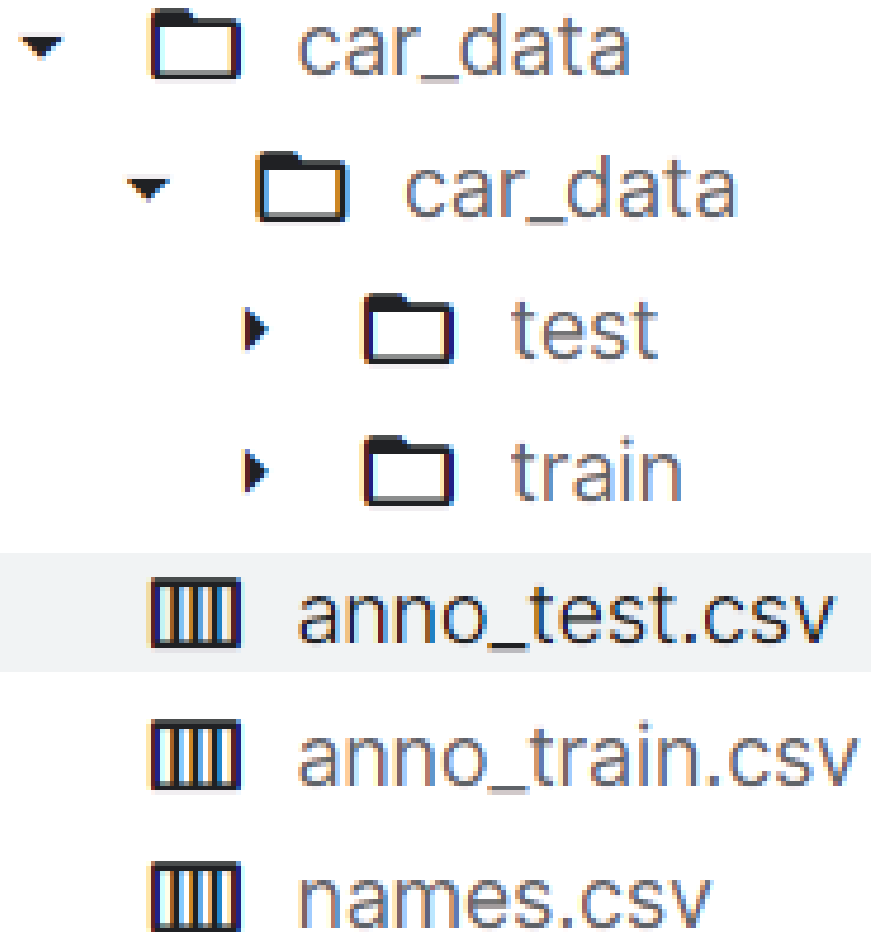# Stanford Cars Dataset

NOA CHU ARTZT

ÍNDICE

Kaggle - Stanford Car Dataset by classes folder

Kaggle - **Stanford Car Dataset by classes folder**

- 16.185 imágenes
- 196 clases
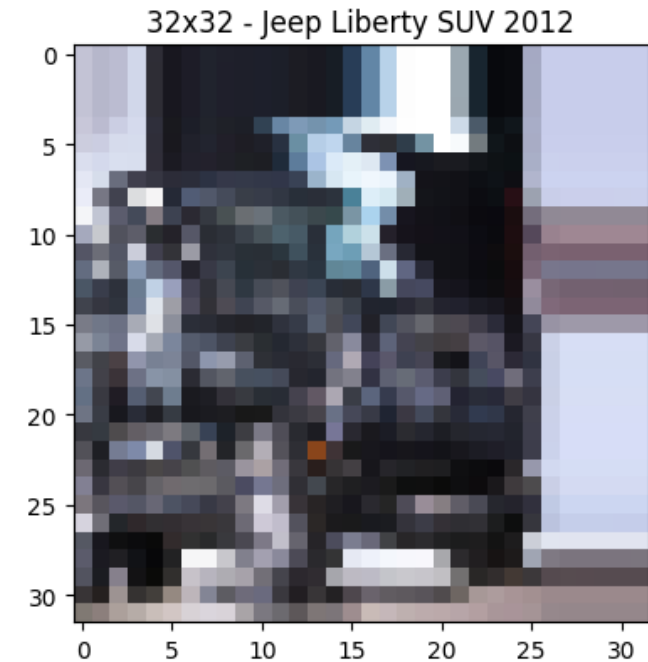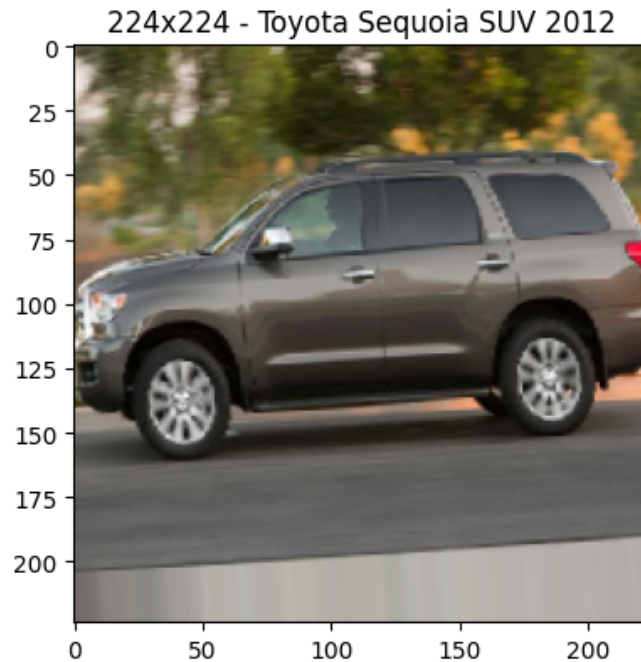
  - 8.144 de entrenamiento
  - 8.041 de testeo

```
▼ 📁 car_data
  ▼ 📁 car_data
    ▶ 📁 test
