
IMAGE SUPER RESOLUTION

— Proyecto Final Machine
Learning Avanzado —

Armando Rios Lastiri

Aplicaciones Super Resolución (SR)

Sistemas de vigilancia



Medicina



Imágenes Satelitales



Restauración de imágenes



Astronomía



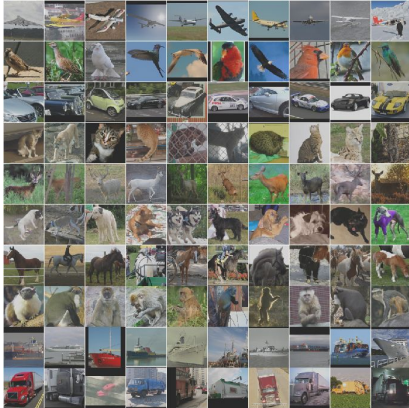
Video juegos



Conjunto de Datos



- **CelebFaces Attributes Dataset (CelebA)**
- 202,599 de imagenes
- Resolución 178x128 píxeles.



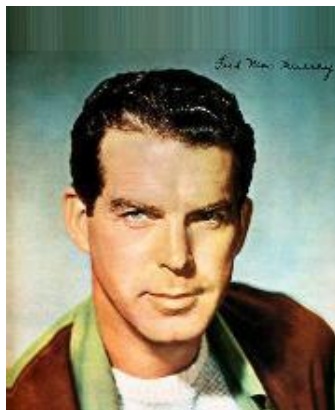
- **STL-10 Image Recognition Dataset**
- 10 classes: airplane, bird, car, cat, deer, dog, horse, monkey, ship, truck
- 100,000 imágenes
- Resolución 96x96 píxeles

