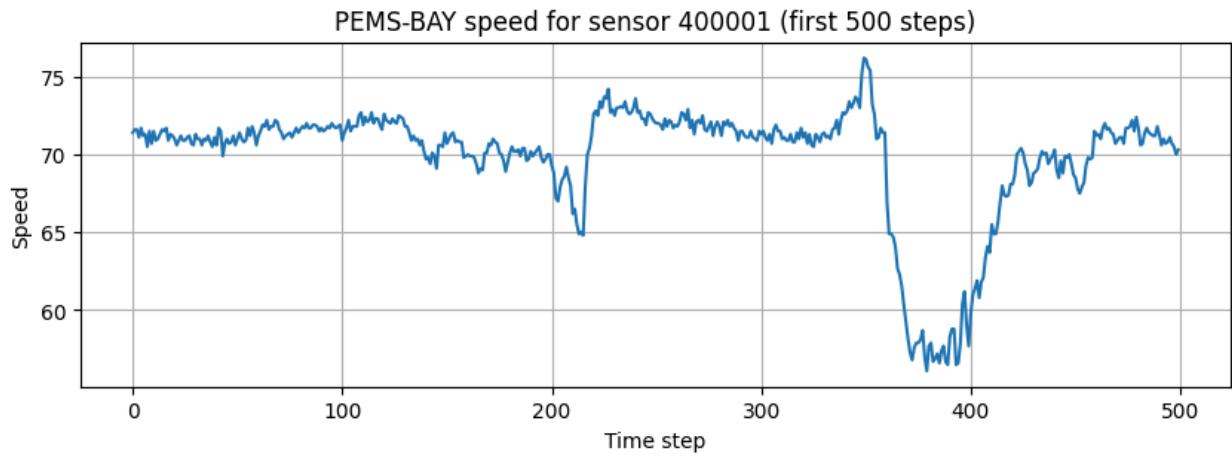


LSTM



Train mean: 67.62931

Train std: 8.047419

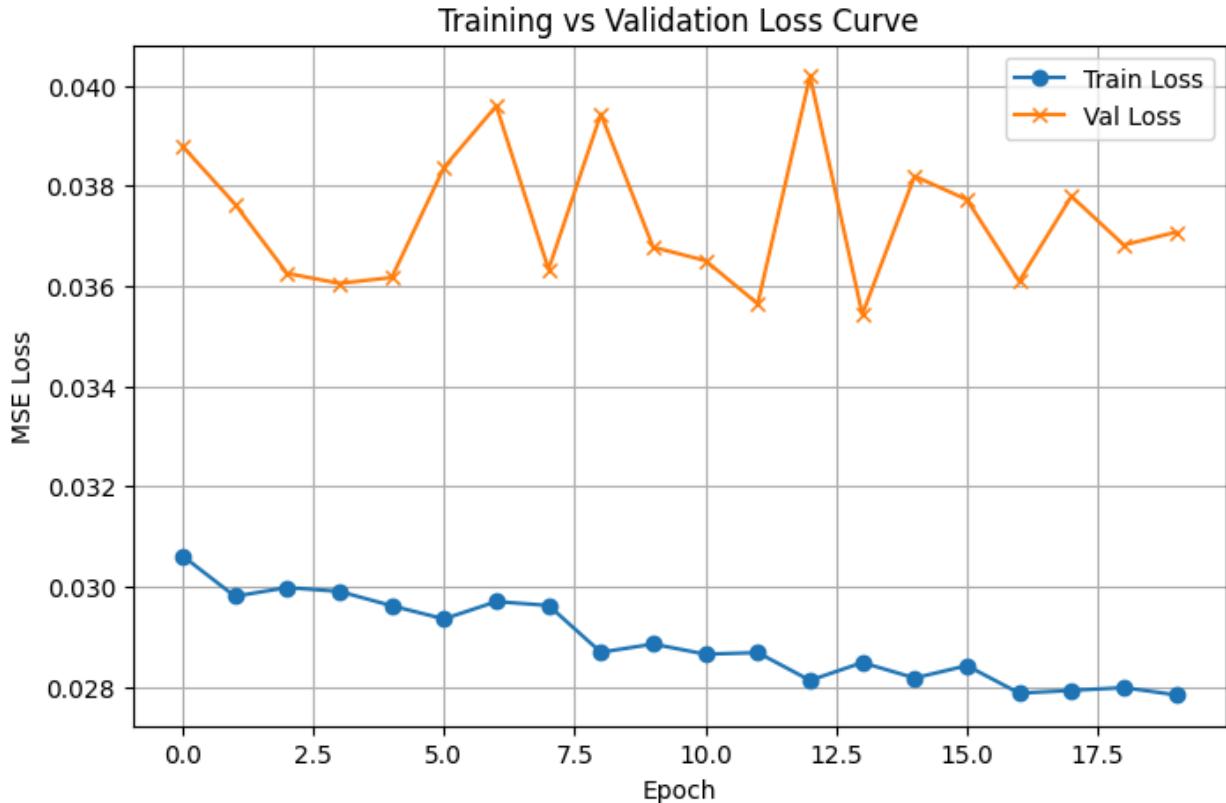
```
SimpleLSTM(  
    (lstm): LSTM(1, 64, num_layers=2, batch_first=True)  
    (fc): Linear(in_features=64, out_features=1, bias=True)  
)
```

LSTM_PEMS_BAY_05min.ipynb

🔥 New best model saved!

Epoch 14/20 | Train loss: 0.0285 | Val loss: 0.0354

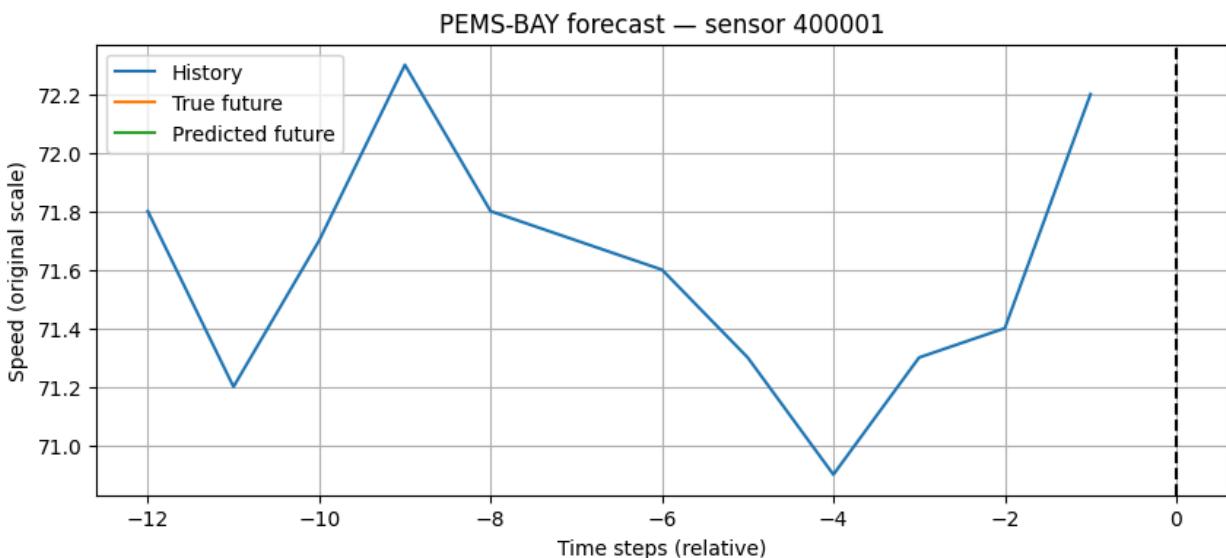
Best validation loss: 0.035429985074541



Test MSE (normalized scale): 0.04256596075388082

Test MAE (original units): 0.8685

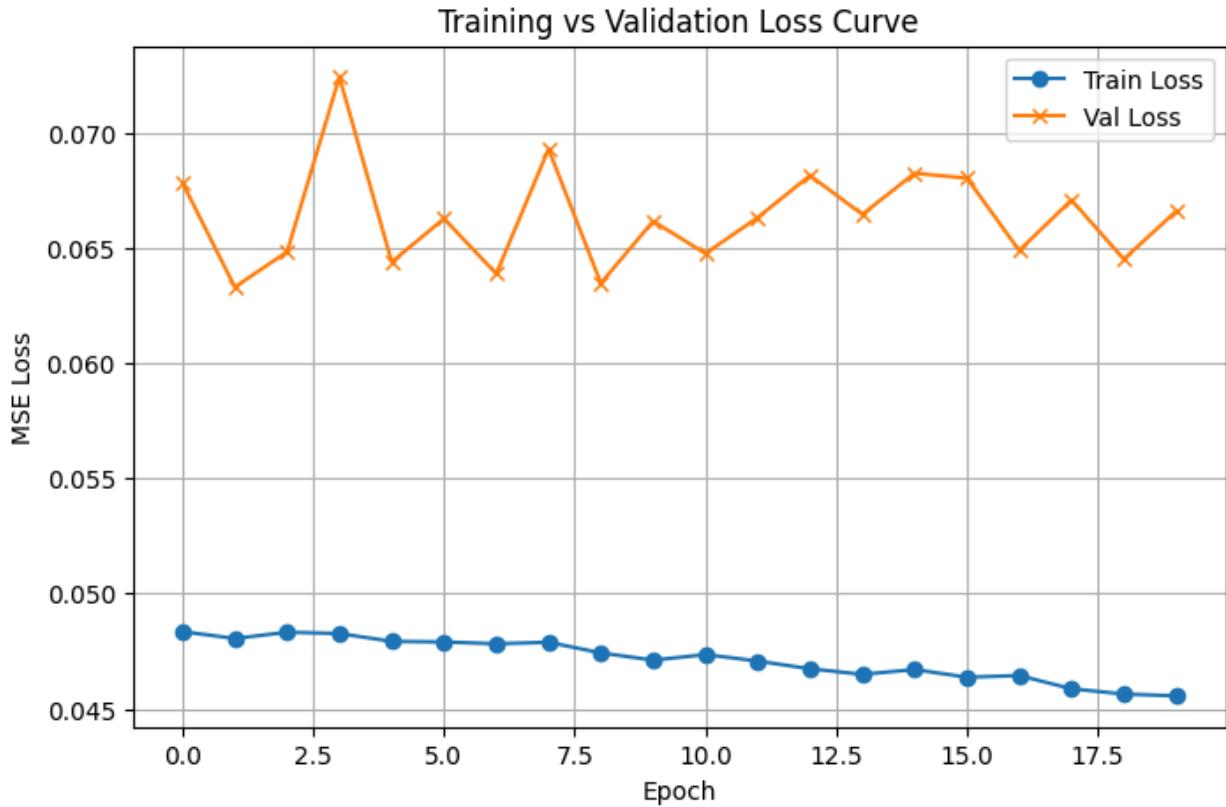
Test RMSE (original units): 1.6603



LSTM_PEMS_BAY_10min.ipynb

🔥 New best model saved!