    ▶ 📁 train
  ▦ anno_test.csv
  ▦ anno_train.csv
  ▦ names.csv
```

Preprocesado

```
TARGET_SIZE = 227, 224, 64, 32

BATCH_SIZE = 128, 64, 32, 16, 8


ImageDataGenerator(rescale, rotation_range,
width_shift_range, height_shift_range, horizontal_flip,
zoom_range, fill_mode, validation_split)

flow_from_directory(train_path, target_size, class_mode,
subset)
```
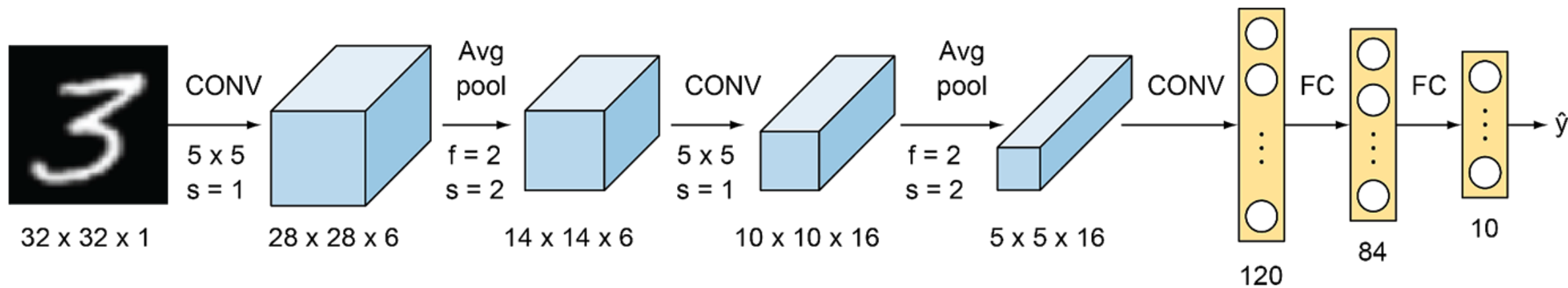

