# ESTIMACIÓN DE LA DEMANDA MEDIANTE MACHINE LEARNING PARA EL CONJUNTO DE DATOS ROSSMAN

## Resultados experimentación hiperparámetros

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## MODELO REDES NEURONALES PERCEPTRÓN MULTICAPA

**Experimento #1**

| | | |
|---|---|---|
| nco | 5 | **CPU times:** user 20min 52s, |
| learning_rate | 0.01 | **Wall time:** 13min 52s |
| Optimizer | Adam | |
| loss | mse | |
| metrics | RootMeanSquaredError | **RMSE:** 1323.99 |
| epochs | 30 | **R2:** 0.88 |
| batch_size | 128 | |

| Epoch | root_mean_squared_error | val_root_mean_squared_error |
|---|---|---|
| 1 | 3618.7395 | 1575.1952 |
| 2 | 1449.7642 | 1402.0848 |
| 3 | 1380.1512 | 1373.4576 |
| 4 | 1358.8511 | 1359.0022 |
| 5 | 1348.7333 | 1351.7546 |
| 6 | 1343.9937 | 1348.0463 |
| 7 | 1341.1025 | 1345.8945 |
| 8 | 1339.0736 | 1343.9855 |
| 12 | 1333.5164 | 1339.0793 |
| 17 | 1327.8431 | 1333.8785 |
| 24 | 1317.4542 | 1323.8734 |
| 26 | 1316.2620 | 1324.0629 |
| 29 | 1315.6061 | 1323.0828 |
| 30 | 1315.5853 | 1322.8026 |

**Experimento #2**

| | | |
|---|---|---|
| nco | 5 | **CPU times:** user 24min 34s, |
| learning_rate | 0.01 | **Wall time:** 15min 2s |
| Optimizer | Adam | |
| loss | mse | |
| metrics | RootMeanSquaredError | **RMSE:** 1298.76 |
| Epochs | 30 | **R2:** 0.89 |
| batch_size | 64 | |

| Epoch | root_mean_squared_error | val_root_mean_squared_error |
|---|---|---|
| 1 | 2734.5220 | 1417.9374 |
| 2 | 1387.1139 | 1379.3254 |
| 3 | 1364.2699 | 1363.5671 |
| 4 | 1352.577 | 1354.6616 |
| 5 | 1345.5503 | 1348.8333 |
| 6 | 1340.0657 | 1344.5160 |
| 7 | 1335.7485 | 1338.9395 |
| 8 | 1331.2128 | 1334.8118 |
| 12 | 1321.5702 | 1326.5852 |
| 17 | 1292.1412 | 1296.6971 |
| 24 | 1290.6055 | 1295.7202 |
| 26 | 1290.4774 | 1295.2195 |
| 29 | 1290.3351 | 1295.4156 |
| 30 | 1290.1532 | 1295.5686 |

**Experimento #3**

| | | |
|---|---|---|
| nco | 5 | **CPU times:** user 25min 6s, |
| learning_rate | 0.01 | **Wall time:** 16min 44s |
| Optimizer | Adam | |
| loss | mse | |
| metrics | RootMeanSquaredError | **RMSE:** 1438.23 |
| Epochs | 8 | **R2:** 0.86 |
| batch_size | 32 | |

| Epoch | root_mean_squared_error | val_root_mean_squared_error |
|---|---|---|
| 1 | 2164.5803 | 1445.3019 |
| 2 | 1434.7711 | 1442.2148 |
| 3 | 1433.4894 | 1442.3577 |
| 4 | 1433.3152 | 1443.1664 |
| 5 | 1433.2526 | 1441.7809 |
| 6 | 1433.0848 | 1441.5920 |
| 7 | 1433.0093 | 1441.7290 |
| 8 | 1433.0605 | 1441.3109 |

**Experimento #4**

| | | |
|---|---|---|
| nco | 5 | **CPU times:** user 3min 36s, |
| learning_rate | 0.01 | **Wall time:** 2min 30s |
| Optimizer | Adam | |
| loss | mse | |
| metrics | RootMeanSquaredError | **RMSE:** 1439.66 |
| Epochs | 8 | **R2:** 0.86 |
| batch_size | 256 | |

| Epoch | root_mean_squared_error | val_root_mean_squared_error |
|---|---|---|
| 1 | 4458.0537 | 2073.9670 |
| 2 | 1720.5115 | 1562.5627 |
| 3 | 1512.6219 | 1492.1060 |
| 4 | 1465.2896 | 1462.0797 |
| 5 | 1446.1571 | 1450.0411 |
| 6 | 1438.0868 | 1444.7572 |
| 7 | 1434.7073 | 1442.7981 |
| 8 | 1433.3708 | 1441.8937 |