Epoch 02/20 | Train loss: 0.0481 | Val loss: 0.0633
Best validation loss: 0.06329141067940829

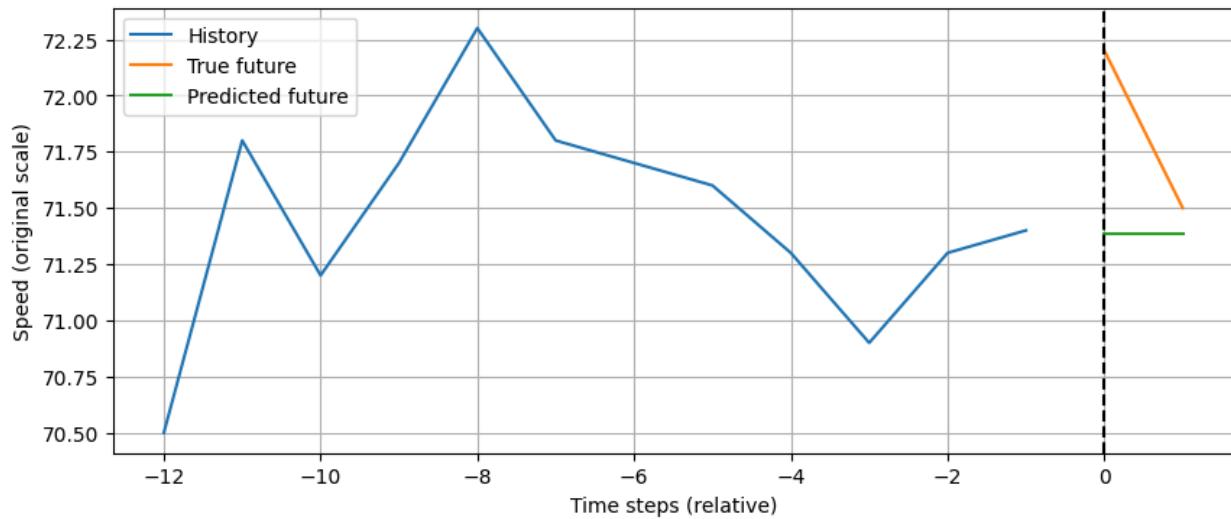


Test MSE (normalized scale): 0.06682486576965216

Test MAE (original units): 1.0357

Test RMSE (original units): 2.0803

PEMS-BAY forecast — sensor 400001

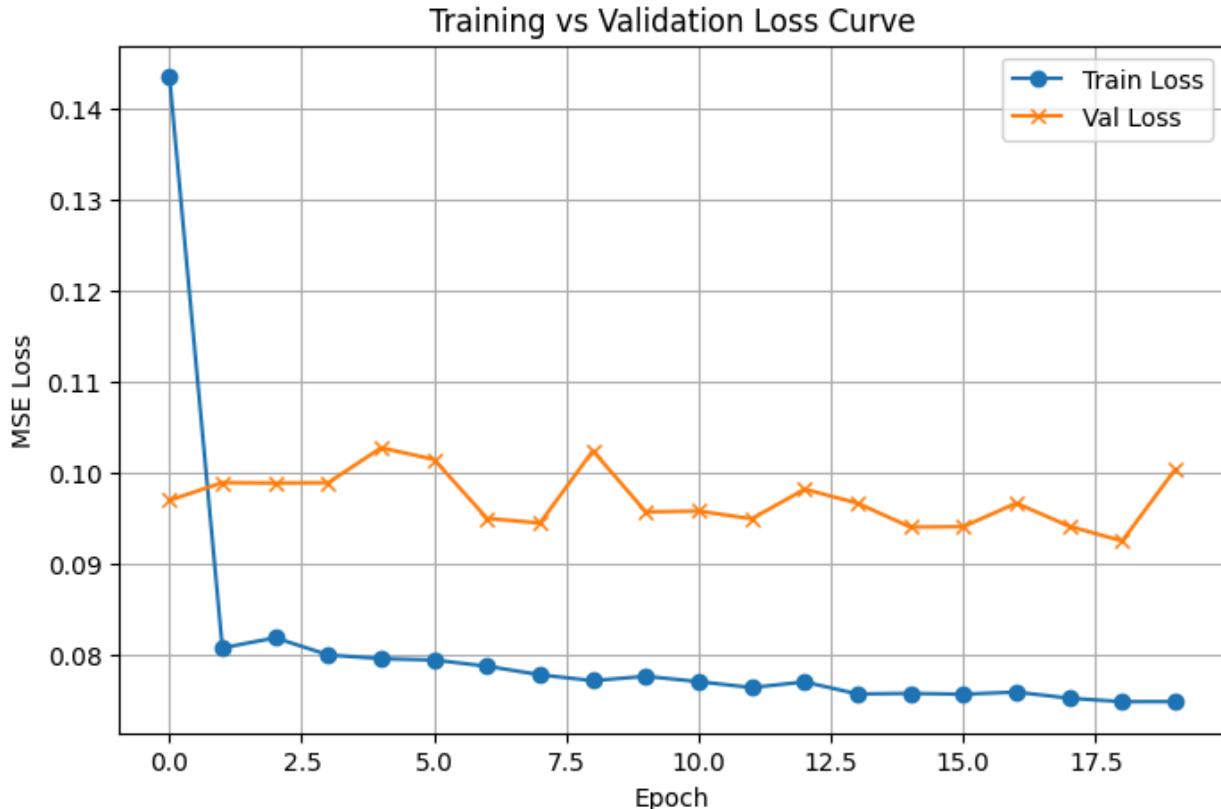


LSTM_PEMS_BAY_15min.ipynb

🔥 New best model saved!

Epoch 19/20 | Train loss: 0.0748 | Val loss: 0.0925

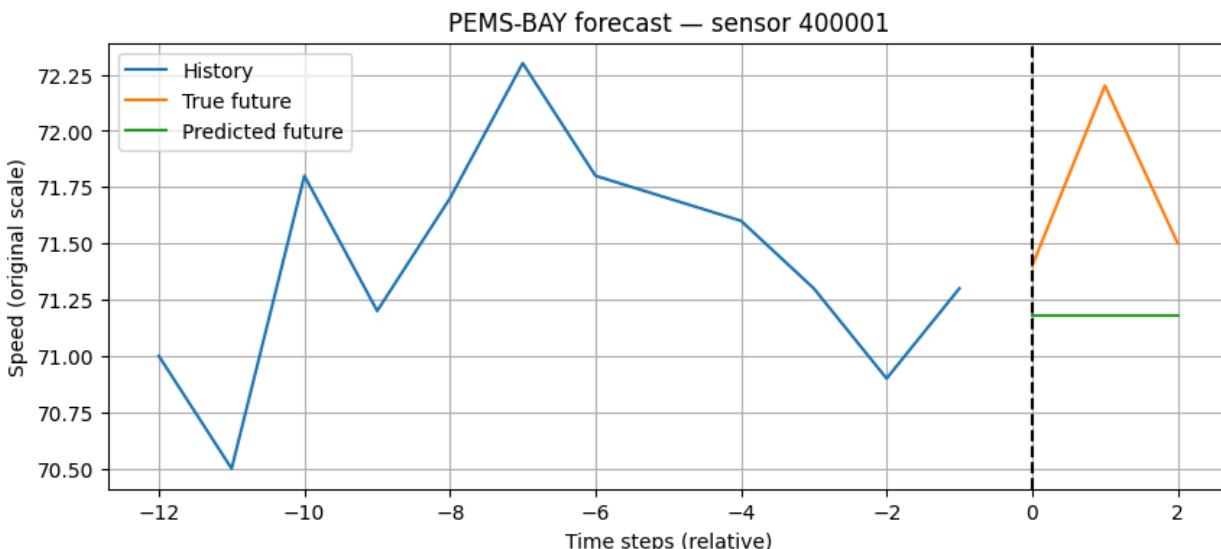
Best validation loss: 0.09249518842955885



Test MSE (normalized scale): 0.09246673650903615

Test MAE (original units): 1.2040

Test RMSE (original units): 2.4471



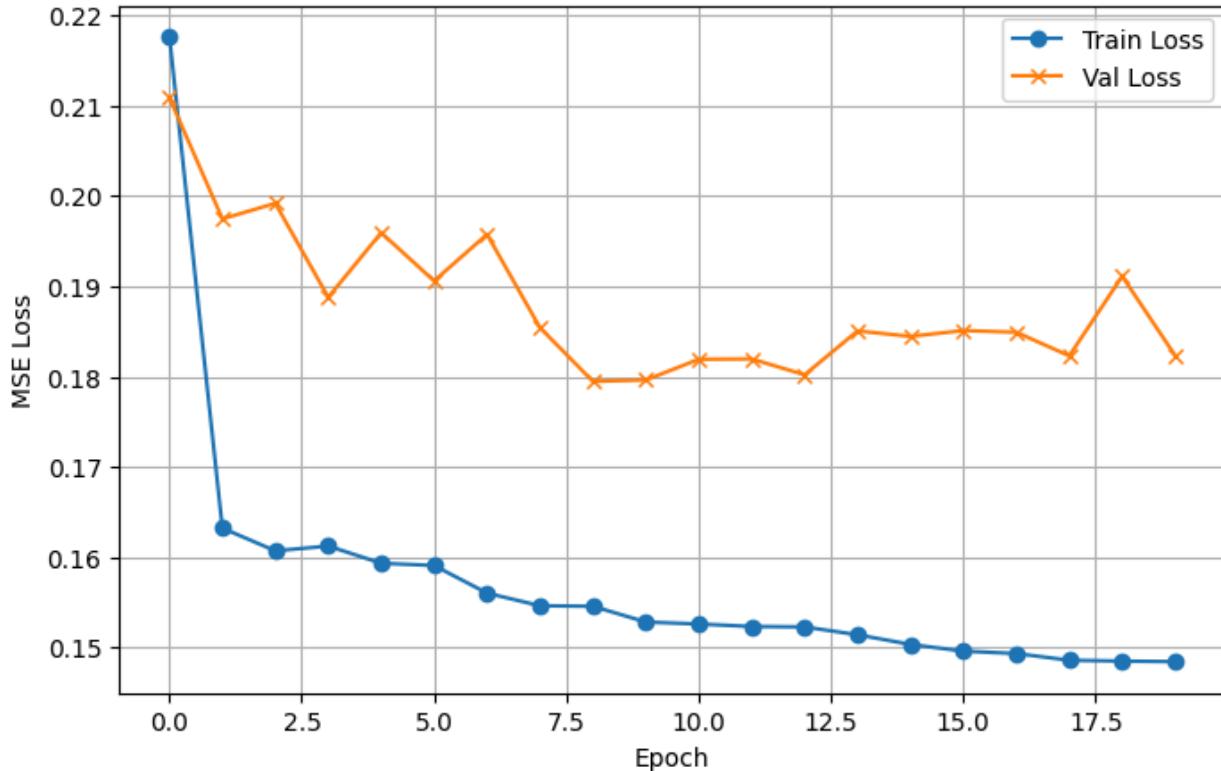
LSTM_PEMS_BAY_30min.ipynb

🔥 New best model saved!