224x224 - Toyota Sequoia SUV 2012

64x64 - Ford E-Series Wagon Van 2012

32x32 - Jeep Liberty SUV 2012

Modelos CNN

LENET

LENET

ACTUAL: Audi A5 Coupe 2012

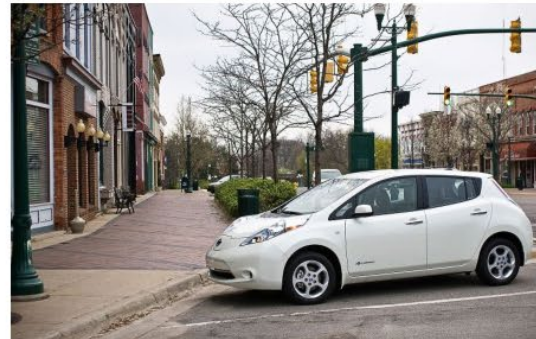ACTUAL: Dodge Challenger SRT8 2011

ACTUAL: Hyundai Tucson SUV 2012

PREDICTION: Lamborghini Gallardo LP 570-4 Superleggera 2012
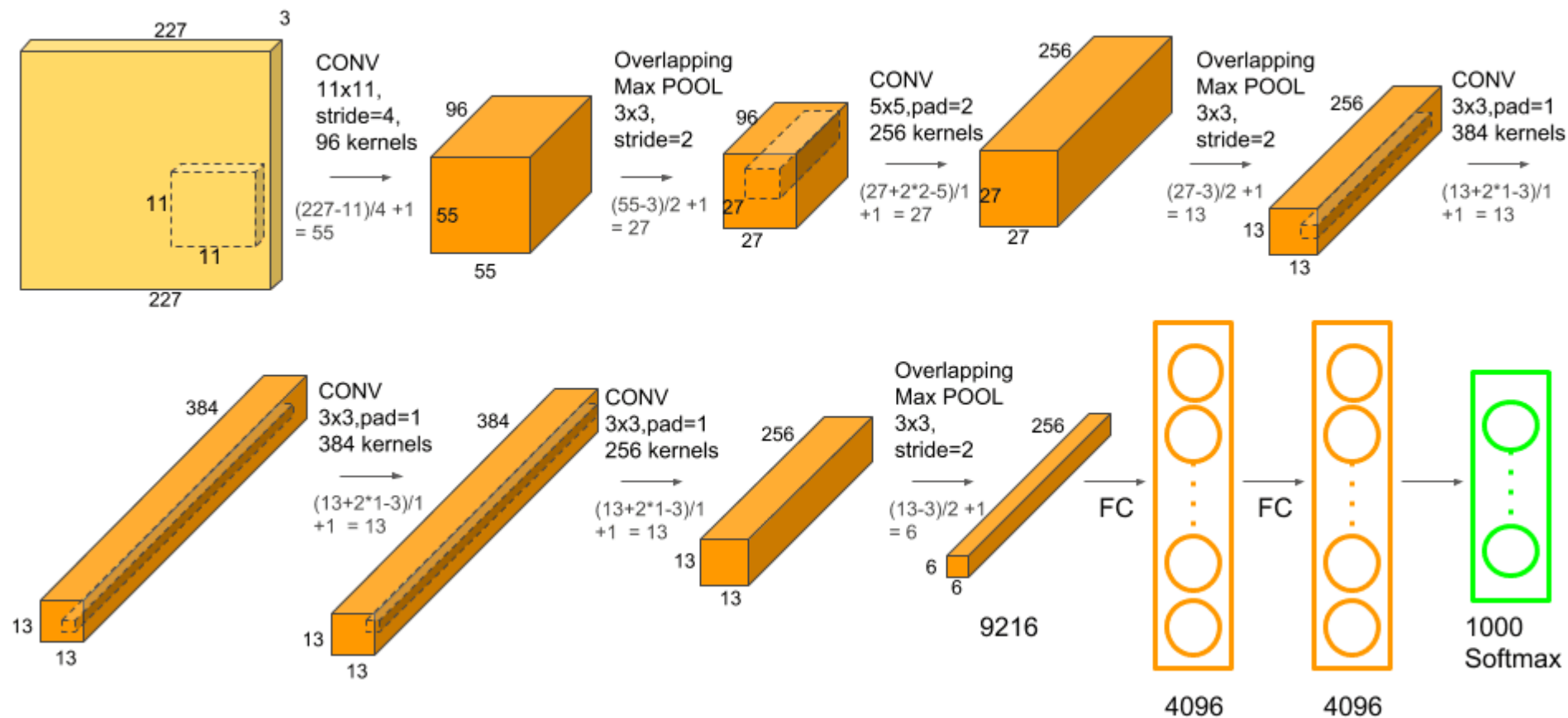

