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# Controle de Um Veículo em Ambiente Simulado

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# Coleta de dados



## Imagens

Imagem\_0  
Imagem\_1  
Imagem\_2  
Imagem\_3



## Controle

Esquerda  
Direita  
Velocidade



## CSV

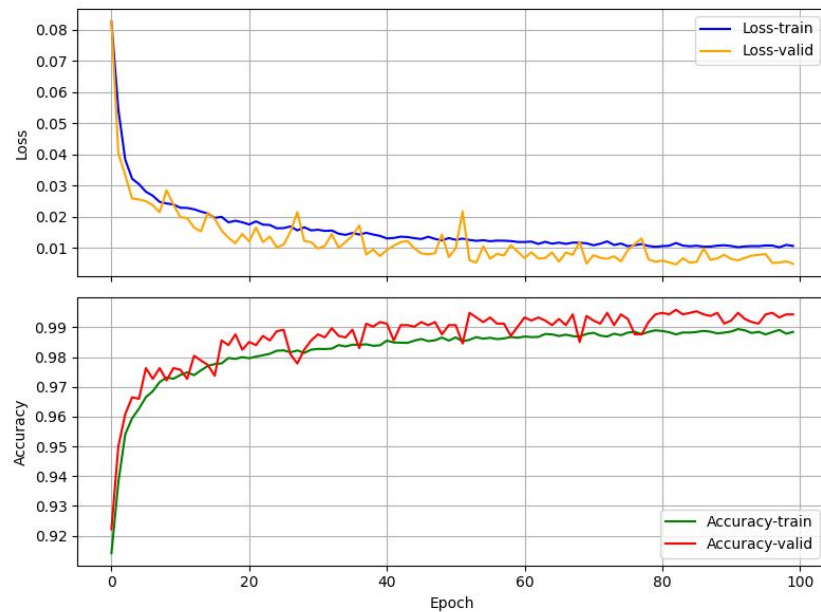
imagem\_0, 0, 1.0, 3.0  
imagem\_1, -1, 1.0, 4.0  
imagem\_2, 1, 1.0, 5.0

# Rede Neural

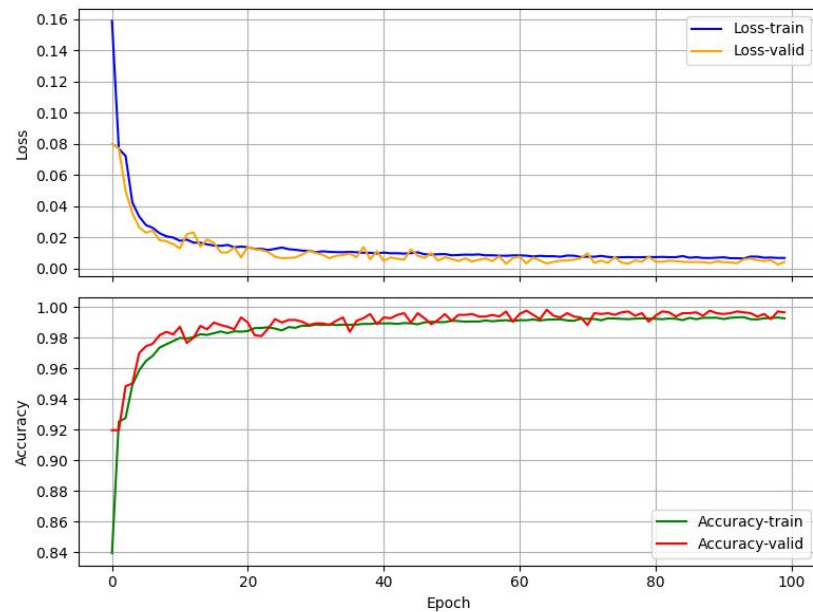
Camada	Tipo	Kernel	Stride	Ativação	Saída	Feat. Map
1	$input_1$	84x84x1	--	--	84x84x1	1
2	Conv2D	8x8	4x4	Sigmoid	20x20x32	32
3	Conv2D	4x4	2x2	Sigmoid	9x9x64	64
4	Conv2D	3x3	2x2	Sigmoid	4x4x64	64
5	Flatten	--	--	--	1024	--
6	Concatenate	--	--	--	$1024 + input_2$	--
7	Dense	--	--	Sigmoid	512	--
8	Dense	--	--	Sigmoid	512	--
9	Dense	--	--	Tanh	2	--