Epoch 09/20 | Train loss: 0.1546 | Val loss: 0.1795

Best validation loss: 0.17946182466788066

Training vs Validation Loss Curve

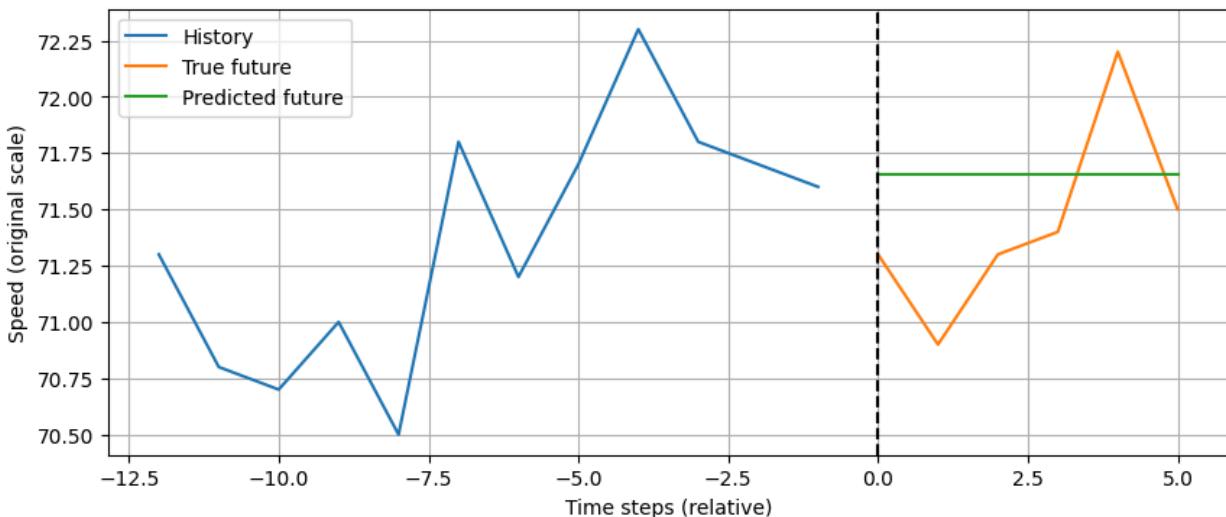


Test MSE (normalized scale): 0.1627675594426917

Test MAE (original units): 1.5399

Test RMSE (original units): 3.2467

PEMS-BAY forecast — sensor 400001



DCRNN

DCRNN_PEMS_Bay_No_Adj_5mins.ipynb

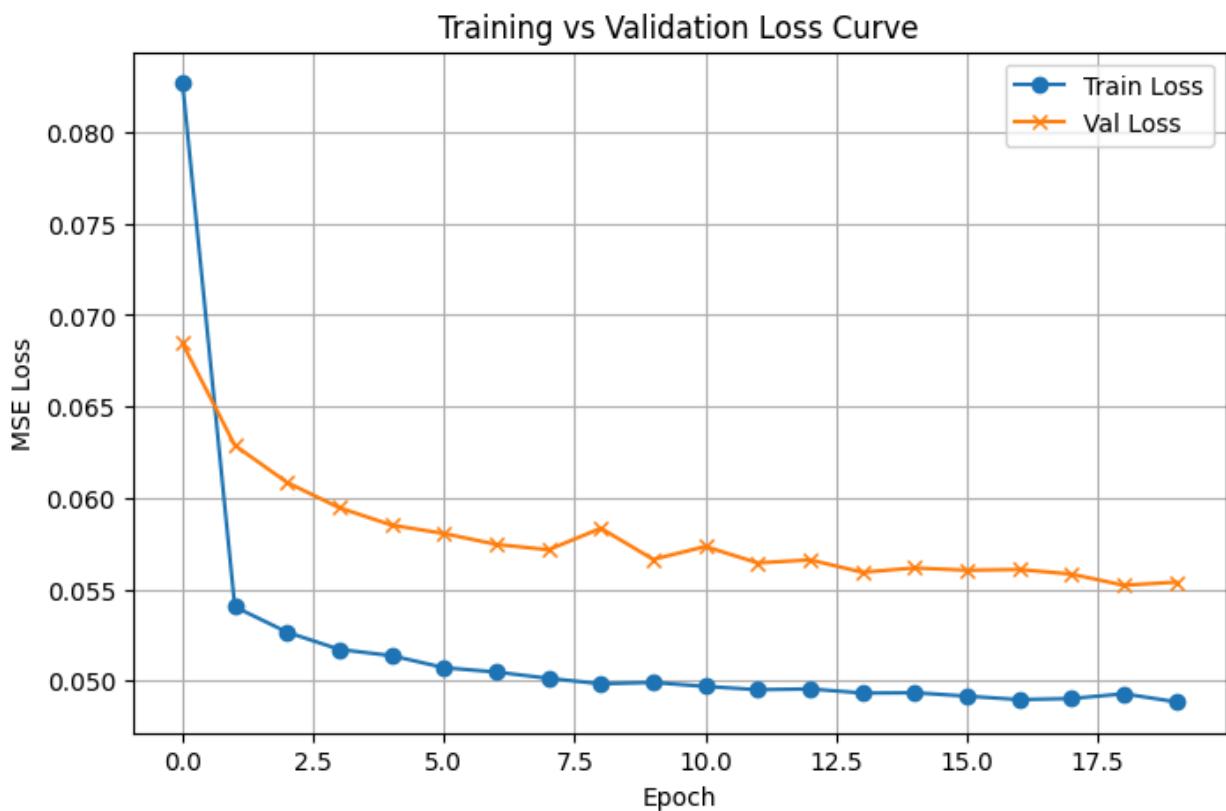
```
DCRNN ( 
    (cell): DCRNNCell (
        (diff): DiffusionConv (
            (dropout): Dropout(p=0.2, inplace=False)
        )
        (gru): GRUCell(64, 64)
        (dropout): Dropout(p=0.2, inplace=False)
    )
    (fc_out): Linear(in_features=64, out_features=1, bias=True)
)

```

🔥 New best model saved!

Epoch 19/20 | Train=0.049293 | Val=0.055226

Training complete! Best Validation Loss: 0.05522646373309241

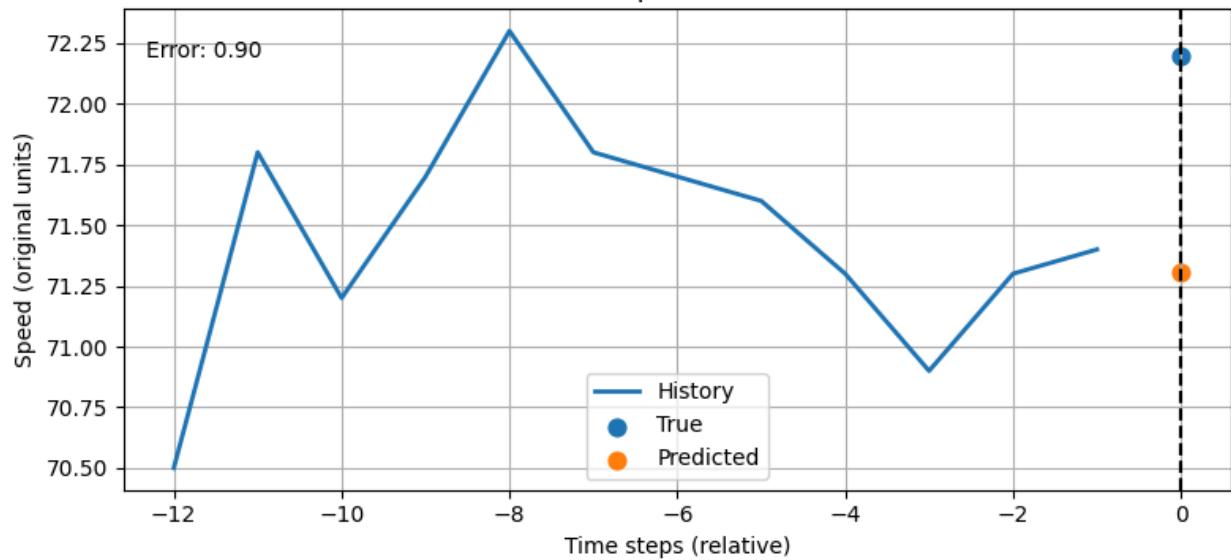


Test MSE (normalized): 0.07373987762879056

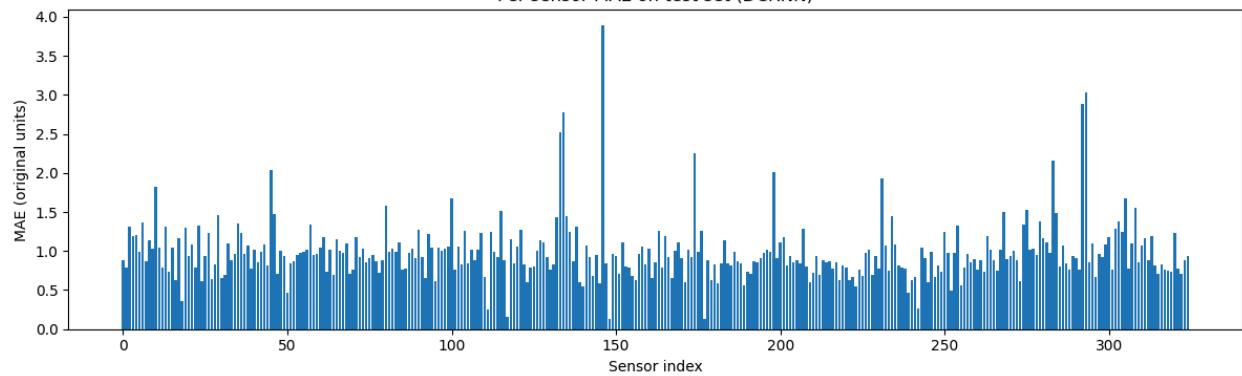
Test MAE (original units): 0.9841

Test RMSE (original units): 1.8501

DCRNN - 1-step forecast (Sensor 0)



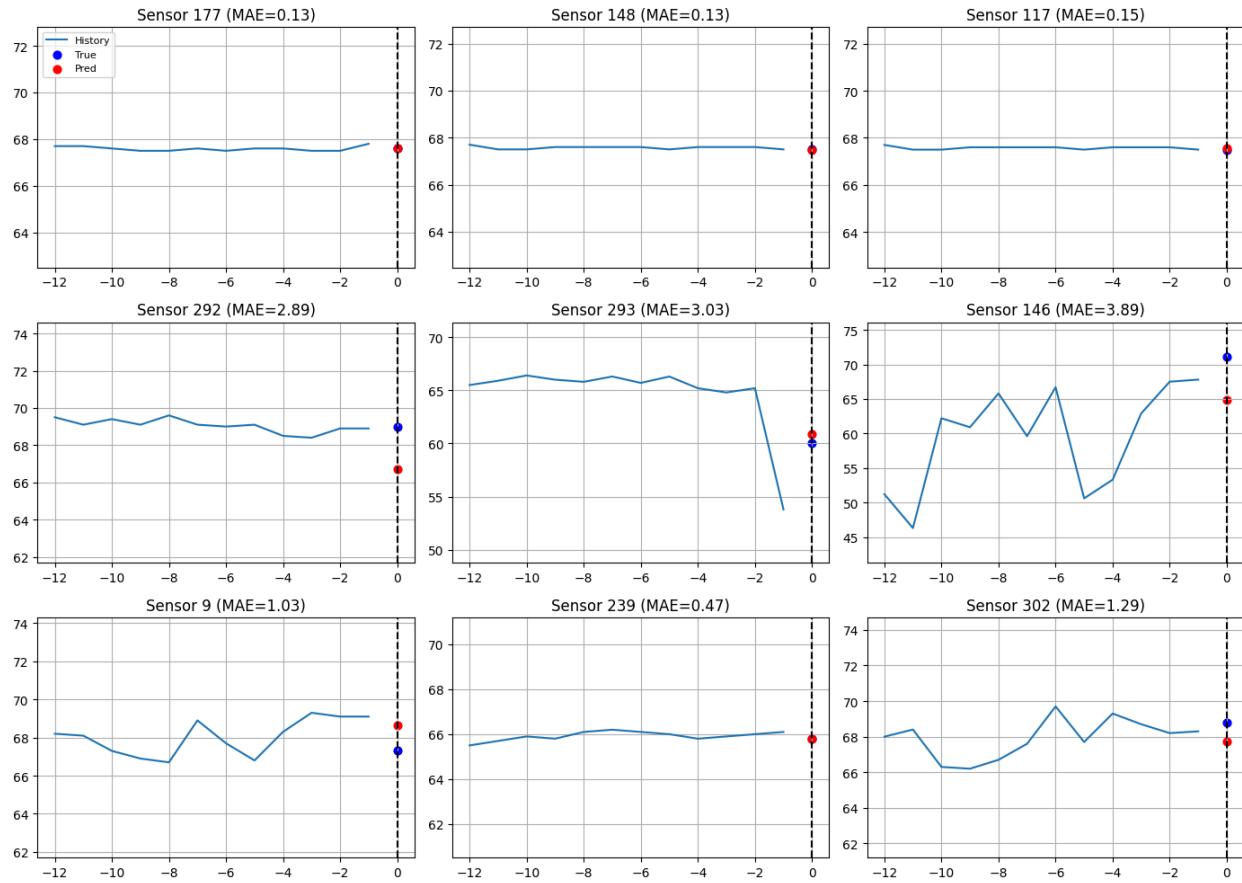
Per-sensor MAE on test set (DCRNN)



Best sensors: [177 148 117]

Worst sensors: [292 293 146]

Random sensors: [9 239 302]

