Documentation

This CNN was built to classify images from 96 classes, wich where generated by an AI model. I have no ideea what the classes was (I only know for sure that two classes was frogs:)). The images are 64x64 RGB.

Train_images folder contains 12000 images to train the model and val_images contains 1000 images for validation. The .csv files contains the labels for the images.

On the next page you will find an image with the model architecture

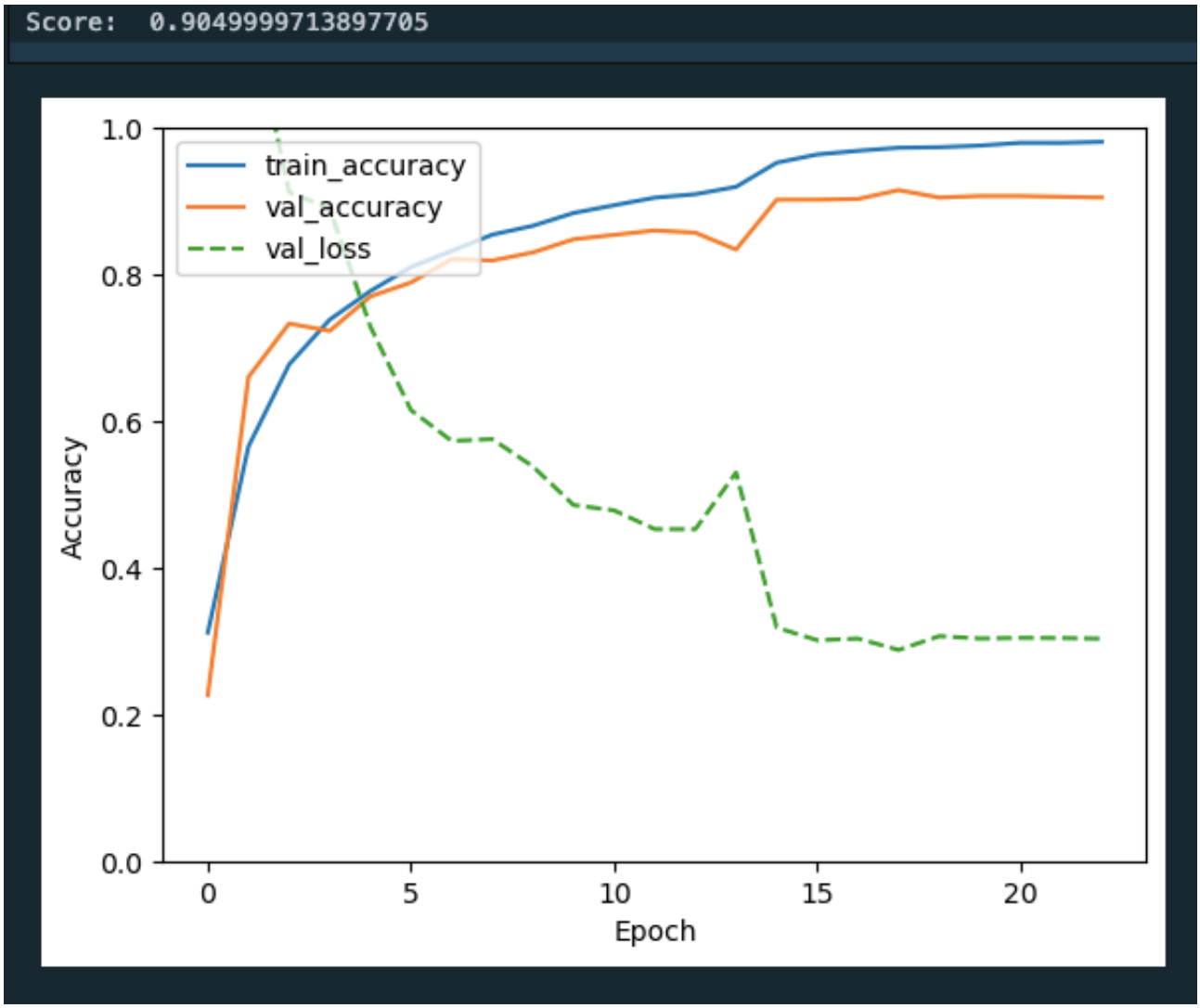
Layer (type)	Output Shape	Param #
conv2d_6 (Conv2D)	(None, 60, 60, 80)	6080
re_lu_7 (ReLU)	(None, 60, 60, 80)	0
batch_normalization_7 (BatchNormalization)	(None, 60, 60, 80)	320
conv2d_7 (Conv2D)	(None, 60, 60, 256)	20736
re_lu_8 (ReLU)	(None, 60, 60, 256)	0
batch_normalization_8 (BatchNormalization)	(None, 60, 60, 256)	1024
max_pooling2d_1 (MaxPooling2D)	(None, 20, 20, 256)	0
conv2d_8 (Conv2D)	(None, 18, 18, 176)	405680
re_lu_9 (ReLU)	(None, 18, 18, 176)	0
batch_normalization_9 (BatchNormalization)	(None, 18, 18, 176)	704
conv2d_9 (Conv2D)	(None, 18, 18, 176)	31152
re_lu_10 (ReLU)	(None, 18, 18, 176)	0
batch_normalization_10 (BatchNormalization)	(None, 18, 18, 176)	704
conv2d_10 (Conv2D)	(None, 16, 16, 200)	317000
re_lu_11 (ReLU)	(None, 16, 16, 200)	0
batch_normalization_11 (BatchNormalization)	(None, 16, 16, 200)	800
conv2d_11 (Conv2D)	(None, 16, 16, 600)	120600
re_lu_12 (ReLU)	(None, 16, 16, 600)	0
batch_normalization_12 (BatchNormalization)	(None, 16, 16, 600)	2400
dropout_1 (Dropout)	(None, 16, 16, 600)	0
global_average_pooling2d_1 (GlobalAveragePooling2D)	(None, 600)	0
flatten_1 (Flatten)	(None, 600)	0
dense_2 (Dense)	(None, 96)	57696
re_lu_13 (ReLU)	(None, 96)	0
batch_normalization_13 (BatchNormalization)	(None, 96)	384
dropout_2 (Dropout)	(None, 96)	0
dense_3 (Dense)	(None, 96)	9312