Entrenamiento: 211,820

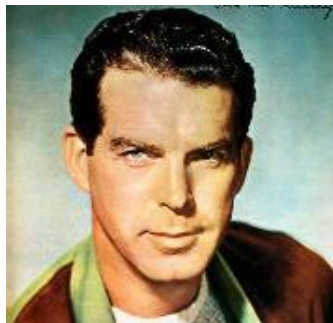
Validación: 86,799

Prueba: 4000

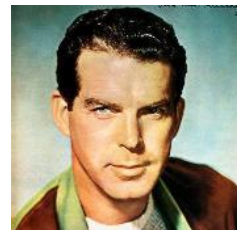
Preprocesamiento



**178x128
(original)**

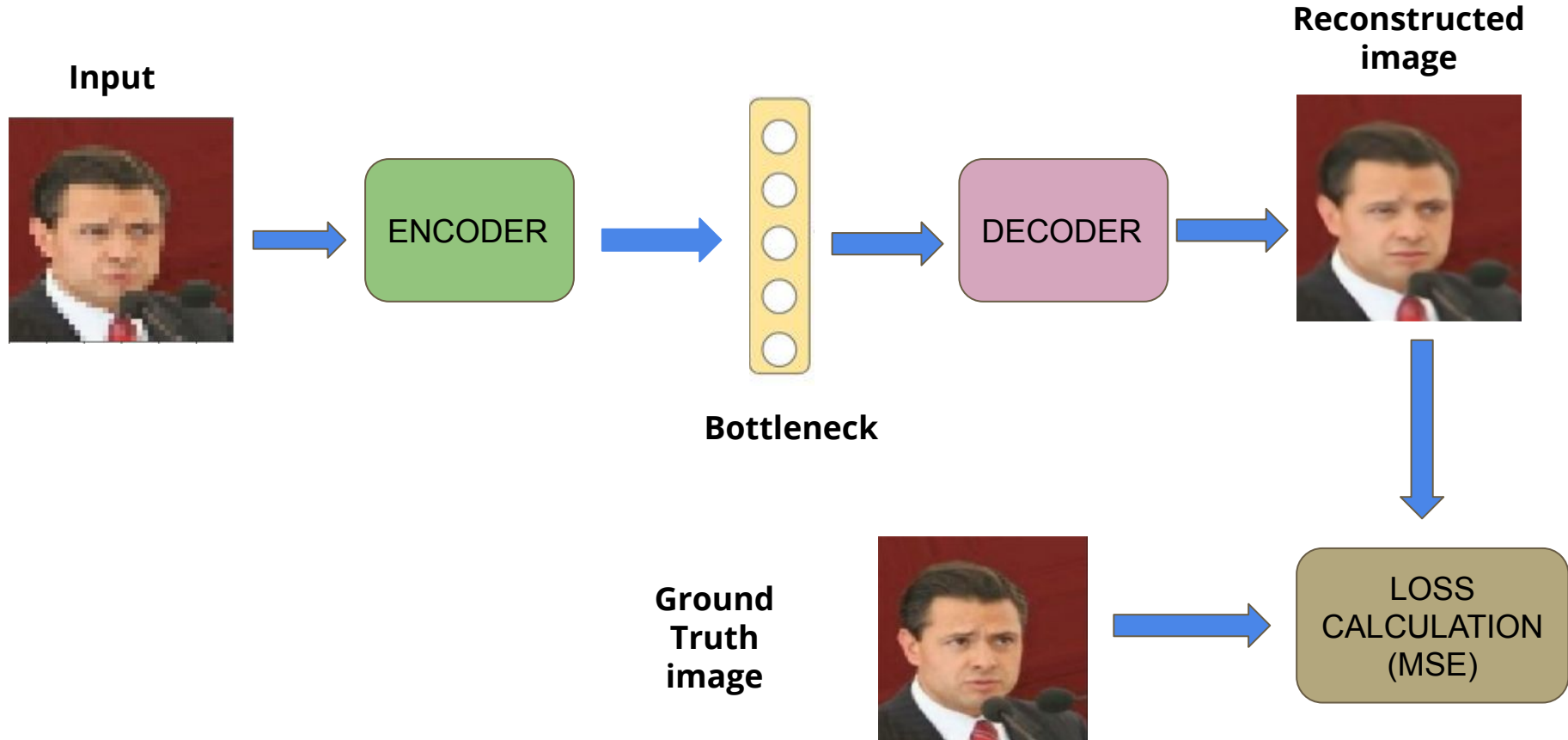


**120x120
High Resolution
(HR)**



**40x40
Low Resolution
(LR)**

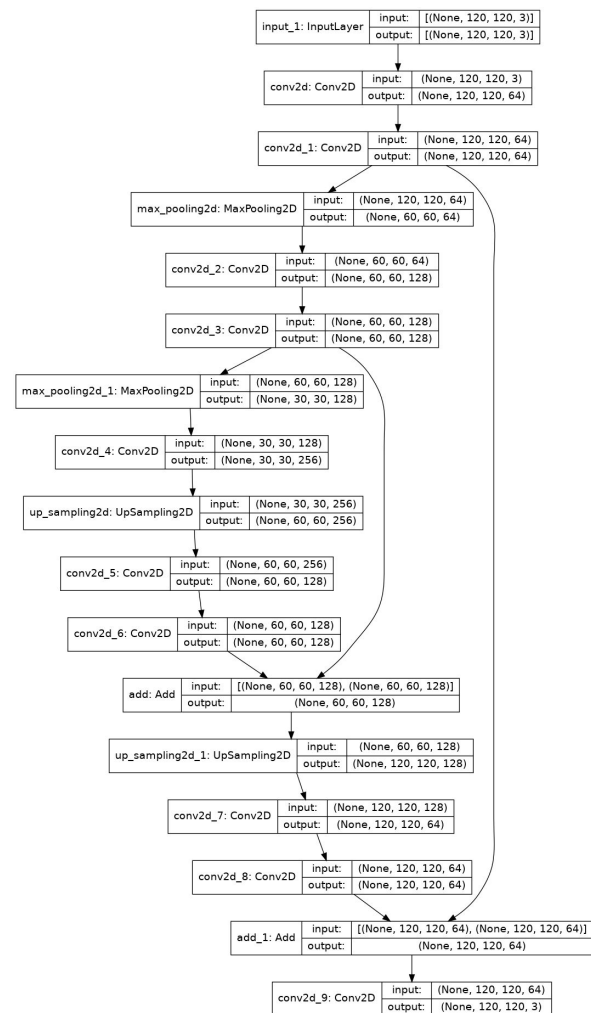
AUTOENCODER (SR)



AUTOENCODER (SR)

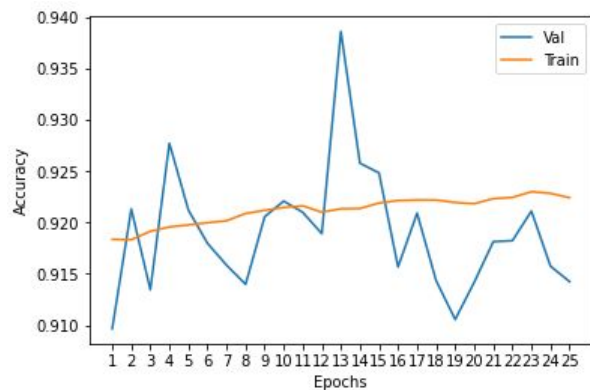
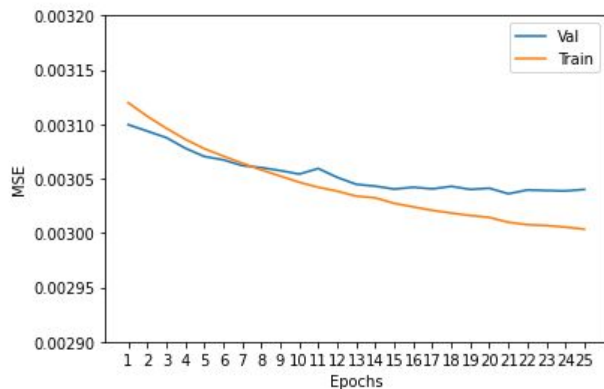
Layer (type)	Output Shape	Param #	Connected to
input_1 (InputLayer)	[(None, 120, 120, 3)]	0	
conv2d (Conv2D)	(None, 120, 120, 64)	1792	input_1[0][0]
conv2d_1 (Conv2D)	(None, 120, 120, 64)	36928	conv2d[0][0]
max_pooling2d (MaxPooling2D)	(None, 60, 60, 64)	0	conv2d_1[0][0]
conv2d_2 (Conv2D)	(None, 60, 60, 128)	73856	max_pooling2d[0][0]
conv2d_3 (Conv2D)	(None, 60, 60, 128)	147584	conv2d_2[0][0]
max_pooling2d_1 (MaxPooling2D)	(None, 30, 30, 128)	0	conv2d_3[0][0]
conv2d_4 (Conv2D)	(None, 30, 30, 256)	295168	max_pooling2d_1[0][0]
up_sampling2d (UpSampling2D)	(None, 60, 60, 256)	0	conv2d_4[0][0]
conv2d_5 (Conv2D)	(None, 60, 60, 128)	295040	up_sampling2d[0][0]
conv2d_6 (Conv2D)	(None, 60, 60, 128)	147584	conv2d_5[0][0]
add (Add)	(None, 60, 60, 128)	0	conv2d_3[0][0] conv2d_6[0][0]
up_sampling2d_1 (UpSampling2D)	(None, 120, 120, 128)	0	add[0][0]
conv2d_7 (Conv2D)	(None, 120, 120, 64)	73792	up_sampling2d_1[0][0]
conv2d_8 (Conv2D)	(None, 120, 120, 64)	36928	conv2d_7[0][0]
add_1 (Add)	(None, 120, 120, 64)	0	conv2d_1[0][0] conv2d_8[0][0]
conv2d_9 (Conv2D)	(None, 120, 120, 3)	1731	add_1[0][0]