# Acurácia e Função Custo - automático

Seed Fixa



Seed Aleatória



# Desempenho

Seed Fixa

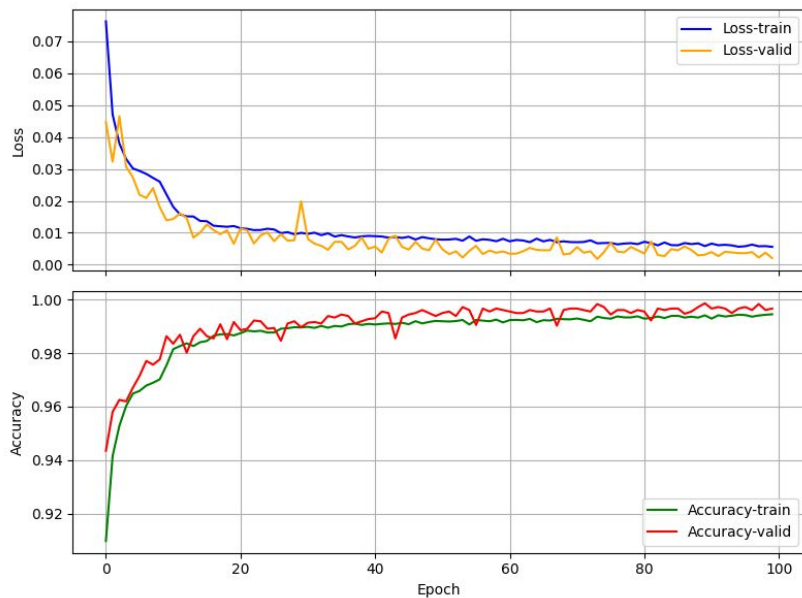


Seed Aleatória



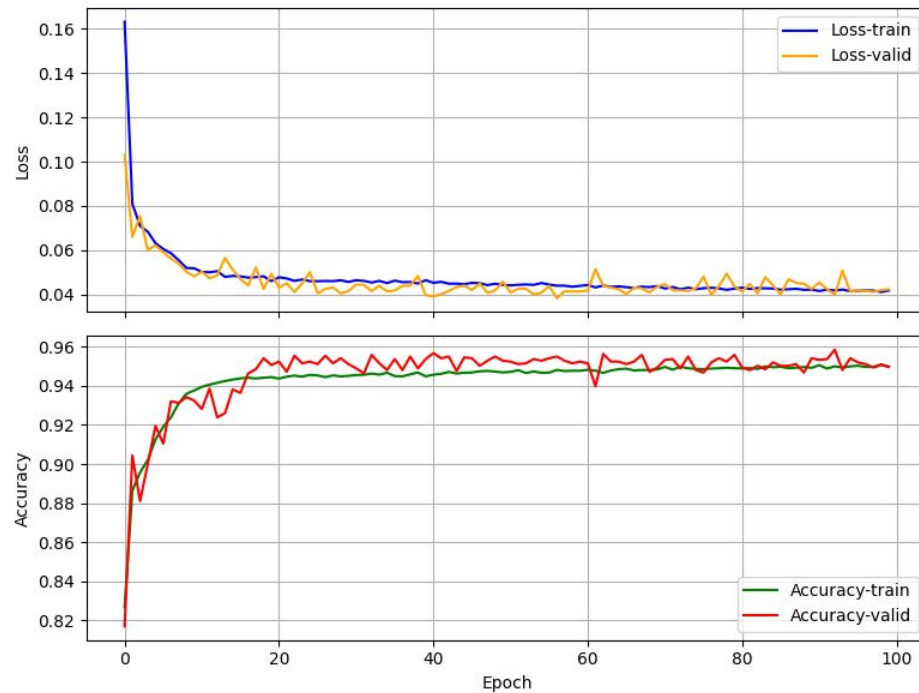
# Acurácia e Função Custo - Sem Velocidade