## Experimento #5

| | |
|---|---|
| nco | 5 |
| learning_rate | 0.1 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 15 |
| batch_size | 64 |

**CPU times:** user 14min 38s,
**Wall time:** 10min 22s

**RMSE:** 1423.04
**R2:** 0.86
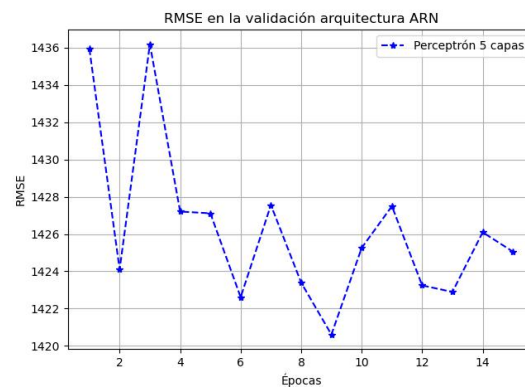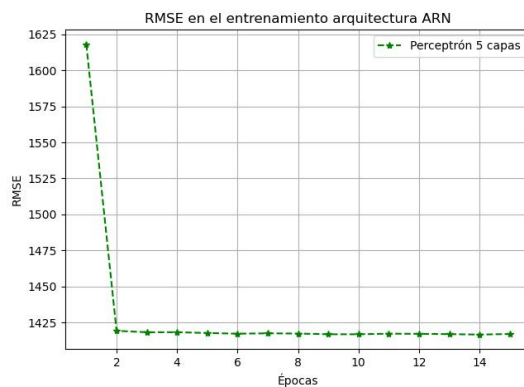


## Experimento #6

| | |
|---|---|
| nco | 5 |
| learning_rate | 0.001 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 15 |
| batch_size | 64 |

**CPU times:** user 19min 31s,
**Wall time:** 14min 23s

**RMSE:** 1350.22
**R2:** 0.88
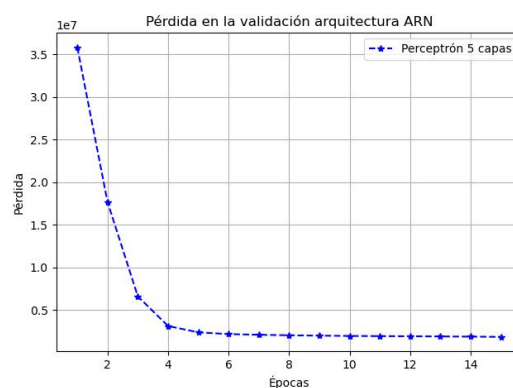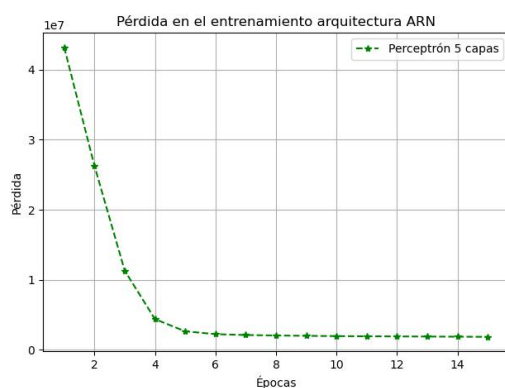
## Experimento #7

| | |
|---|---|
| nco | 32 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 8 |
| batch_size | 64 |