Total params: 974,592
Trainable params: 971,424
Non-trainable params: 3,168

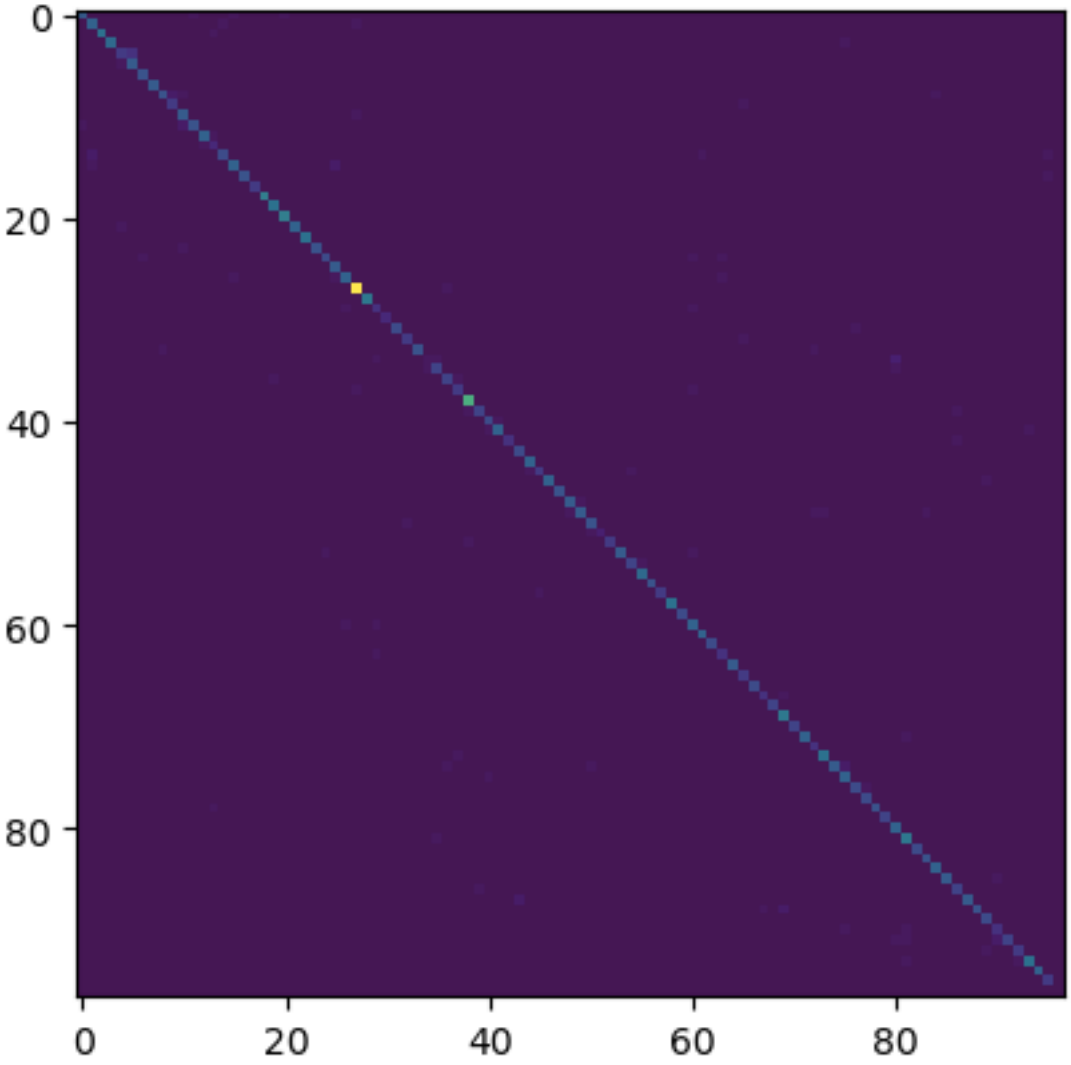
Hiperparameters:

