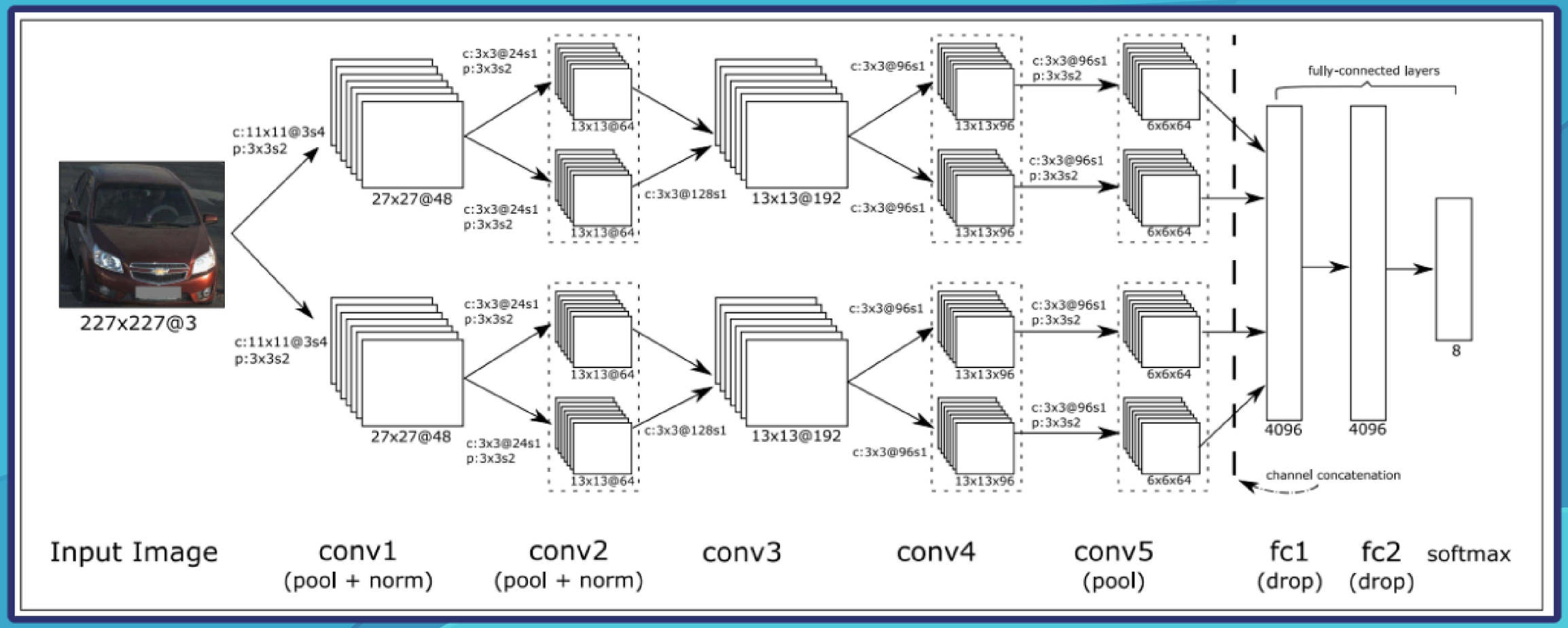
PROJETO II - SOYFIELD

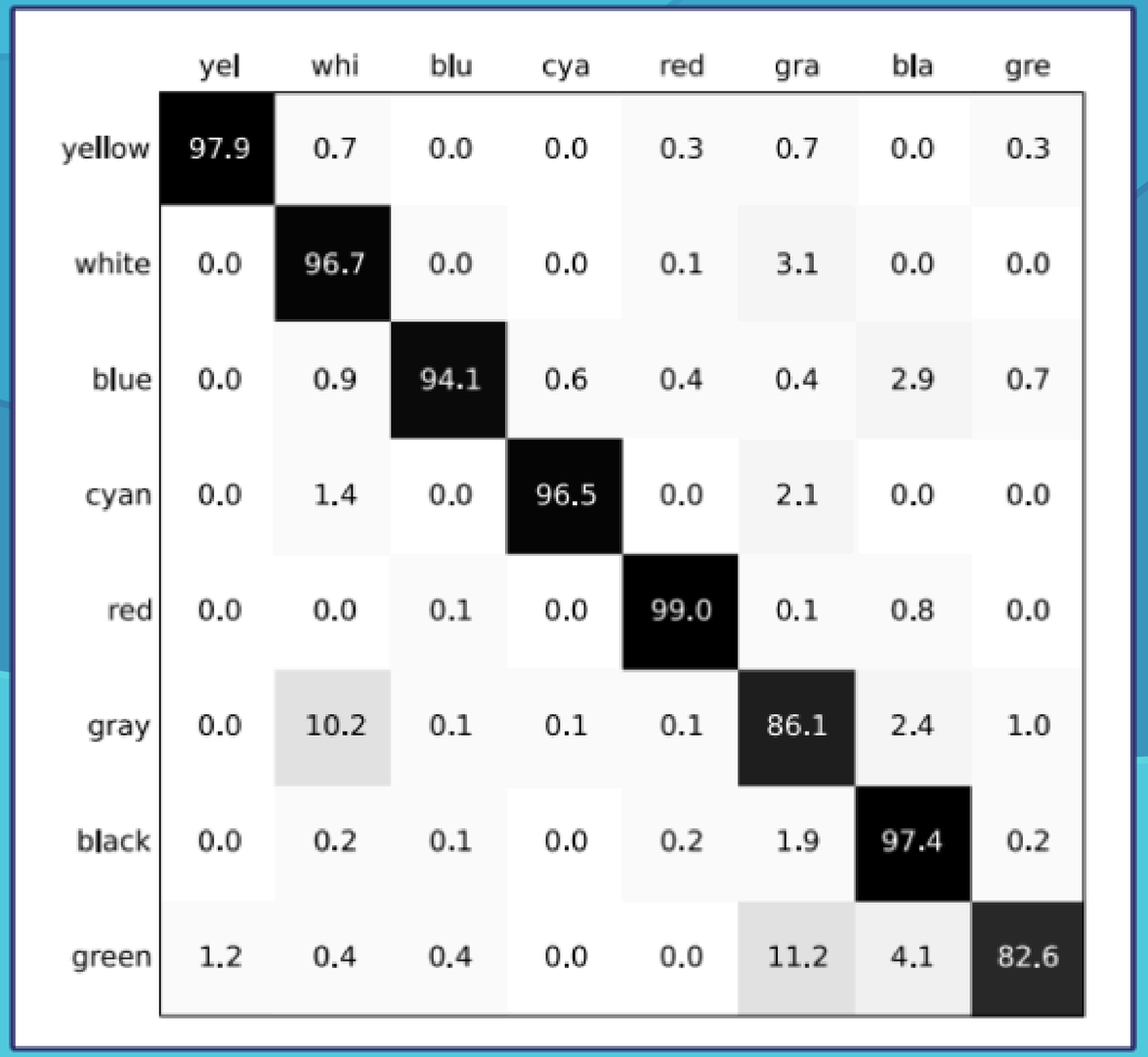
APRENDIZADO PROFUNDO

ARQUITETURA ORIGINAL



RESULTADOS DIVULGADOS

Acurácia
94.47%



SIMULAÇÕES

0s

```
Accuracy: 12.50%
Label 1: 0/910 (0.00%)
Label 2: 906/910 (99.56%)
Label 3: 0/910 (0.00%)
Label 4: 0/910 (0.00%)
Label 5: 0/910 (0.00%)
Label 6: 0/910 (0.00%)
Label 7: 4/910 (0.44%)
Label 8: 0/910 (0.00%)
```