**CPU times:** user 9min 42s,
**Wall time:** 6min 16s
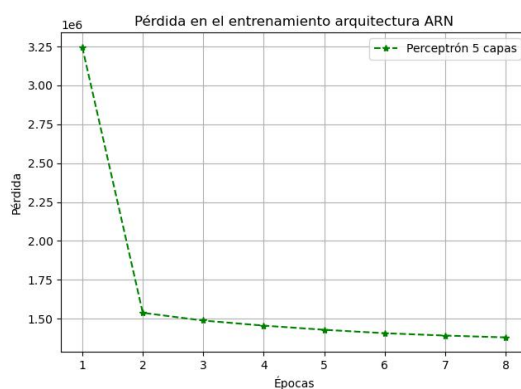
**RMSE:** 1280.74
**R2:** 0.89
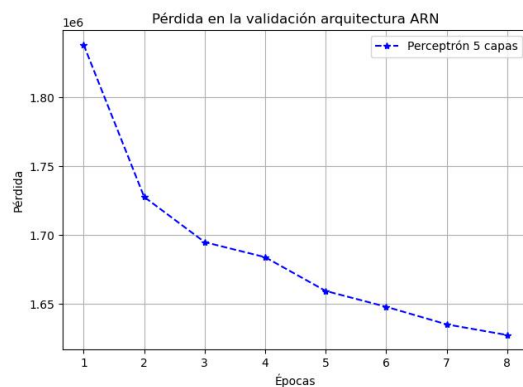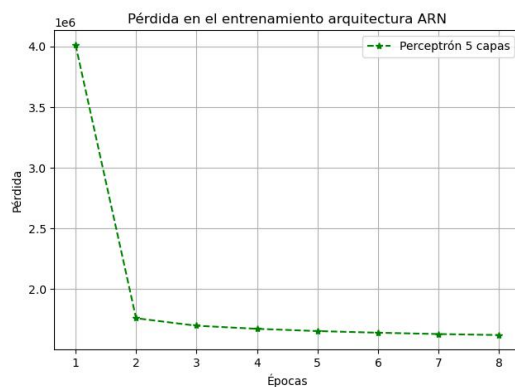




## Experimento #8

| | |
|---|---|
| nco | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 8 |
| batch_size | 64 |

**CPU times:** user 16min 47s,
**Wall time:** 14min 22s
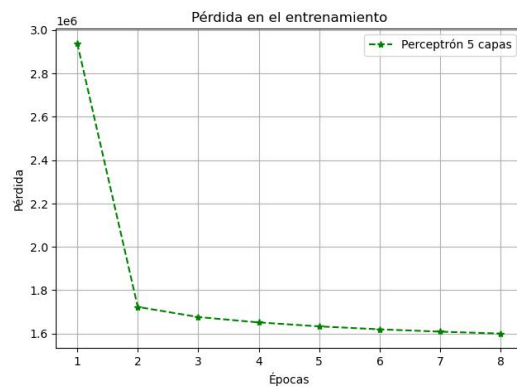
**RMSE:** 1183.88
**R2:** 0.91
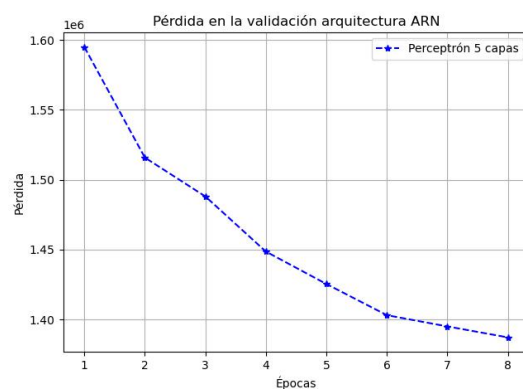
## Experimento #9

| | |
|---|---|
| nco | 128 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 8 |
| batch_size | 64 |