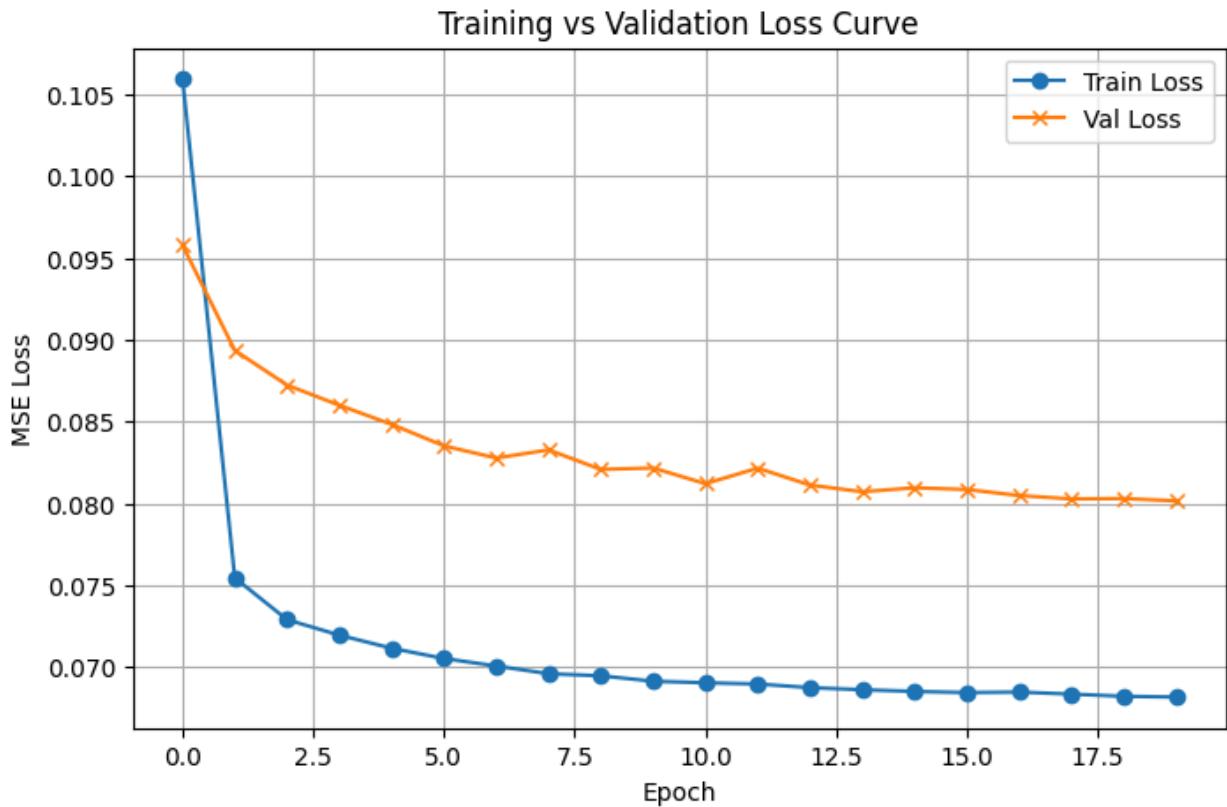


DCRNN_PEMS_Bay_No_Adj_10mins.ipynb

```

DCRNN (
    (cell): DCRNNCell(
        (diff): DiffusionConv(
            (dropout): Dropout(p=0.2, inplace=False)
        )
        (gru): GRUCell(64, 64)
        (dropout): Dropout(p=0.2, inplace=False)
    )
    (fc_out): Linear(in_features=64, out_features=2, bias=True)
)
🔥 New best model saved!
Epoch 20/20 | Train=0.068184 | Val=0.080162
Training complete! Best Validation Loss: 0.0801620524765158

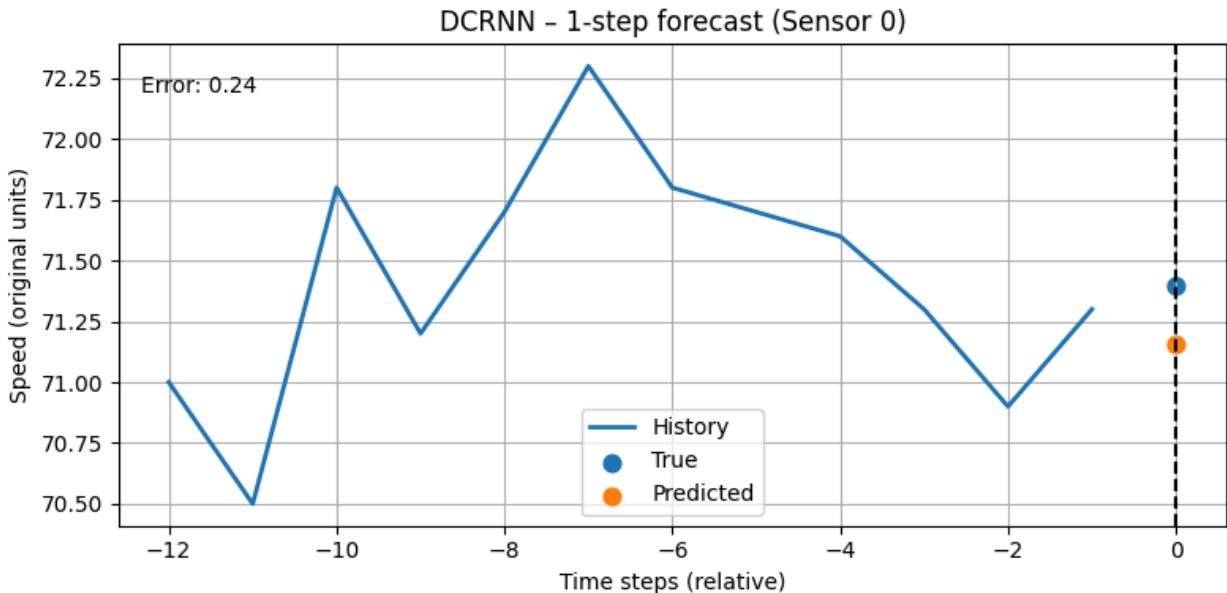
```



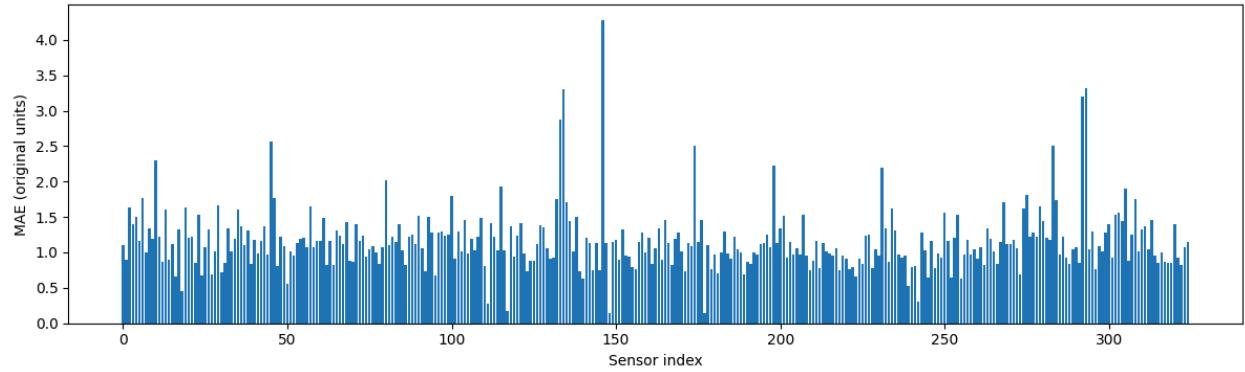
Test MSE (normalized) : 0.10306883734629768

Test MAE (original units) : 1.1601

Test RMSE (original units) : 2.2525



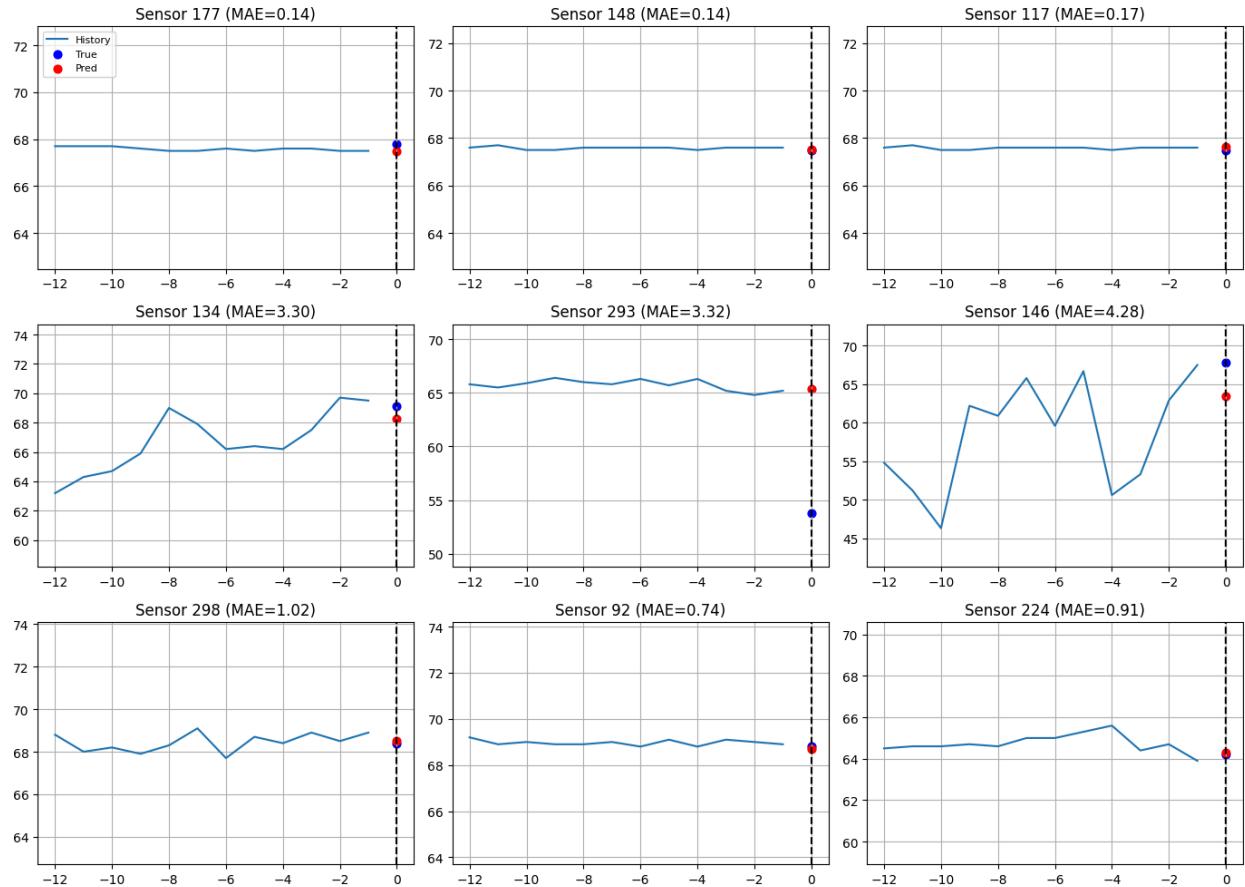
Per-sensor MAE on test set (DCRNN)



Best sensors: [177 148 117]

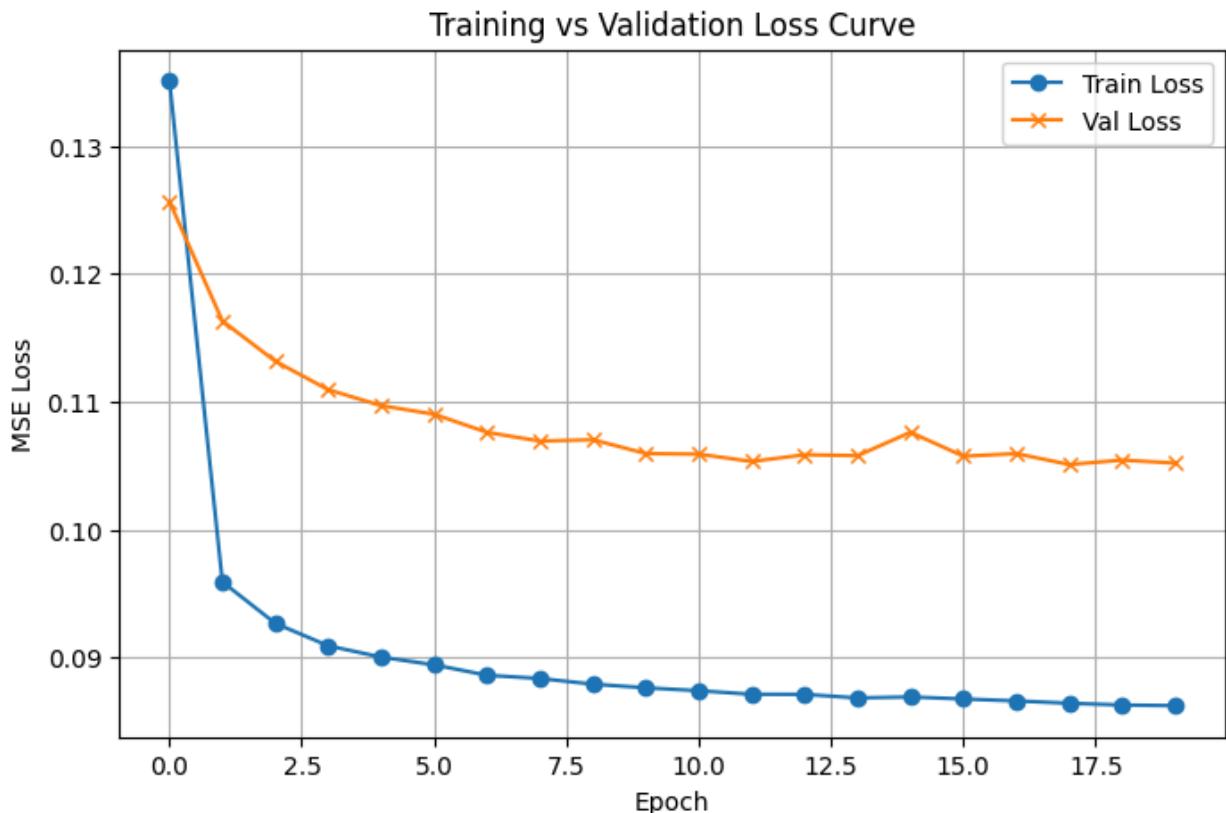
Worst sensors: [134 293 146]