- **OPTIMIZER: ADAM**
- **LOSS FUNCTION: CATEGORICAL CROSSENTROPY**
- **LEARNING RATE: 0.0005 (+REDUCE ON PLATEAU)**
- **EPOCHS: 50 (+EARLY STOPPING)**

Learning Grafic:



Confusion Matrix:



Recall and f1-score:

class	precision	recall	f1-score	support
0	1.00	0.92	0.96	13
1	0.86	0.92	0.89	13
2	0.93	1.00	0.97	14
3	1.00	0.92	0.96	13
4	0.71	0.45	0.56	11
5	0.60	0.82	0.69	11
6	1.00	1.00	1.00	9
7	1.00	0.90	0.95	10
8	0.88	0.54	0.67	13
9	0.67	0.86	0.75	7
10	0.73	1.00	0.85	11
11	1.00	0.83	0.91	12
12	1.00	0.92	0.96	12
13	0.83	1.00	0.91	5
14	0.92	0.92	0.92	12
15	0.80	0.57	0.67	14
16	1.00	0.90	0.95	10
17	1.00	1.00	1.00	6
18	1.00	0.93	0.97	15
19	1.00	1.00	1.00	13
20	1.00	1.00	1.00	15
21	1.00	0.92	0.96	12
22	1.00	1.00	1.00	13
23	1.00	0.90	0.95	10
24	0.89	0.73	0.80	11
25	0.64	0.90	0.75	10
26	0.92	0.79	0.85	14
27	0.97	1.00	0.99	36
28	1.00	0.93	0.96	14
29	0.56	0.71	0.63	7
30	1.00	1.00	1.00	4
31	0.89	0.89	0.89	9
32	0.70	1.00	0.82	7
33	1.00	0.91	0.95	11
34	0.75	0.50	0.60	6
35	0.80	0.89	0.84	9
36	0.90	1.00	0.95	9
37	1.00	0.88	0.93	8
38	0.81	1.00	0.90	22
39	0.83	0.56	0.67	9
40	0.58	0.78	0.67	9
41	0.83	0.77	0.80	13
42	1.00	0.83	0.91	6
43	0.70	0.88	0.78	8
44	0.92	1.00	0.96	11
45	1.00	0.88	0.93	8

46	1.00	0.83	0.91	12
47	1.00	1.00	1.00	9
48	0.91	0.91	0.91	11
49	0.92	0.86	0.89	14
50	1.00	0.80	0.89	10
51	0.67	1.00	0.80	4
52	1.00	0.86	0.92	7
53	0.85	0.92	0.88	12
54	1.00	0.88	0.93	8
55	0.92	1.00	0.96	12
56	1.00	0.89	0.94	9
57	1.00	1.00	1.00	7
58	1.00	0.92	0.96	13
59	0.89	1.00	0.94	8
60	0.85	0.85	0.85	13
61	1.00	1.00	1.00	11
62	1.00	1.00	1.00	8
63	0.50	0.83	0.62	6
64	1.00	1.00	1.00	10
65	0.83	0.83	0.83	6
66	1.00	1.00	1.00	8
67	0.75	1.00	0.86	6
68	1.00	0.86	0.92	7
69	1.00	1.00	1.00	14
70	1.00	1.00	1.00	7
71	1.00	0.92	0.96	12
72	1.00	1.00	1.00	5
73	0.93	1.00	0.97	14
74	1.00	0.71	0.83	14
75	0.73	0.92	0.81	12
76	0.90	1.00	0.95	9
77	1.00	1.00	1.00	8
78	1.00	1.00	1.00	10
79	1.00	1.00	1.00	7
80	0.77	0.91	0.83	11
81	0.76	0.87	0.81	15
82	1.00	1.00	1.00	8
83	1.00	1.00	1.00	9
84	0.83	0.91	0.87	11
85	1.00	0.91	0.95	11
86	0.88	0.88	0.88	8
87	0.91	0.83	0.87	12
88	1.00	0.75	0.86	12
89	0.73	1.00	0.84	8
90	0.71	0.71	0.71	7
91	0.90	0.82	0.86	11
92	0.86	0.86	0.86	7
93	1.00	0.93	0.97	15

94	1.00	1.00	1.00	11
95	0.83	0.83	0.83	6
accuracy			0.90	