	Image Name	Actual Label	Predicted Label
0	image_1_21_I_chunk0_0.png	1	2
1	image_1_21_I_chunk0_1.png	1	2
2	image_1_21_I_chunk0_10.png	1	2
3	image_1_21_I_chunk0_11.png	1	2
4	image_1_21_I_chunk0_12.png	1	2
...	...	...	...
7275	image_8_30_M_chunk6_5.png	8	2
7276	image_8_30_M_chunk6_6.png	8	2
7277	image_8_30_M_chunk6_7.png	8	2
7278	image_8_30_M_chunk6_8.png	8	2
7279	image_8_30_M_chunk6_9.png	8	2

7280 rows × 3 columns

SIMULAÇÕES

```
Accuracy: 12.79%
Label 1: 0/910 (0.00%)
Label 2: 39/910 (4.29%)
Label 3: 0/910 (0.00%)
Label 4: 0/910 (0.00%)
Label 5: 575/910 (63.19%)
Label 6: 0/910 (0.00%)
Label 7: 317/910 (34.84%)
Label 8: 0/910 (0.00%)
```

	Image Name	Actual Label	Predicted Label
0	image_1_21_I_chunk0_0.png	1	5
1	image_1_21_I_chunk0_1.png	1	5
2	image_1_21_I_chunk0_10.png	1	7
3	image_1_21_I_chunk0_11.png	1	5
4	image_1_21_I_chunk0_12.png	1	5
...	...	...	...
7275	image_8_30_M_chunk6_5.png	8	7
7276	image_8_30_M_chunk6_6.png	8	7
7277	image_8_30_M_chunk6_7.png	8	7
7278	image_8_30_M_chunk6_8.png	8	5
7279	image_8_30_M_chunk6_9.png	8	7

7280 rows × 3 columns

SIMULAÇÕES

```
Accuracy: 12.72%
Label 1: 0/910 (0.00%)
Label 2: 86/910 (9.45%)
Label 3: 394/910 (43.30%)
Label 4: 0/910 (0.00%)
Label 5: 90/910 (9.89%)
Label 6: 0/910 (0.00%)
Label 7: 355/910 (39.01%)
Label 8: 1/910 (0.11%)
```

	Image Name	Actual Label	Predicted Label
0	image_1_21_I_chunk0_0.png	1	3
1	image_1_21_I_chunk0_1.png	1	7
2	image_1_21_I_chunk0_10.png	1	2
3	image_1_21_I_chunk0_11.png	1	3
4	image_1_21_I_chunk0_12.png	1	7
...	...	...	...
7275	image_8_30_M_chunk6_5.png	8	2
7276	image_8_30_M_chunk6_6.png	8	3
7277	image_8_30_M_chunk6_7.png	8	3

ARQUITETURA PRÓPRIA

ESPECIFICAÇÕES DO PROJETO

Parâmetros e Hiperparâmetros	
Base de dados	Bayer
Tamanho do batch	64
Épocas	5 e 10
Passos/Época	227
Passos de validação	113

REGULARIZAÇÃO

Regularização do kernel		Dropout	
Tipo	L2	Quantidade	3
Quantidade	3	Dropout 1	20%
Valor	0.01	Dropout 2	30%
		Dropout 3	40%

REGULARIZAÇÃO

Early Stopping	
Valor monitorado	Perda no conjunto de validação
Paciência	3

ReduceLROnPlateau	
Valor monitorado	Perda no conjunto de validação
Paciência	2
Fator	0.5
LR mínima	1e-6

DATA AUGMENTATION

Data Augmentation (Treinamento)	
Rescale (norm.)	1 / 255
Rotação	-15° a +15°
Deslocamento	10% da larg. e alt.
Brilho	80% a 120%
Zoom	-20% a 20%
Cisalhamento	15%