Total params: 1,110,403
 Trainable params: 1,110,403
 Non-trainable params: 0



RESULTADOS

ENTRENAMIENTO



PRUEBA

MSE	0.0030
ACCURACY	0.9113

RESULTADOS

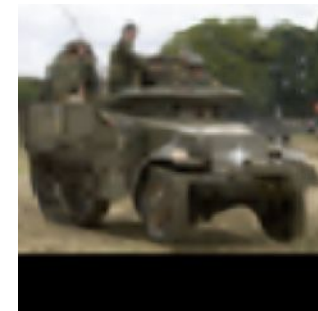
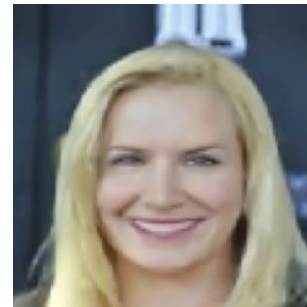
HR



LR



PREDICTED



RESULTADOS

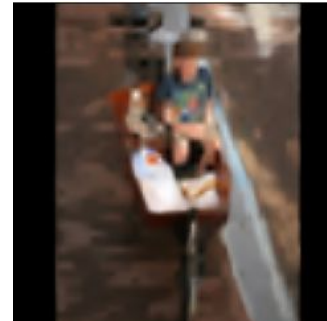
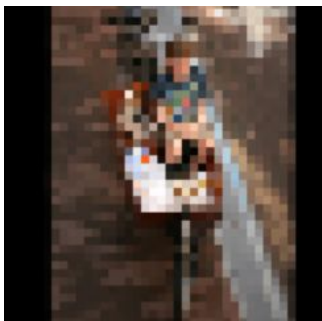
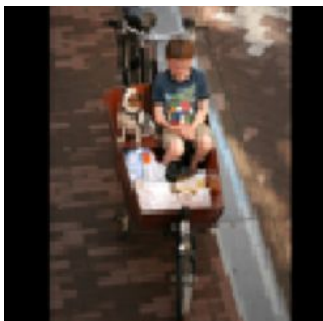
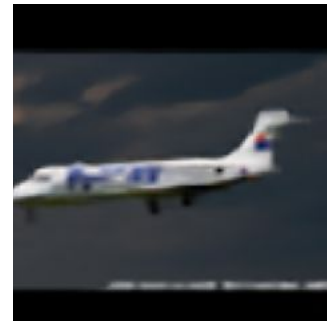
HR



LR



PREDICTED



RESULTADOS

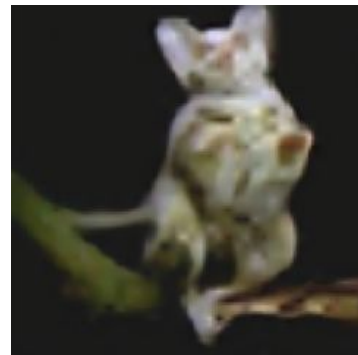
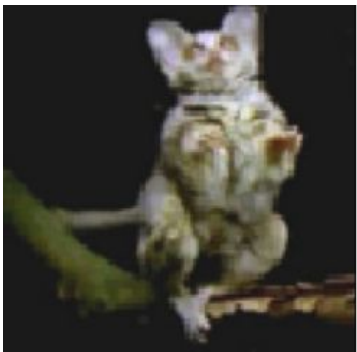
HR



LR



PREDICTED



CONCLUSIONES Y RECOMENDACIONES