Random sensors: [298 92 224]



DCRNN_PEMS_Bay_No_Adj_15mins.ipynb

```
DCRNN(  
    (cell): DCRNNCell(  
        (diff): DiffusionConv(  
            (dropout): Dropout(p=0.2, inplace=False)  
        )  
        (gru): GRUCell(64, 64)  
        (dropout): Dropout(p=0.2, inplace=False)  
    )  
    (fc_out): Linear(in_features=64, out_features=3, bias=True)  
)  
🔥 New best model saved!  
Epoch 18/20 | Train=0.086421 | Val=0.105087  
Training complete! Best Validation Loss: 0.10508742311432318
```

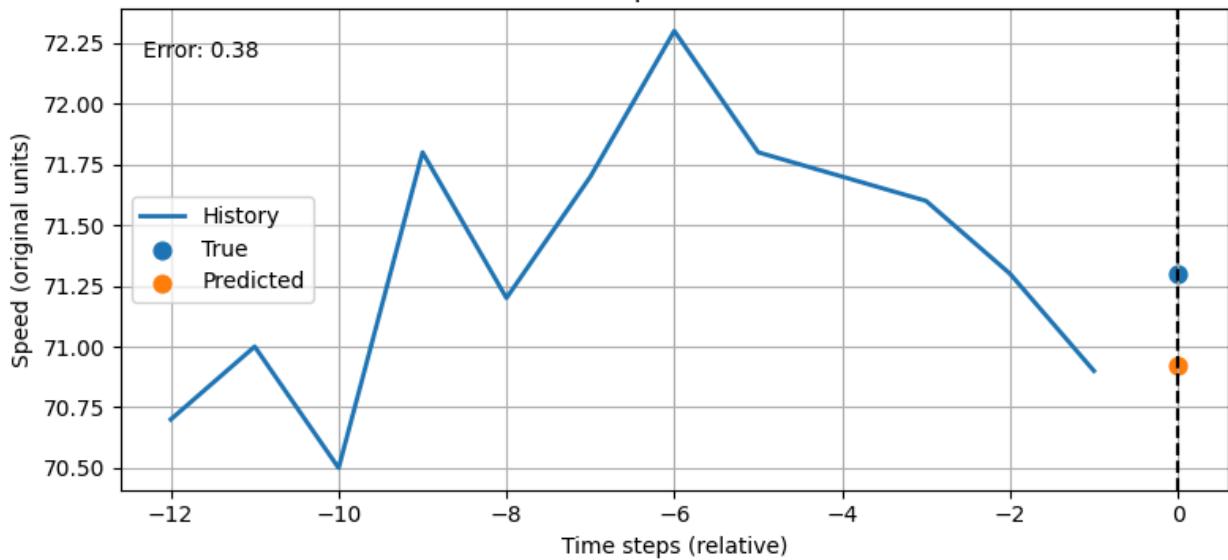


Test MSE (normalized): 0.13224592379837144

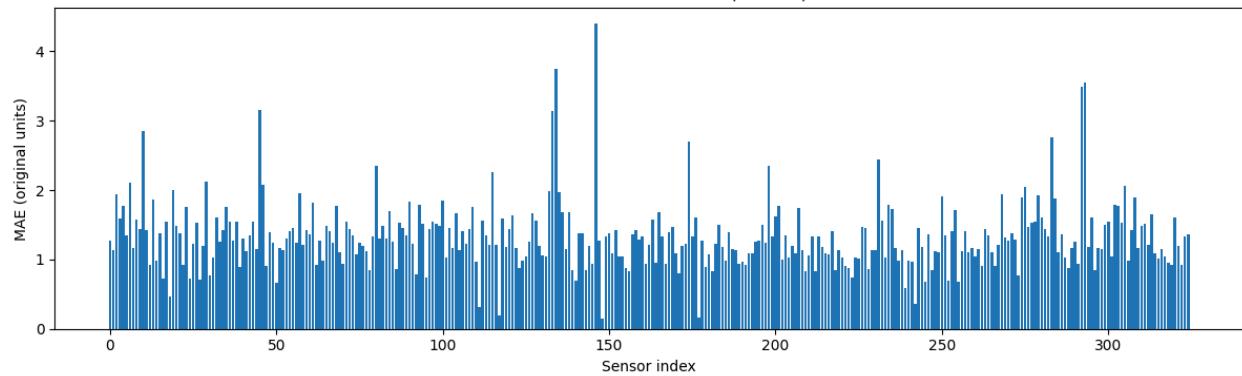
Test MAE (original units): 1.3320

Test RMSE (original units): 2.5764

DCRNN - 1-step forecast (Sensor 0)



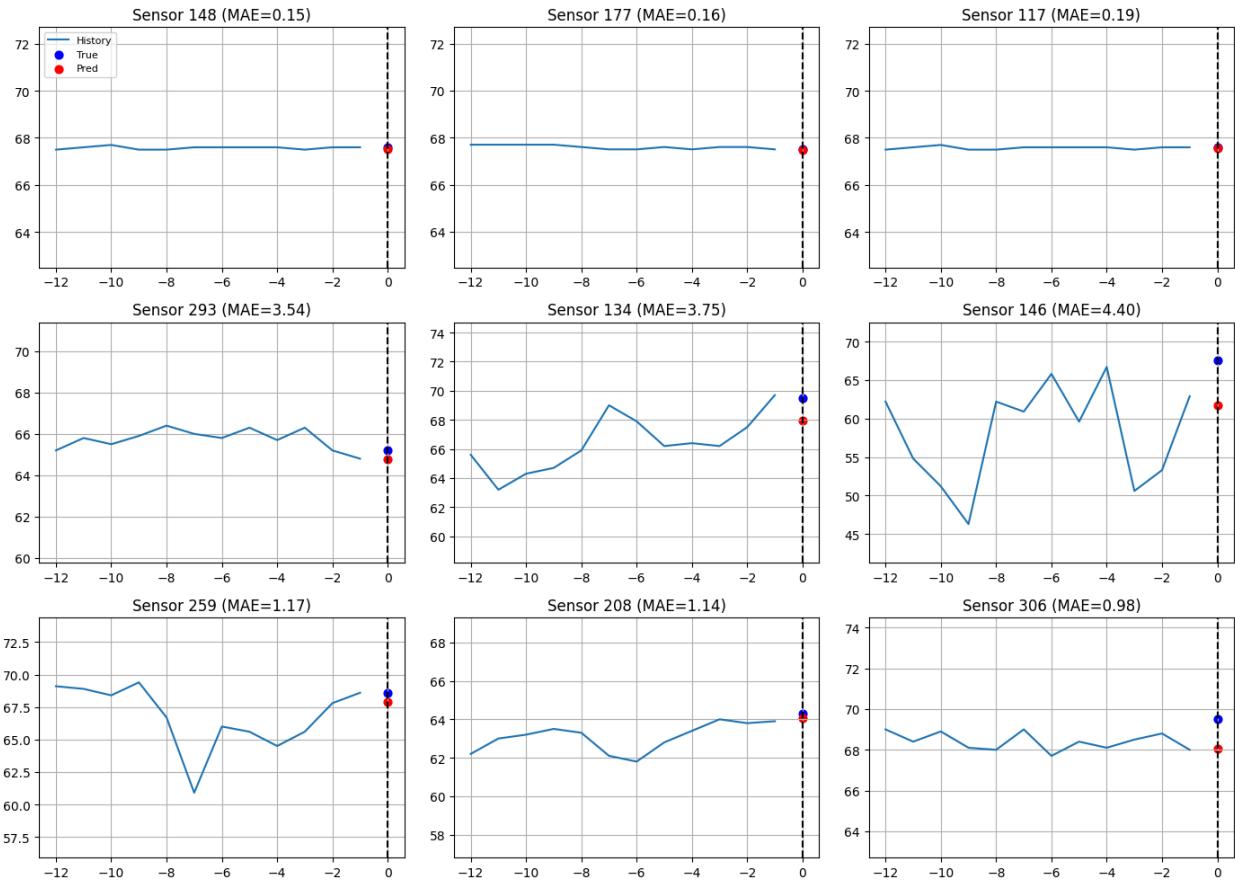
Per-sensor MAE on test set (DCRNN)



Best sensors: [148 177 117]

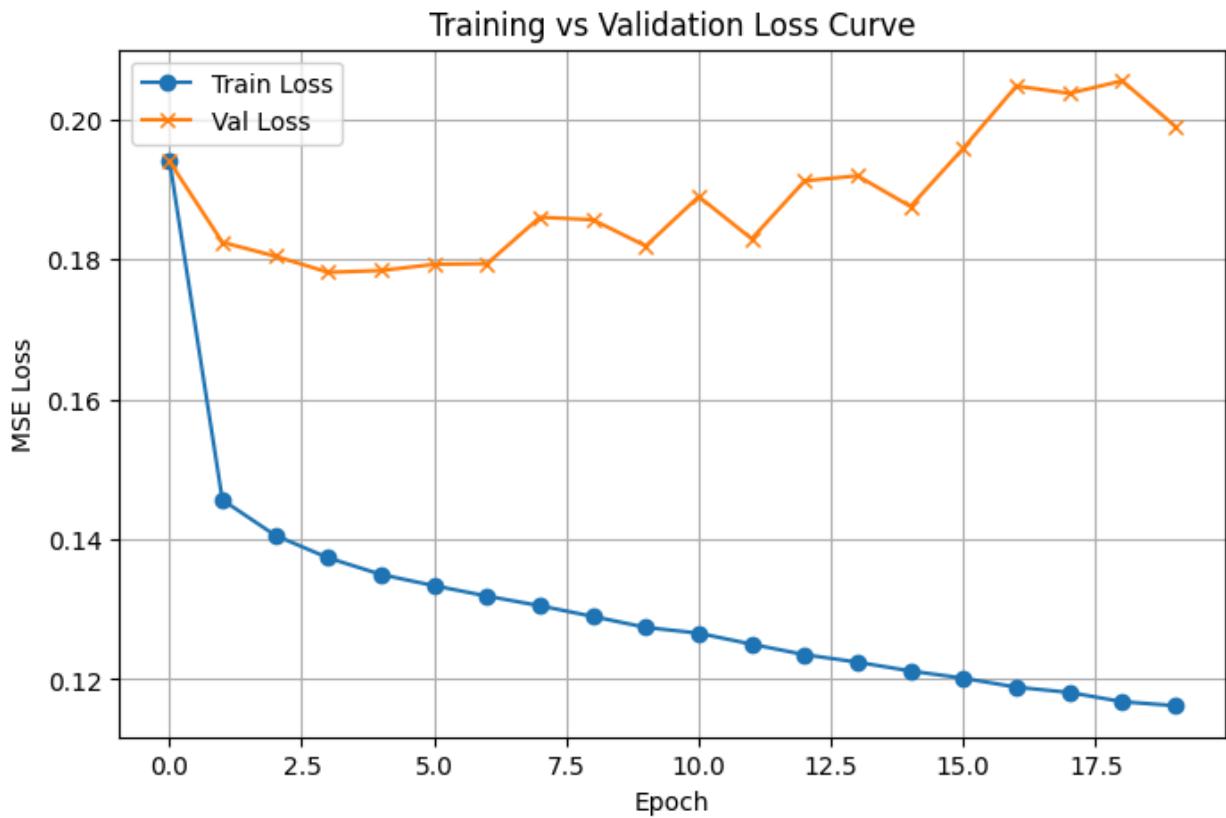
Worst sensors: [293 134 146]

Random sensors: [259 208 306]