Data Augmentation (Teste)	
Rescale (norm.)	1 / 255

SUMÁRIO DO MODELOS

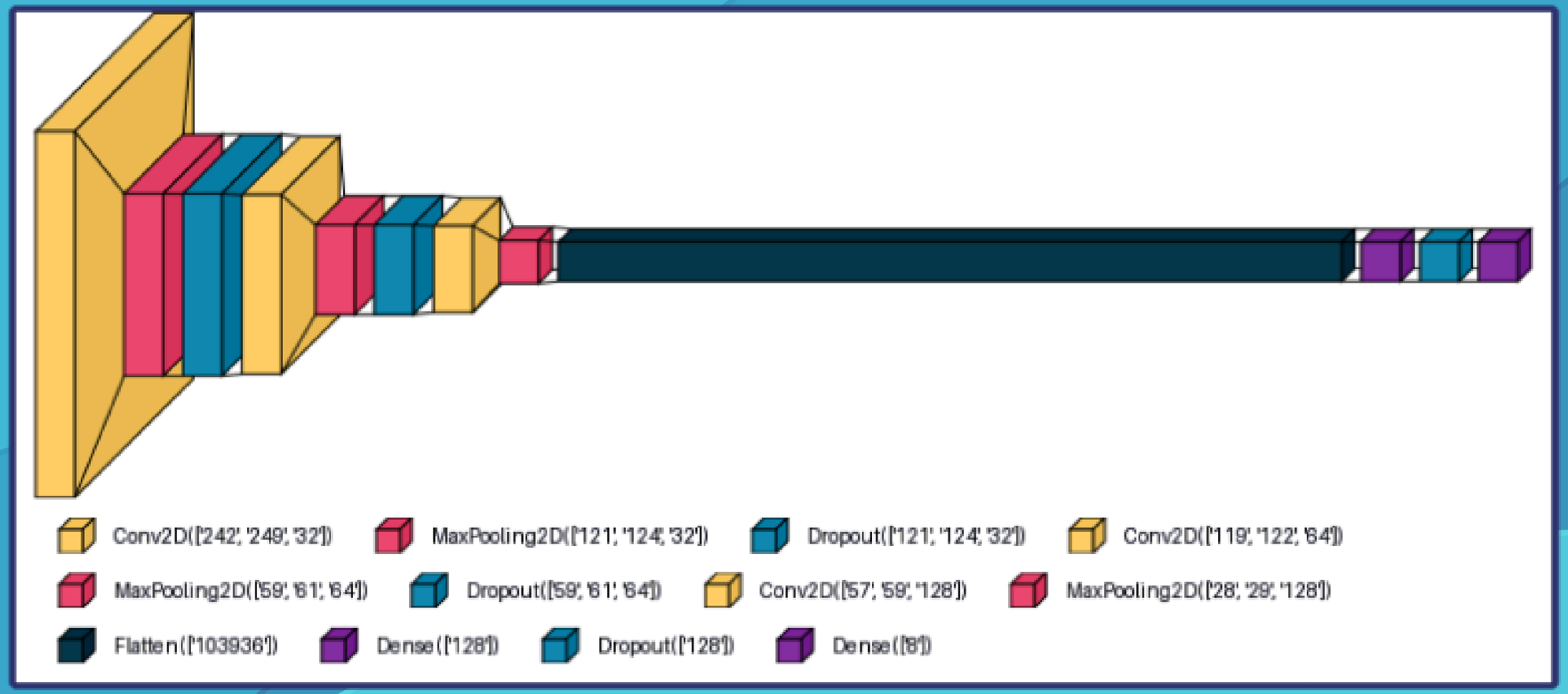
```
0s
1 model.summary()
```

Model: "sequential_3"

Layer (type)	Output Shape	Param #
conv2d_9 (Conv2D)	(None, 242, 249, 32)	896
max_pooling2d_9 (MaxPooling2D)	(None, 121, 124, 32)	0
dropout_9 (Dropout)	(None, 121, 124, 32)	0
conv2d_10 (Conv2D)	(None, 119, 122, 64)	18,496
max_pooling2d_10 (MaxPooling2D)	(None, 59, 61, 64)	0
dropout_10 (Dropout)	(None, 59, 61, 64)	0
conv2d_11 (Conv2D)	(None, 57, 59, 128)	73,856
max_pooling2d_11 (MaxPooling2D)	(None, 28, 29, 128)	0
flatten_3 (Flatten)	(None, 103936)	0
dense_6 (Dense)	(None, 128)	13,303,936
dropout_11 (Dropout)	(None, 128)	0
dense_7 (Dense)	(None, 8)	1,032