PREDICTION: Nissan Leaf Hatchback 2012

PREDICTION: Audi TT Hatchback 2011

ALEXNET

ALEXNET

ACTUAL: Ford Edge SUV 2012

ACTUAL: Ferrari 458 Italia Coupe 2012

ACTUAL: smart fortwo Convertible 2012

PREDICTION: GMC Yukon Hybrid SUV 2012

PREDICTION: GMC Yukon Hybrid SUV 2012

PREDICTION: GMC Yukon Hybrid SUV 2012

RESNET
Loss: 5.28
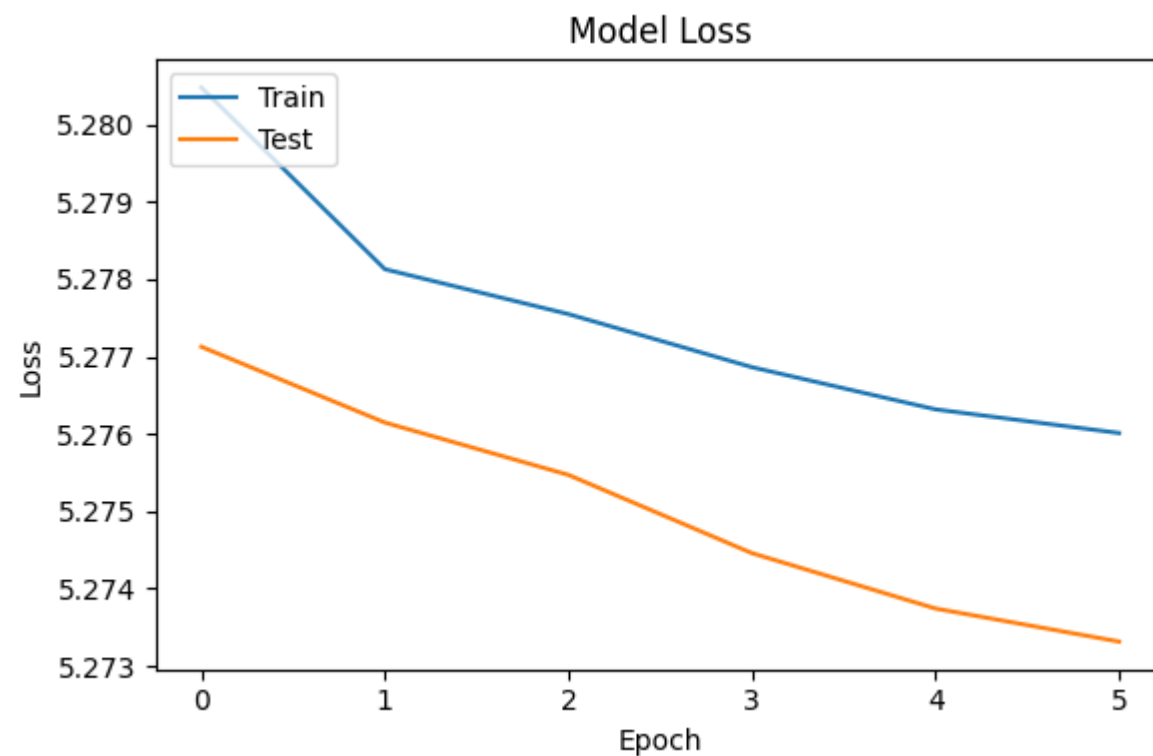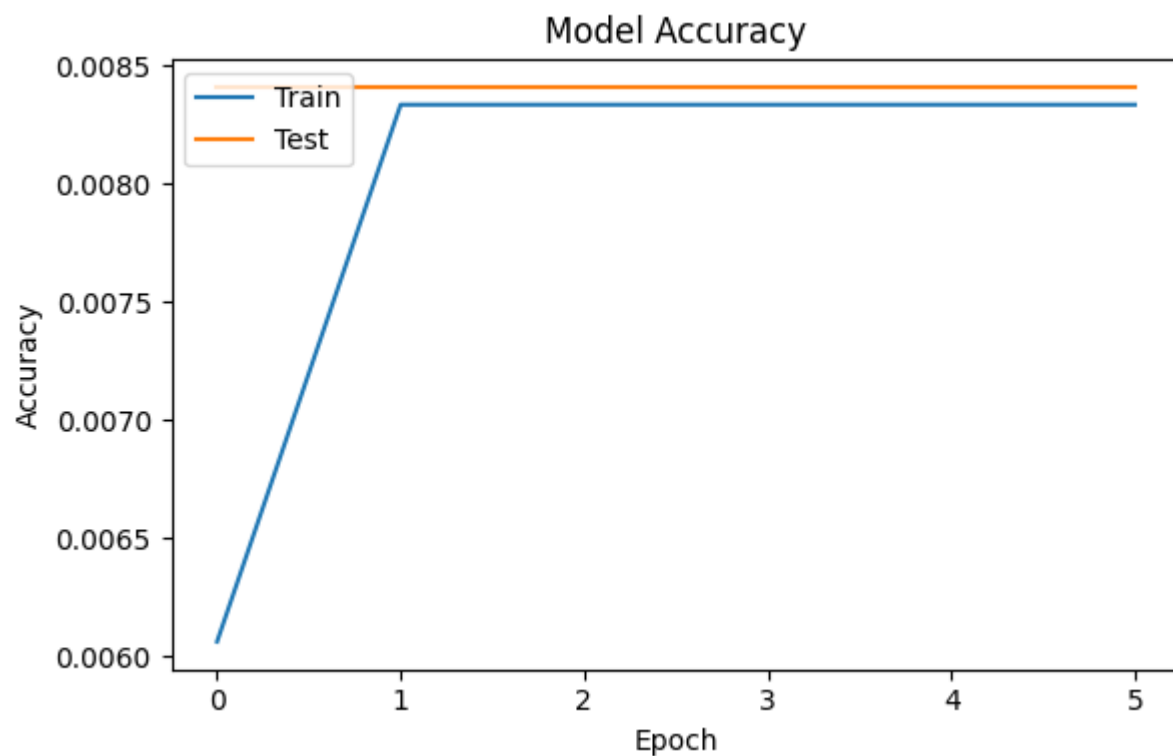Accuracy: 0.85%