**CPU times:** user 14min 20s,
**Wall time:** 10min 15s
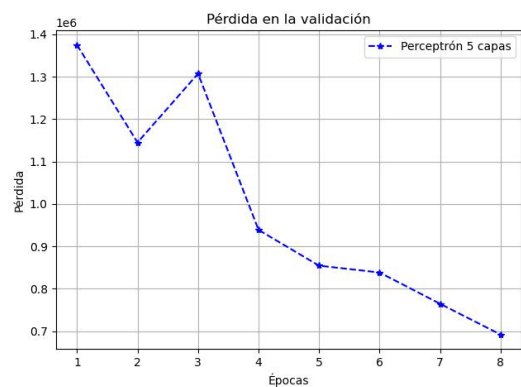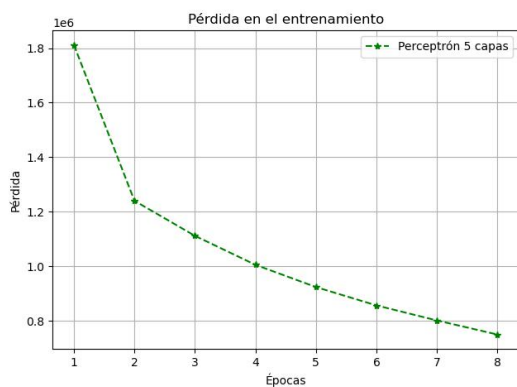
**RMSE:** 1273.27
**R2:** 0.89
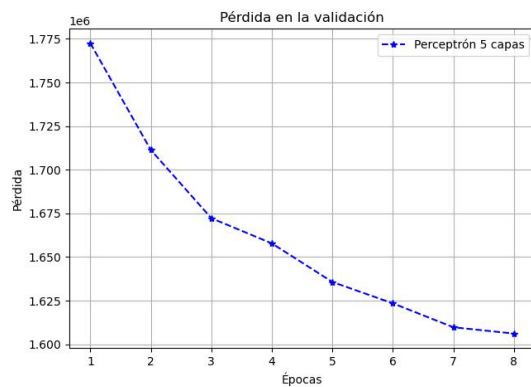


## Experimento #10

| | |
|---|---|
| nco1 | 128 |
| nco2 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 8 |
| batch_size | 64 |

**CPU times:** user 14min 40s,
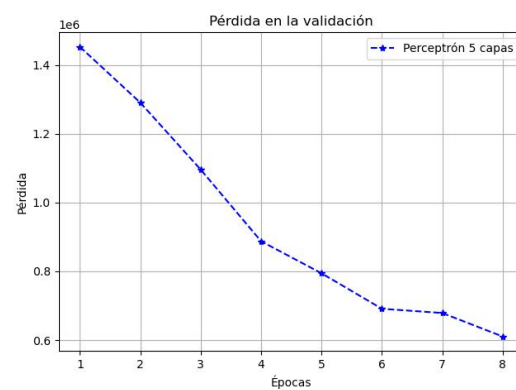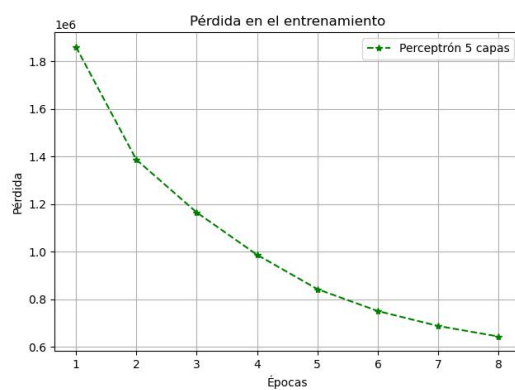**Wall time:** 9min 41s

**RMSE:** 844
**R2:** 0.95

## Experimento #11

| | |
|---|---|
| nco1 | 64 |
| nco2 | 64 |
| nco2 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 8 |
| batch_size | 64 |

**CPU times:** user 18min 10s,
**Wall time:** 12min 23s

**RMSE:** 784.35
**R2:** 0.96



## Experimento #12

| | |
|---|---|
| nco1 | 64 |
| nco2 | 64 |
| nco3 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 25 |
| batch_size | 64 |

**CPU times:** user 1h 22min 49s,
**Wall time:** 57min 25s

**RMSE:** 561.91
**R2:** 0.98
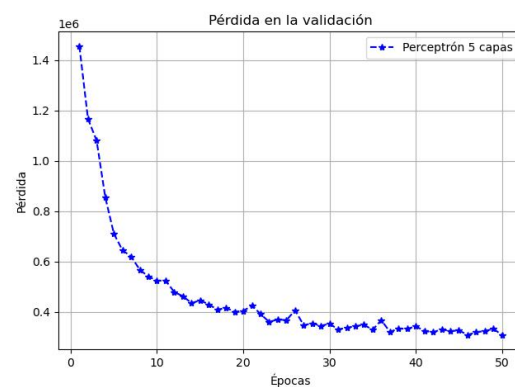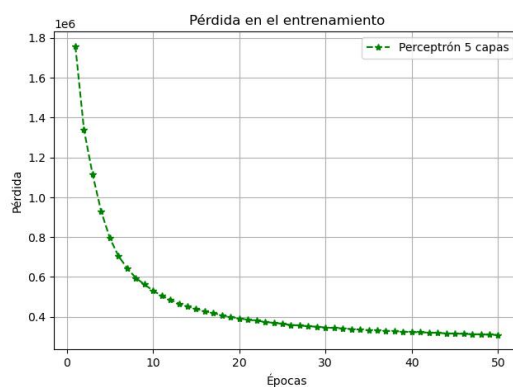
## Experimento #13

| | |
|---|---|
| nco1 | 64 |
| nco2 | 64 |
| nco3 | 64 |
| nco4 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 25 |
| batch_size | 64 |