Total params: 13,398,216 (51.11 MB)
Trainable params: 13,398,216 (51.11 MB)
Non-trainable params: 0 (0.00 B)

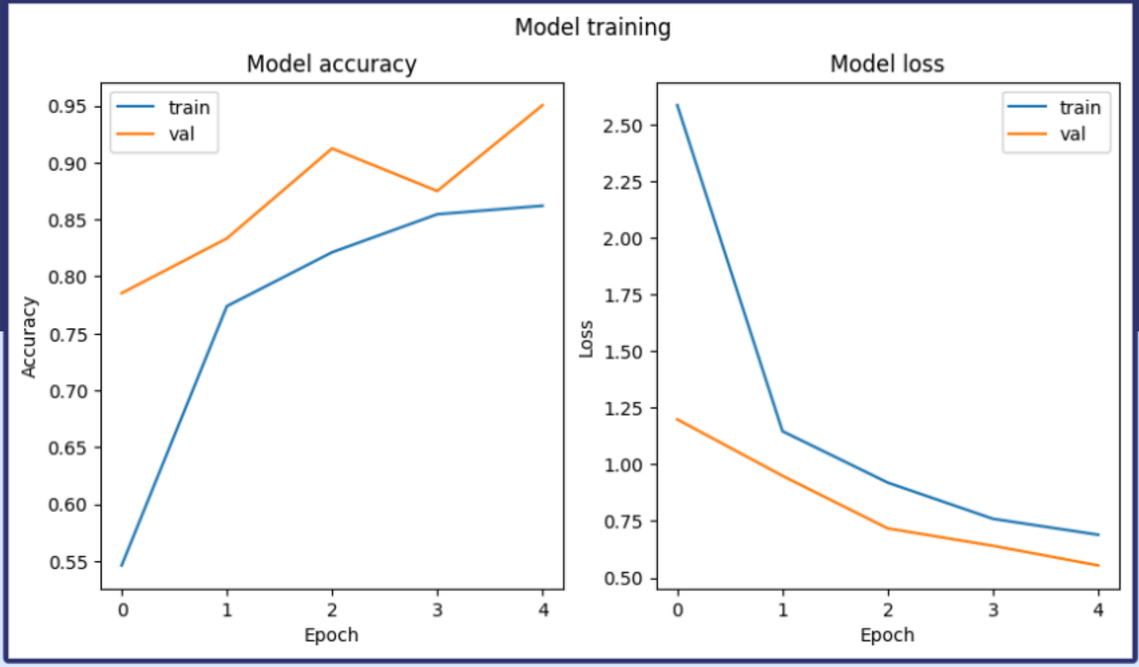
ARQUITETURA



TREINAMENTO

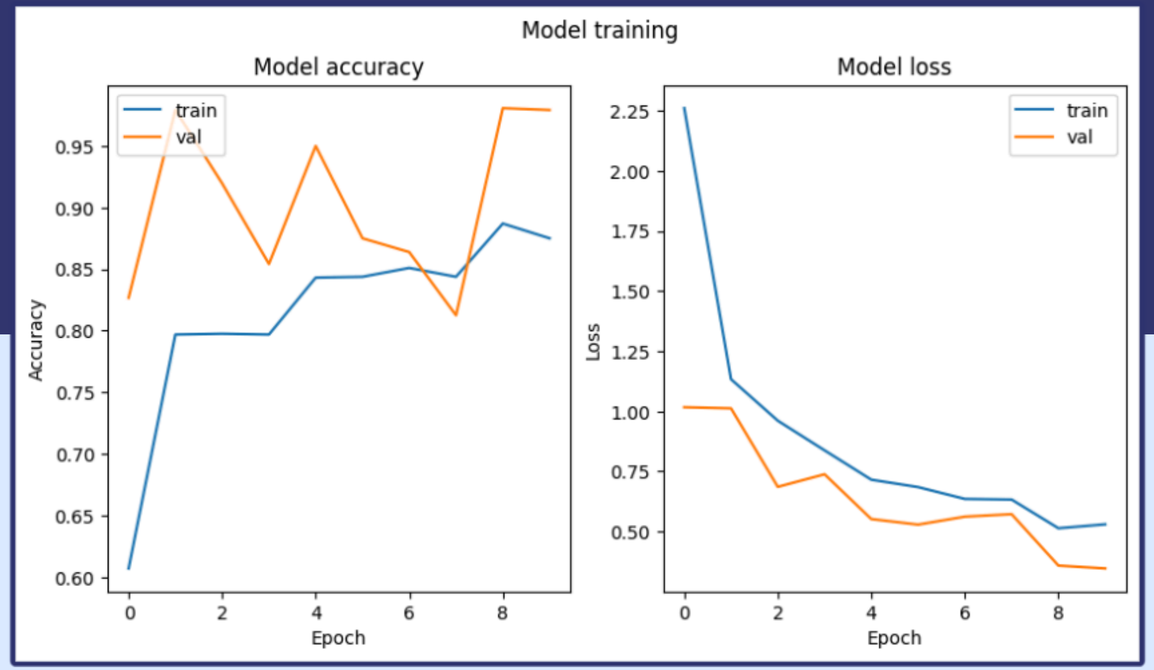
MODELO 1

5 ÉPOCAS



Época	Acurácia	ΔA	ΔA (%)	Perda	ΔP	ΔP (%)
1	0,3699	-	-	4,2027	-	-
2	0,7645	0,3946	106,6775	1,1754	-3,0273	-72,0323
3	0,8046	0,0401	5,245258	1,005	-0,1704	-14,4972
4	0,8506	0,046	5,717127	0,7736	-0,2314	-23,0249
5	0,8488	-0,0018	-0,21162	0,7489	-0,0247	-3,19286

MODELO 2
10 ÉPOCAS



Época	Acurácia	ΔA	ΔA (%)	Perca	ΔP	ΔP (%)
1	0,4265	-	-	3,8292	-	-
2	0,7969	0,3704	86,84642	1,1335	-2,6957	-70,3985
3	0,7903	-0,0066	-0,82821	1,0298	-0,1037	-9,14865
4	0,7969	0,0066	0,835126	0,8376	-0,1922	-18,6638
5	0,8381	0,0412	5,170034	0,7528	-0,0848	-10,1242
6	0,8438	0,0057	0,68011	0,6847	-0,0681	-9,04623
7	0,8448	0,001	0,118511	0,6607	-0,024	-3,50518
8	0,8438	-0,001	-0,11837	0,6329	-0,0278	-4,20766
9	0,8799	0,0361	4,278265	0,5358	-0,0971	-15,3421
10	0,875	-0,0049	-0,55688	0,5297	-0,0061	-1,13848

TESTES

COMPARAÇÃO ENTRE OS MODELOS

Acurácia	
Modelo 1	Modelo 2
95,04%	97,93%

COMPARAÇÃO ENTRE OS MODELOS

MODELO 1

```
Results per class:
- Stage 1: 100.00%
- Stage 2: 92.64%
- Stage 3: 93.85%
- Stage 4: 93.63%
- Stage 5: 100.00%
- Stage 6: 99.78%
- Stage 7: 88.13%
- Stage 8: 92.11%
```