GoogleNet + Inception
Loss: 5.28
Accuracy: 0.85%

VGG-16
Loss: 5.27
Accuracy: 0.83%

Transfer Learning

RESNET-50

Loss: 1.12
Accuracy: 70.65%

```python
# Load pre-trained ResNet50 model without top layers
base_model = ResNet50(weights='imagenet', include_top=False, input_shape=self.input_shape)

# Freeze base model layers
for layer in base_model.layers:
    if "BatchNormalization" in layer.__class__.__name__:
        layer.trainable = True

# Add custom layers for classification
x = GlobalAveragePooling2D()(base_model.output)
x = BatchNormalization()(x)

x = Dense(1024, activation='relu')(x)
x = Dropout(0.5)(x)
x = BatchNormalization()(x)

x = Dense(512, activation='relu')(x)
x = Dropout(0.5)(x)
x = BatchNormalization()(x)

output = Dense(self.num_classes, activation='softmax')(x)

model = Model(inputs=base_model.input, outputs=output)
```

RESNET-50

ACTUAL: Hyundai Tucson SUV 2012

ACTUAL: Land Rover LR2 SUV 2012

ACTUAL: Audi 100 Sedan 1994

PREDICTION: Jeep Liberty SUV 2012

PREDICTION: Ford Freestar Minivan 2007
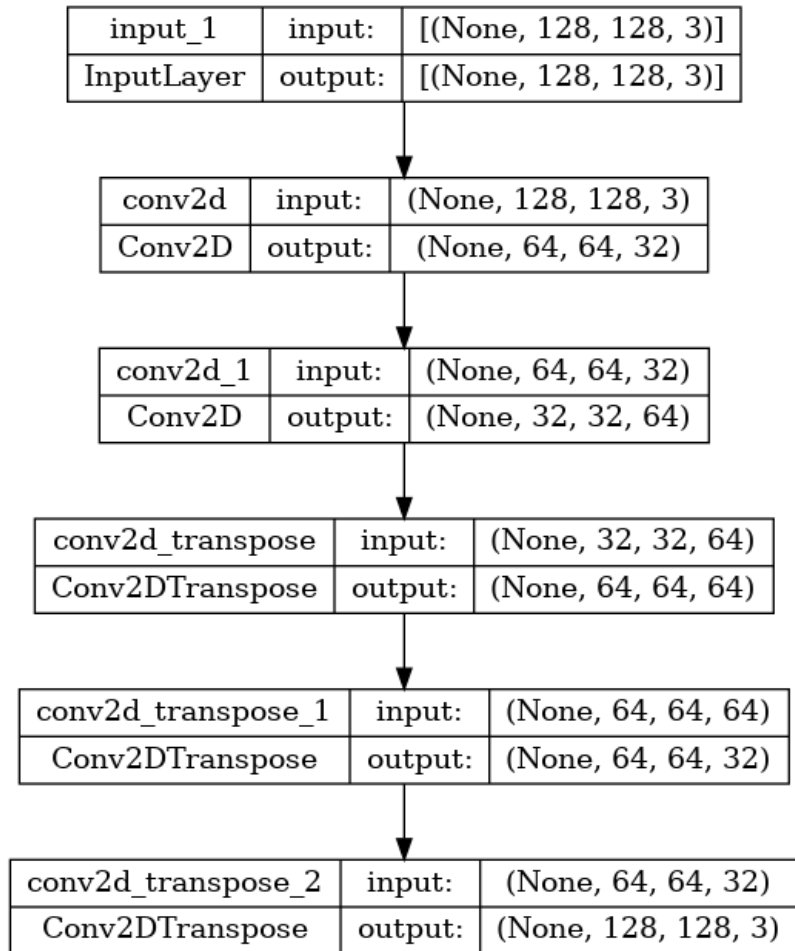

PREDICTION: Volvo 240 Sedan 1993

Autoencoder

Perturbación de las imágenes con ruido

ARQUITECTURA

loss: 6.9119e-04 - accuracy: 0.7632 - val_loss: 6.0662e-04 - val_accuracy: 0.7647

RESULTADOS