DCRNN_PEMS_Bay_No_Adj_30mins.ipynb

```
DCRNN(  
    (cell): DCRNNCell(  
        (diff): DiffusionConv(  
            (dropout): Dropout(p=0.2, inplace=False)  
        )  
        (gru): GRUCell(64, 64)  
        (dropout): Dropout(p=0.2, inplace=False)  
    )  
    (fc_out): Linear(in_features=64, out_features=6, bias=True)  
)  
🔥 New best model saved!  
Epoch 4/20 | Train=0.137344 | Val=0.178157  
Training complete! Best Validation Loss: 0.1781573285651536
```

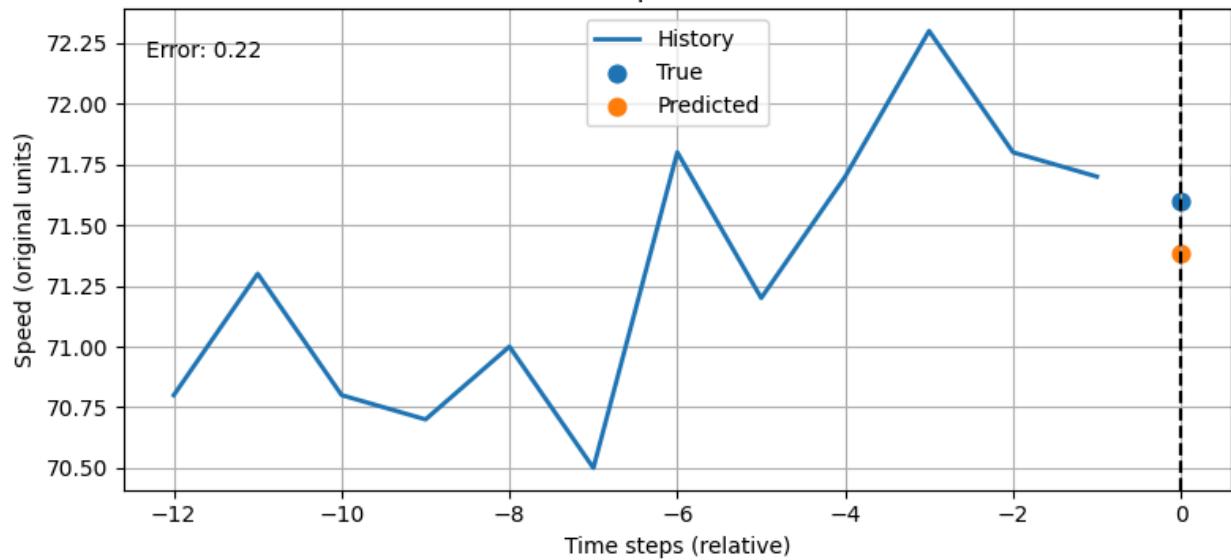


Test MSE (normalized): 0.22172301382824786

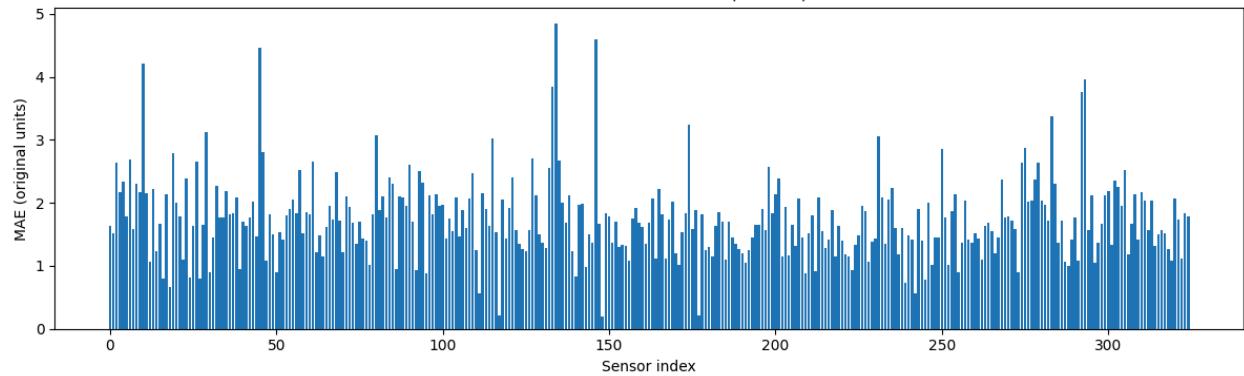
Test MAE (original units): 1.7440

Test RMSE (original units): 3.3933

DCRNN - 1-step forecast (Sensor 0)



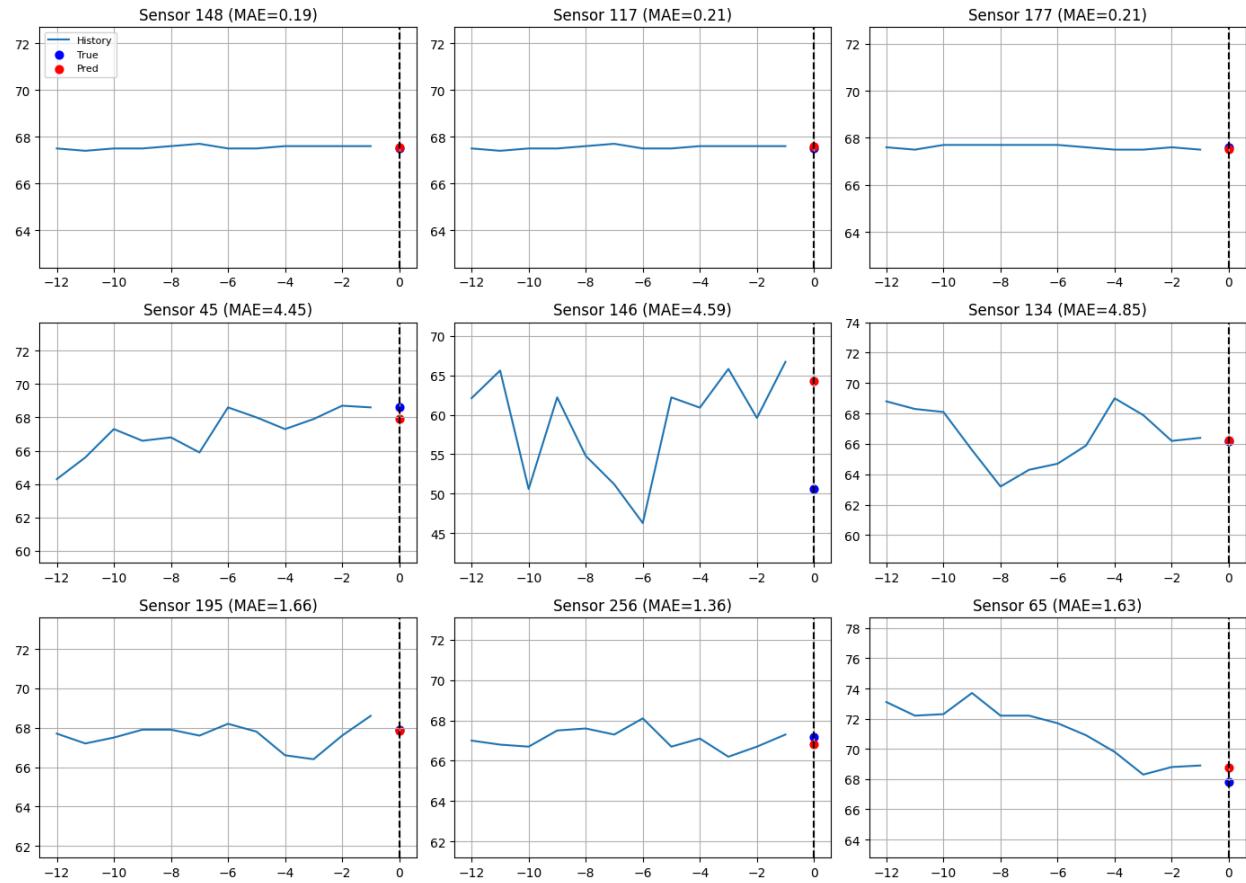
Per-sensor MAE on test set (DCRNN)



Best sensors: [148 117 177]

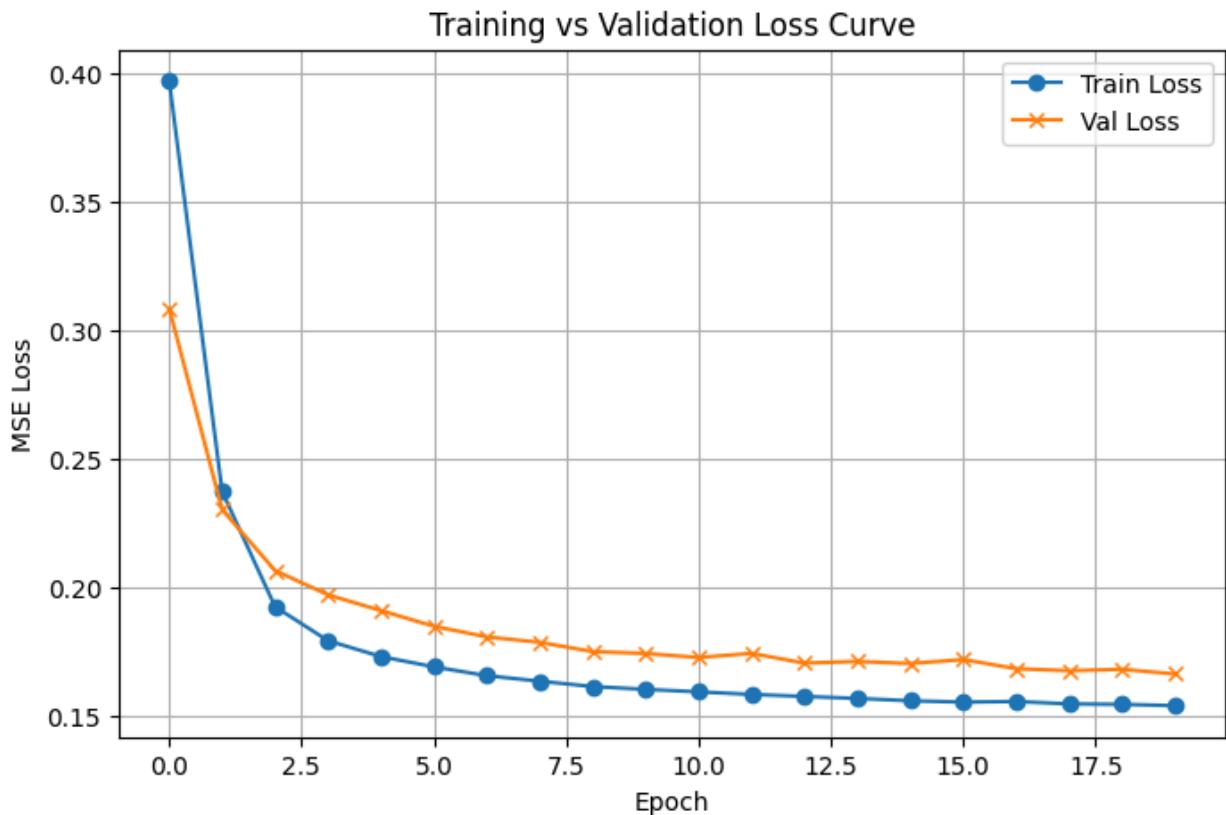
Worst sensors: [45 146 134]

Random sensors: [195 256 65]