Seed Fixa



# Acurácia e Função Custo

Treinamento humano 1º tentativa (fail)



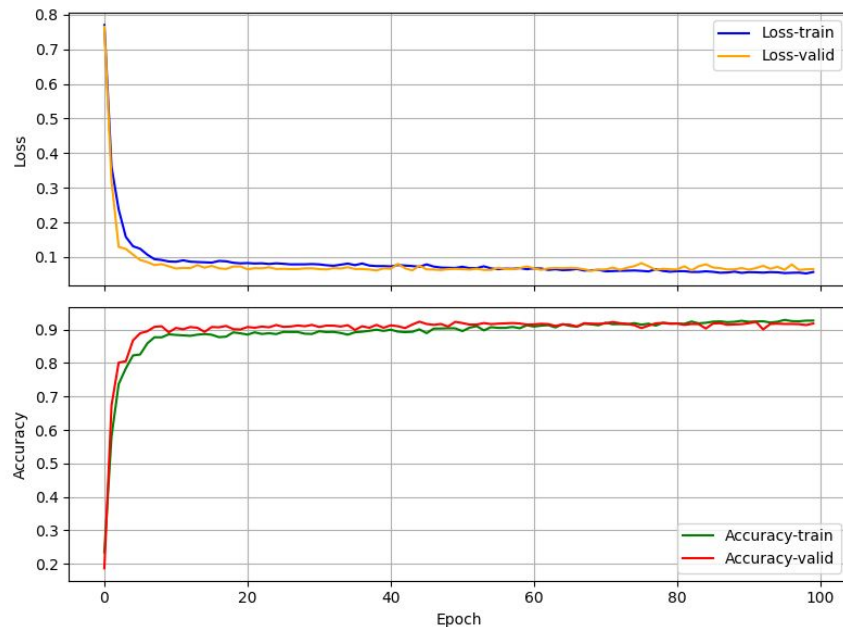
# Balanceamento dos Dados

```
# salva as fotos sem zoom
if counter >= 30:
    if(retaCount1 < maxCount and input[0] == 0 and car.true_speed < 30 and car.true_speed > 1.0):
        add_image_and_input_to_array(screen, input, car.true_speed)
        retaCount1 += 1
    elif(curvaEsquerdaCount1 < maxCount and input[0] == -1 and car.true_speed < 30 and car.true_speed > 1.0):
        add_image_and_input_to_array(screen, input, car.true_speed)
        curvaEsquerdaCount1 += 1
    elif(curvaDireitaCount1 < maxCount and input[0] == 1 and car.true_speed < 30 and car.true_speed > 1.0):
        add_image_and_input_to_array(screen, input, car.true_speed)
        curvaDireitaCount1 += 1
    elif(retaCount2 < maxCount and input[0] == 0 and car.true_speed > 30):
        add_image_and_input_to_array(screen, input, car.true_speed)
        retaCount2 += 1
    elif(curvaEsquerdaCount2 < maxCount and input[0] == -1 and car.true_speed > 30):
        add_image_and_input_to_array(screen, input, car.true_speed)
        curvaEsquerdaCount2 += 1
    elif(curvaDireitaCount2 < maxCount and input[0] == 1 and car.true_speed > 30):
        add_image_and_input_to_array(screen, input, car.true_speed)
        curvaDireitaCount2 += 1
```



# Acurácia e Função Custo

Treinamento humano 2º tentativa (Success)





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# Demonstração

# Referências

KERAS. Applications. Disponível em: <https://keras.io/api/applications/>. Acesso em: 04 out. 2024.

OPENCV. OpenCV Documentation. Disponível em: <https://opencv.org/>. Acesso em: 04 out. 2024.

VERGOTTEN. Optimizers: A comprehensive study of optimizers in deep learning. Medium, 07 nov. 2019. Disponível em: <https://medium.com/@vergotten/optimizers-a-comprehensive-study-of-optimizers-in-deep-learning-80a54490181f>. Acesso em: 04