**CPU times:** user 34min 02s,
**Wall time:** 22min 30s

**RMSE:** 645.75
**R2:** 0.97



Pérdida en el entrenamiento



Pérdida en la validación
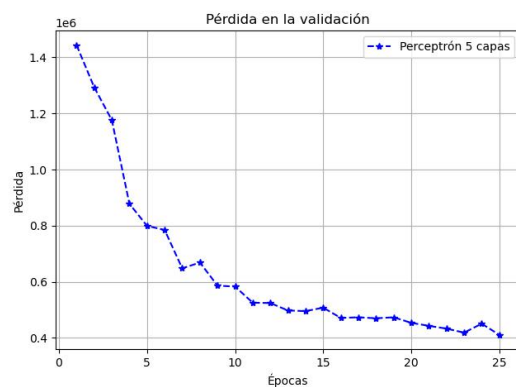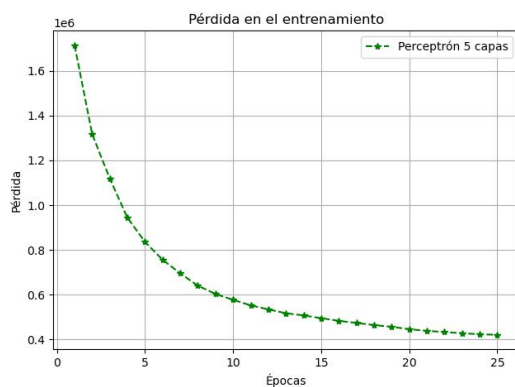
## Experimento #14

| | |
|---|---|
| nco1 | 128 |
| nco2 | 128 |
| nco3 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 25 |
| batch_size | 64 |

**CPU times:** user 38min 17s,
**Wall time:** 27min 47s

**RMSE:** 555.99
**R2:** 0.98



Pérdida en el entrenamiento



Pérdida en la validación
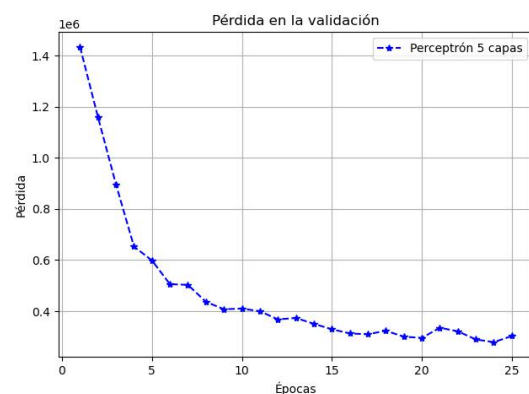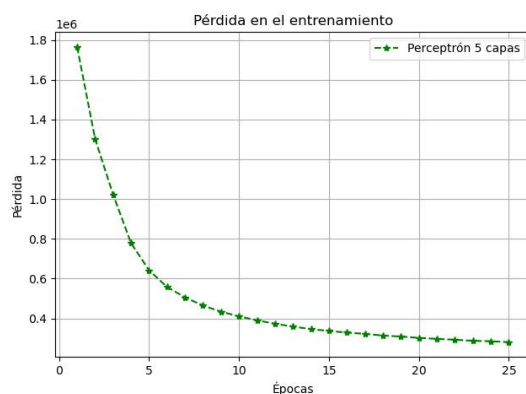
**Experimento #15**

| | |
|---|---|
| nco1 | 512 |
| nco2 | 256 |
| nco3 | 64 |
| learning_rate | 0.01 |
| Optimizer | Adam |
| loss | mse |
| metrics | RootMeanSquaredError |
| epochs | 25 |
| batch_size | 64 |

**CPU times:** user Xh XXmin XXs,
**Wall time:** XXmin XXs

**RMSE:**
**R2:**