DCRNN_PEMS_Bay_with_Adj_5mins.ipynb

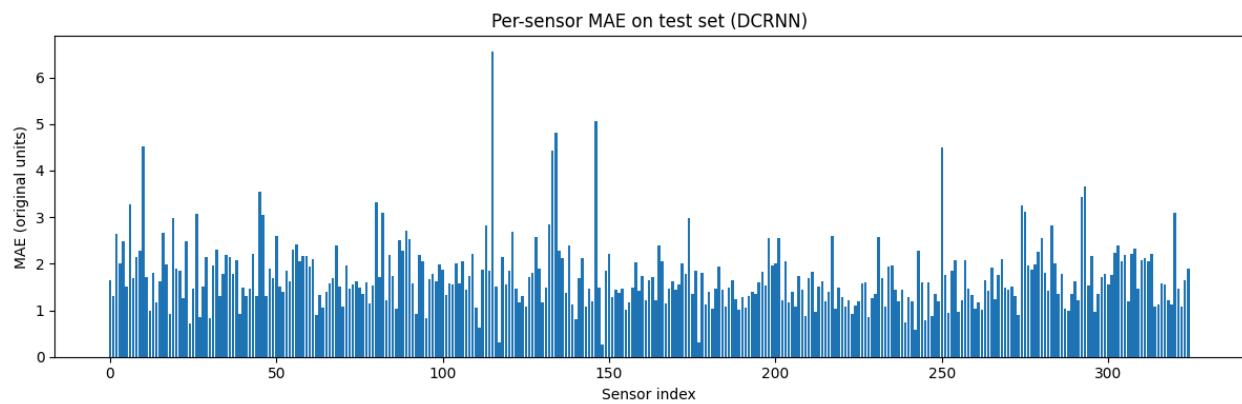
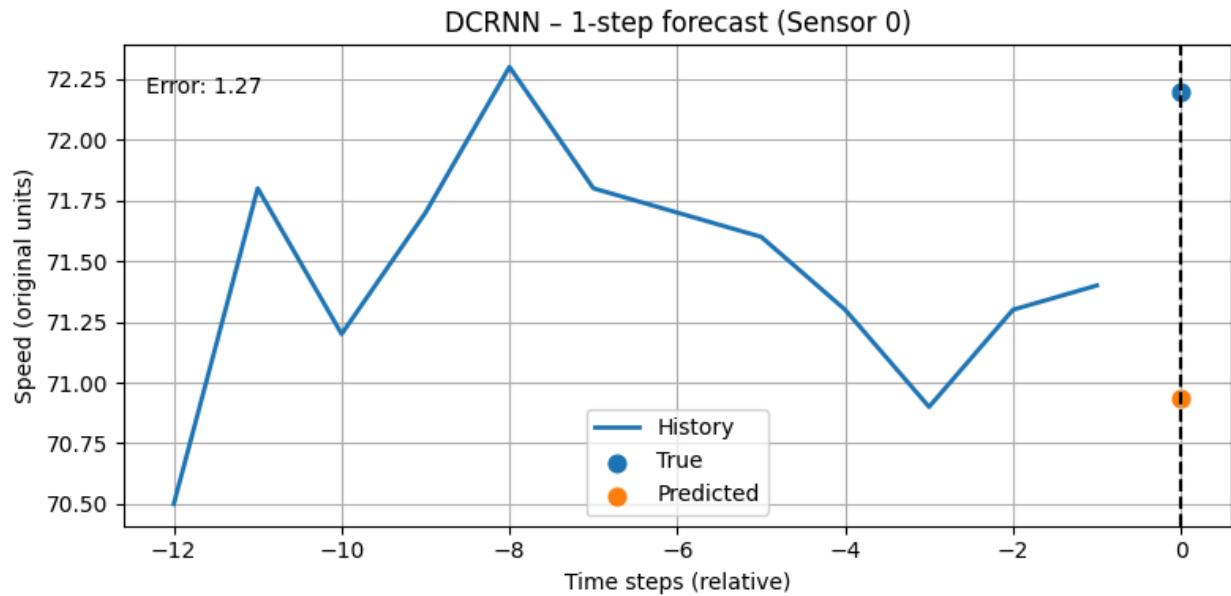
```
DCRNN(  
    (cell): DCRNNCell(  
        (diff): DiffusionConv(  
            (dropout): Dropout(p=0.2, inplace=False)  
        )  
        (gru): GRUCell(64, 64)  
        (dropout): Dropout(p=0.2, inplace=False)  
    )  
    (fc_out): Linear(in_features=64, out_features=1, bias=True)  
)  
🔥 New best model saved!  
Epoch 20/20 | Train=0.153807 | Val=0.166137  
Training complete! Best Validation Loss: 0.16613711145895024
```



Test MSE (normalized): 0.22092727942105256

Test MAE (original units): 1.7321

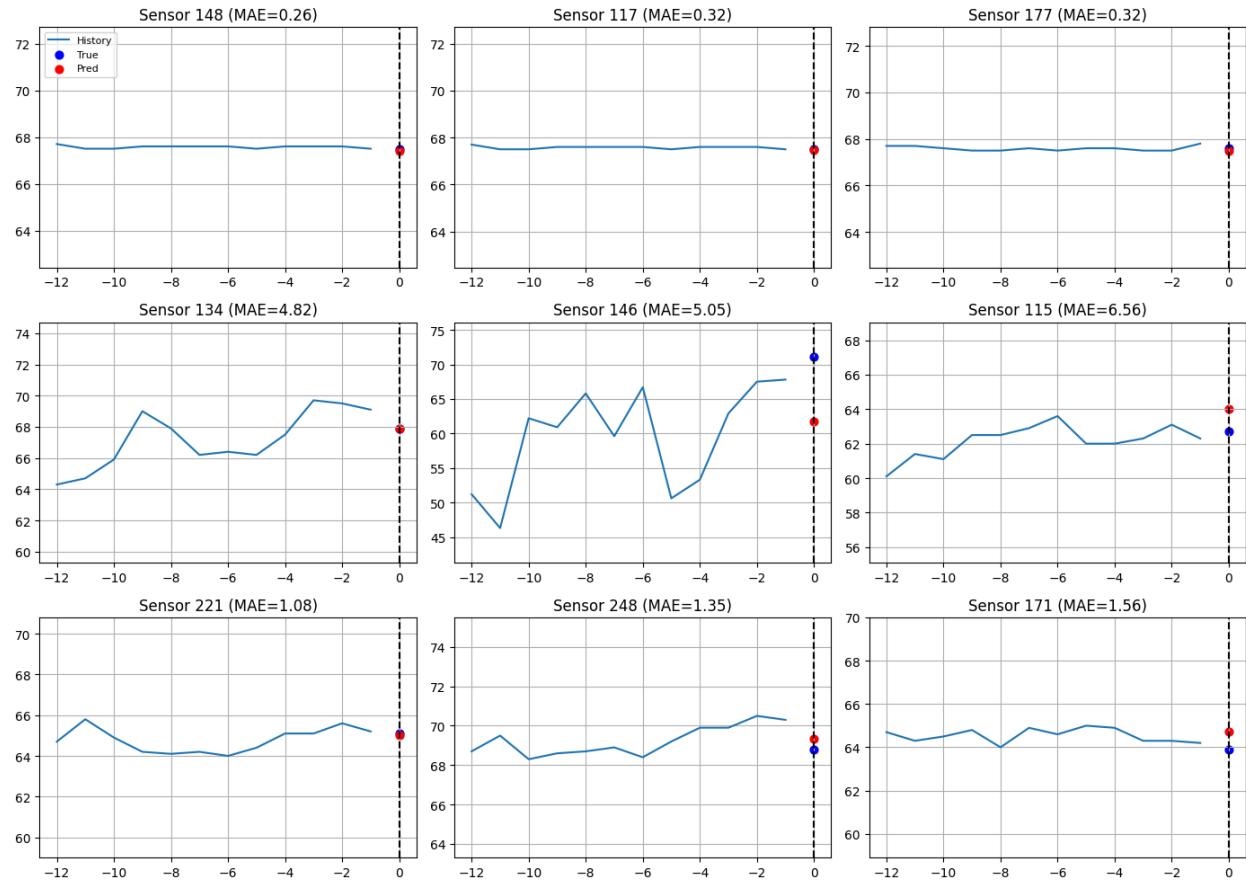
Test RMSE (original units): 3.2884



Best sensors: [148 117 177]

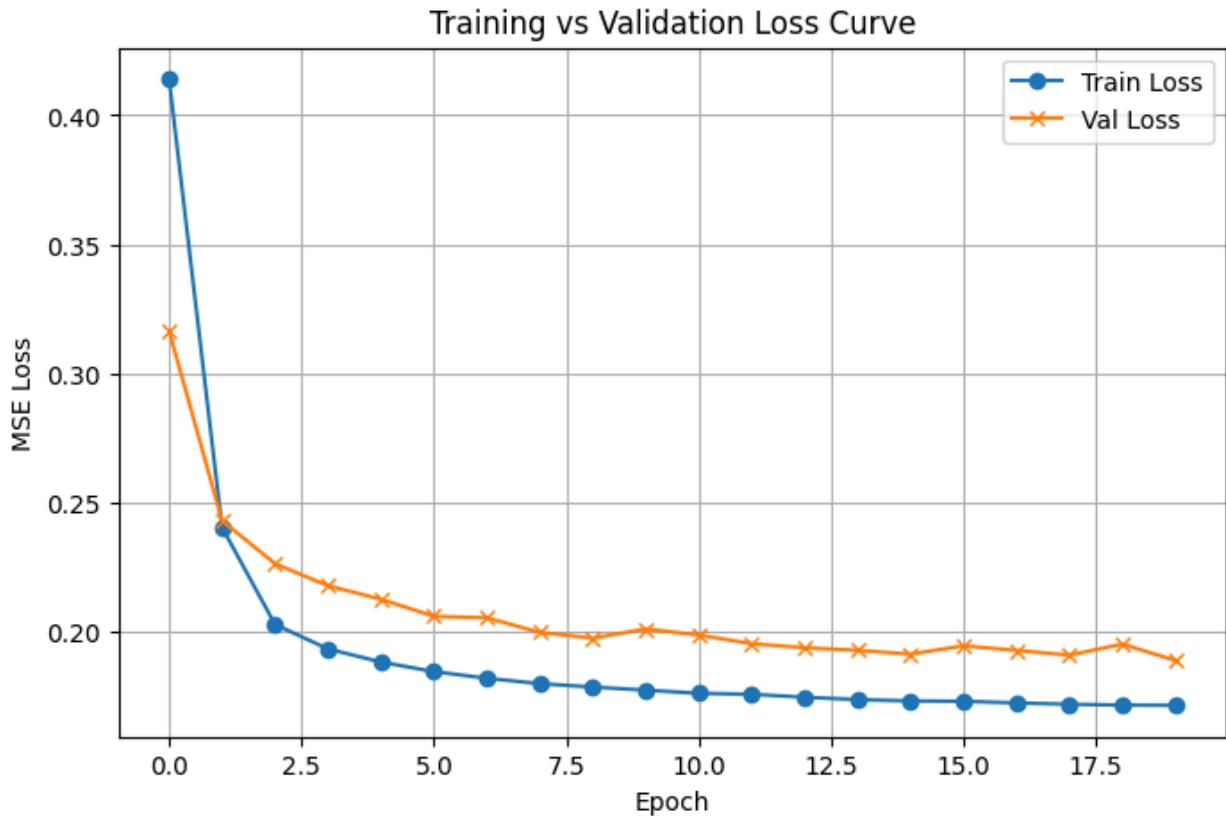
Worst sensors: [134 146 115]

Random sensors: [221 248 171]