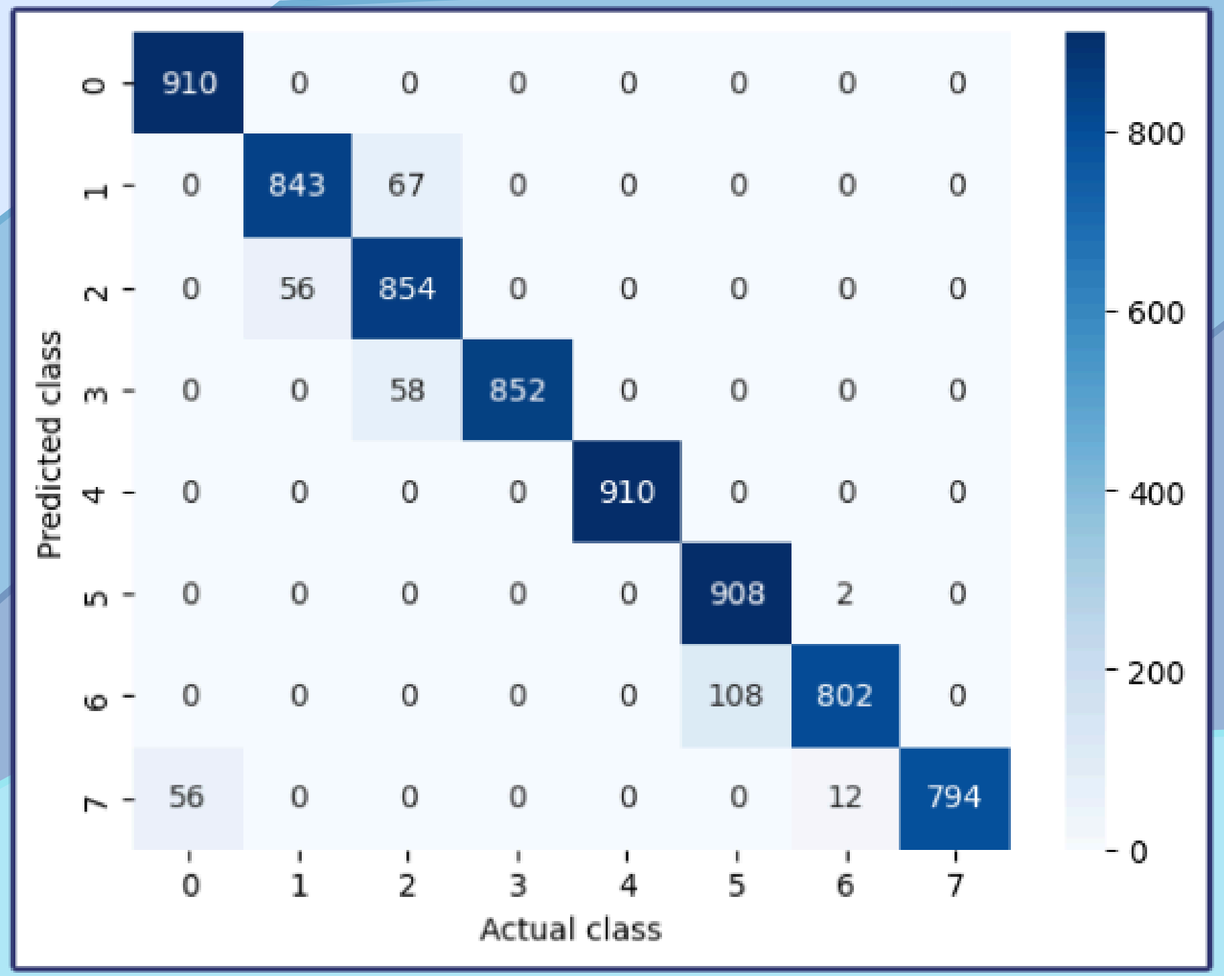
MODELO 2

```
Results per class:
- Stage 1: 99.23%
- Stage 2: 96.59%
- Stage 3: 97.69%
- Stage 4: 97.58%
- Stage 5: 100.00%
- Stage 6: 94.51%
- Stage 7: 99.67%
- Stage 8: 98.14%
```

COMPARAÇÃO ENTRE OS MODELOS

MATRIZ DE CONFUSÃO

MODELO 1

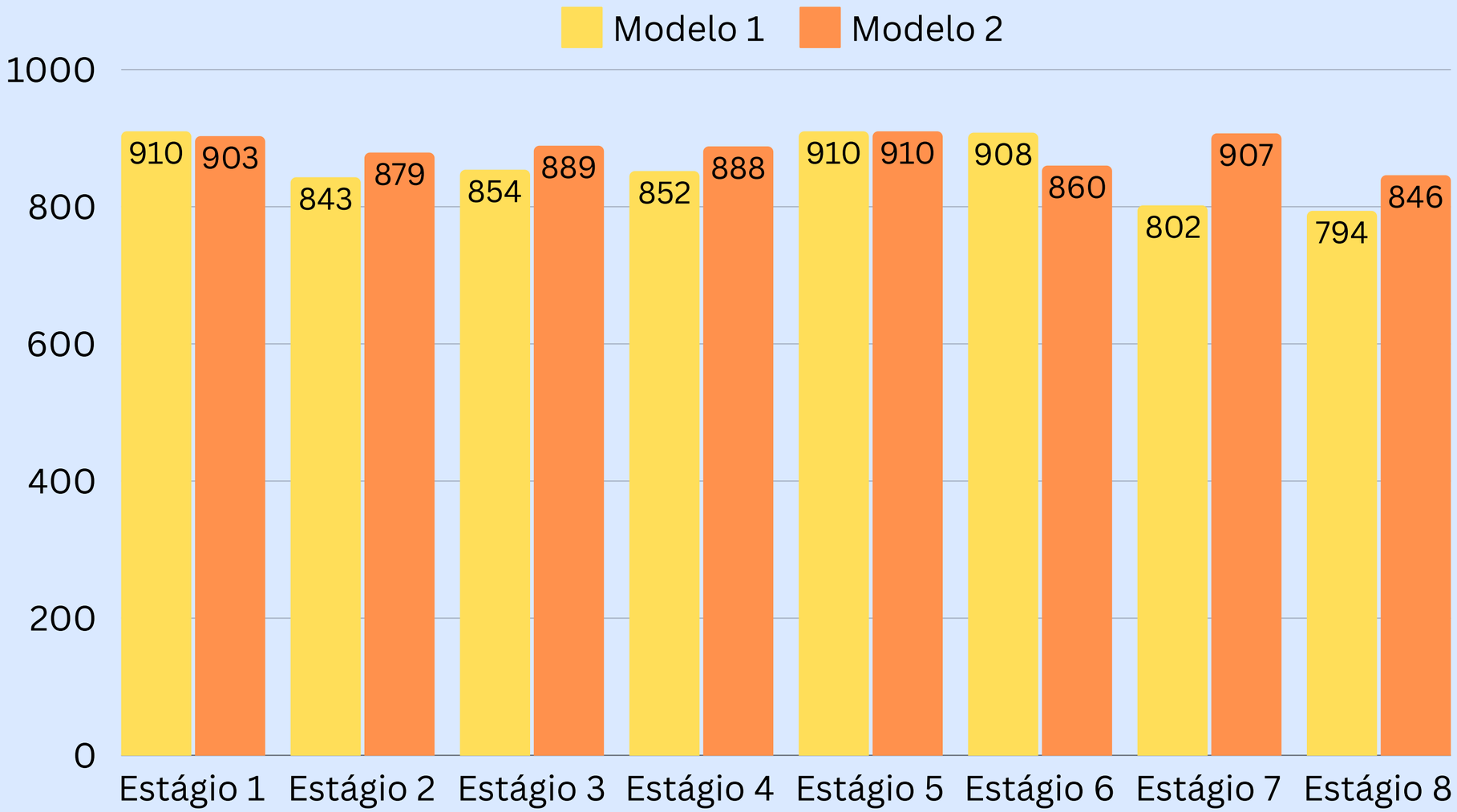


COMPARAÇÃO ENTRE OS MODELOS

MATRIZ DE CONFUSÃO

MODELO 2

COMPARAÇÃO ENTRE OS MODELOS



DIFICULDADES

REFERÊNCIAS

- CHEN, P.; BAI, X.; LIU, W. Vehicle Color Recognition on Urban Road by Feature Context. IEEE Transactions on Intelligent Transportation Systems, v. 15, n. 5, p. 2340–2346, out. 2014.
- PAUL, G. visualkeras. Github repository, 2020. Disponível em: <https://github.com/paulgavrikov/visualkeras/>.