DCRNN_PEMS_Bay_with_Adj_10mins.ipynb

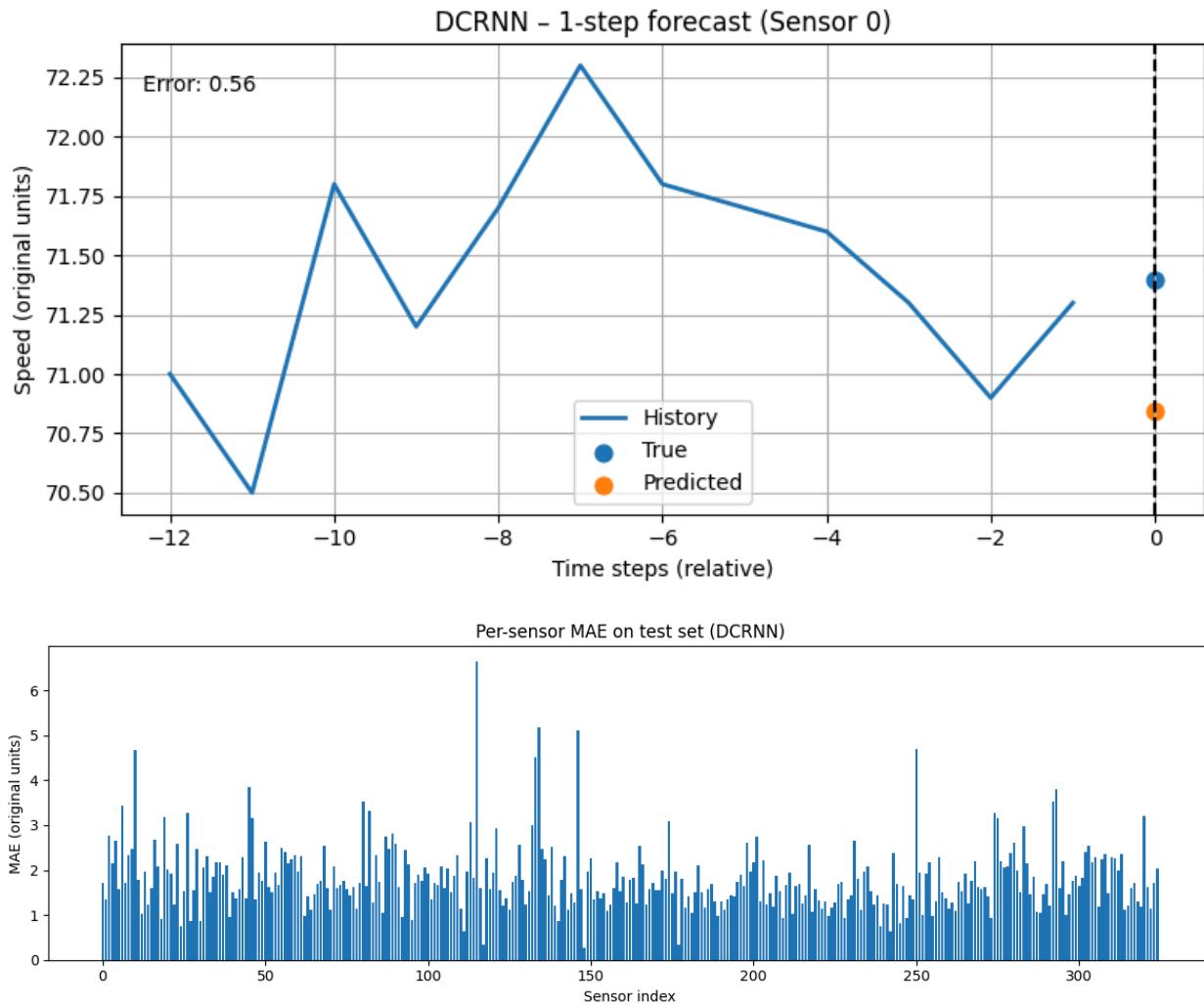
```
DCRNN(  
    (cell): DCRNNCell(  
        (diff): DiffusionConv(  
            (dropout): Dropout(p=0.2, inplace=False)  
        )  
        (gru): GRUCell(64, 64)  
        (dropout): Dropout(p=0.2, inplace=False)  
    )  
    (fc_out): Linear(in_features=64, out_features=2, bias=True)  
)  
🔥 New best model saved!  
Epoch 20/20 | Train=0.171384 | Val=0.188730  
Training complete! Best Validation Loss: 0.18872969764416203
```



Test MSE (normalized): 0.2445512235196176

Test MAE (original units): 1.8163

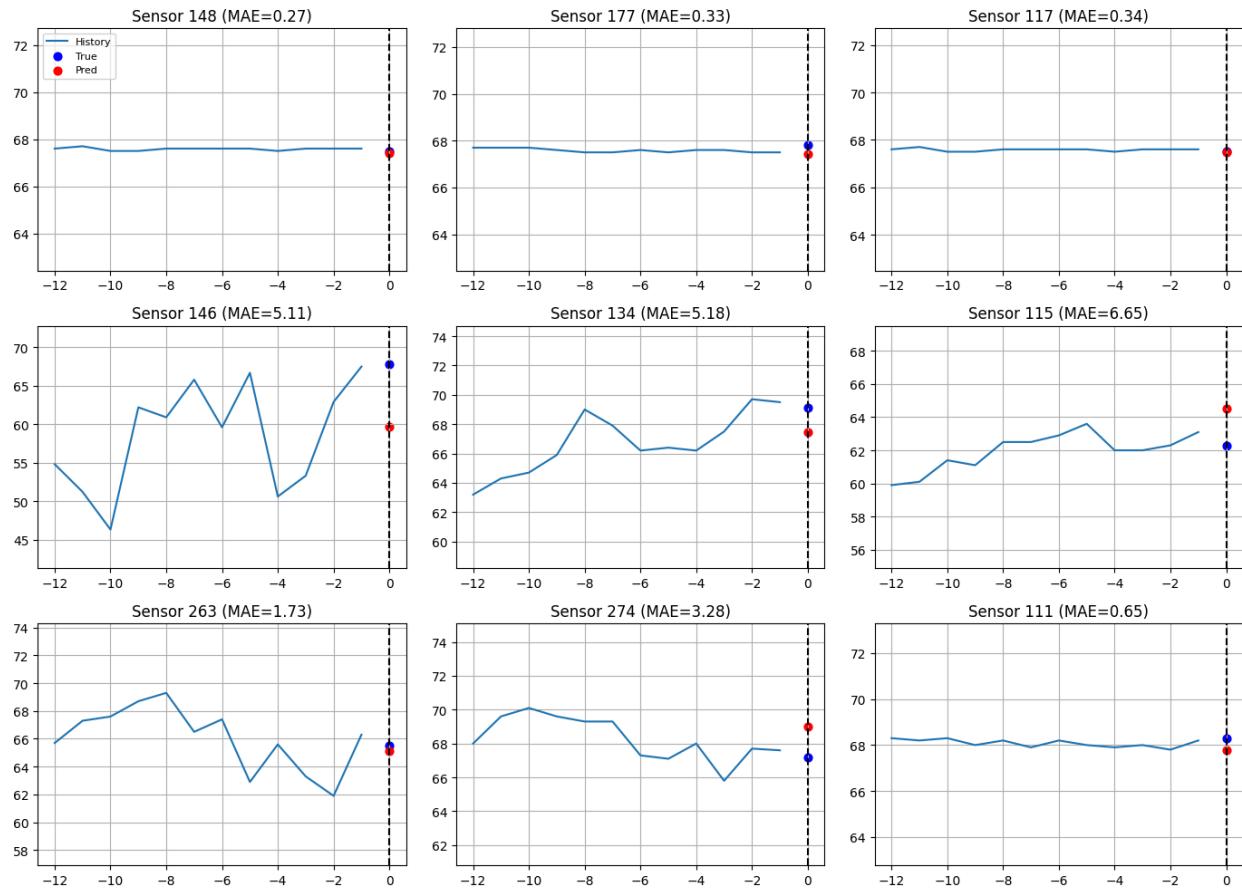
Test RMSE (original units): 3.4893



Best sensors: [148 177 117]

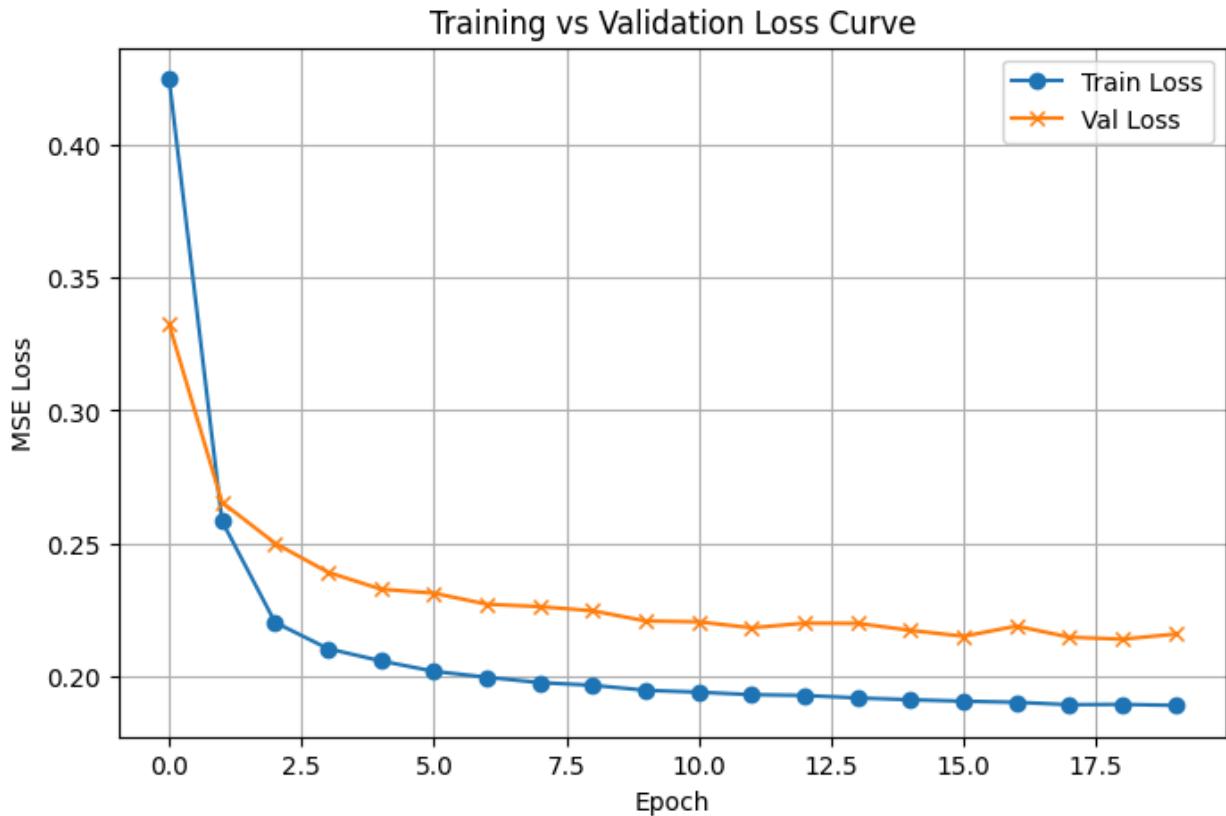
Worst sensors: [146 134 115]

Random sensors: [263 274 111]



DCRNN_PEMS_Bay_with_Adj_15mins.ipynb

```
DCRNN ( 
    (cell): DCRNNCell ( 
        (diff): DiffusionConv ( 
            (dropout): Dropout (p=0.2, inplace=False) 
        ) 
        (gru): GRUCell (64, 64) 
        (dropout): Dropout (p=0.2, inplace=False) 
    ) 
    (fc_out): Linear (in_features=64, out_features=3, bias=True) 
)
🔥 New best model saved!
Epoch 19/20 | Train=0.189258 | Val=0.213824
Training complete! Best Validation Loss: 0.2138241394051562
```

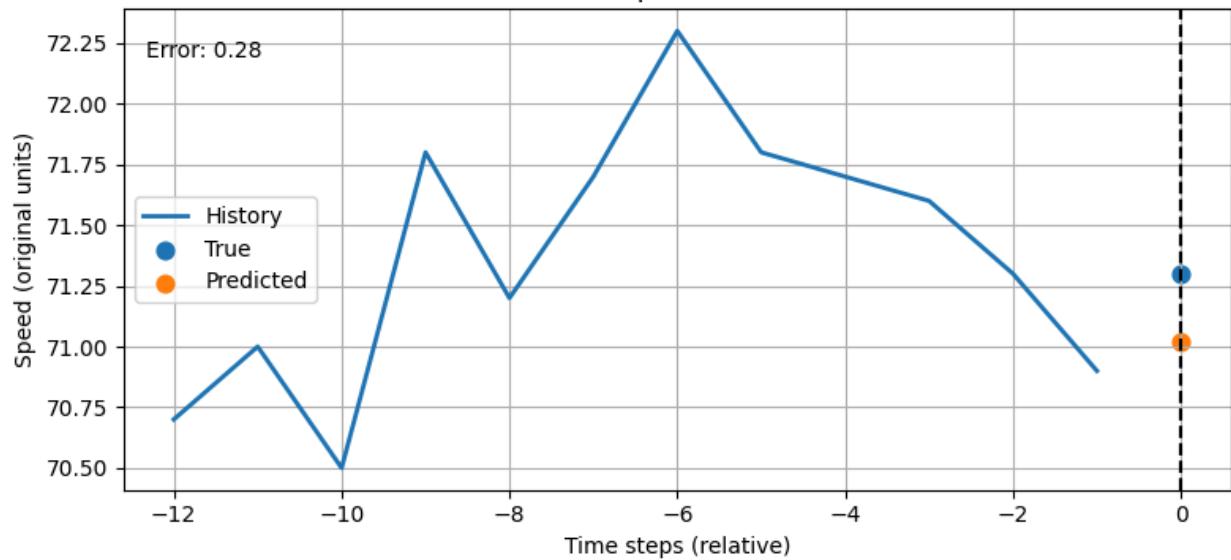


Test MSE (normalized): 0.27128532159430535

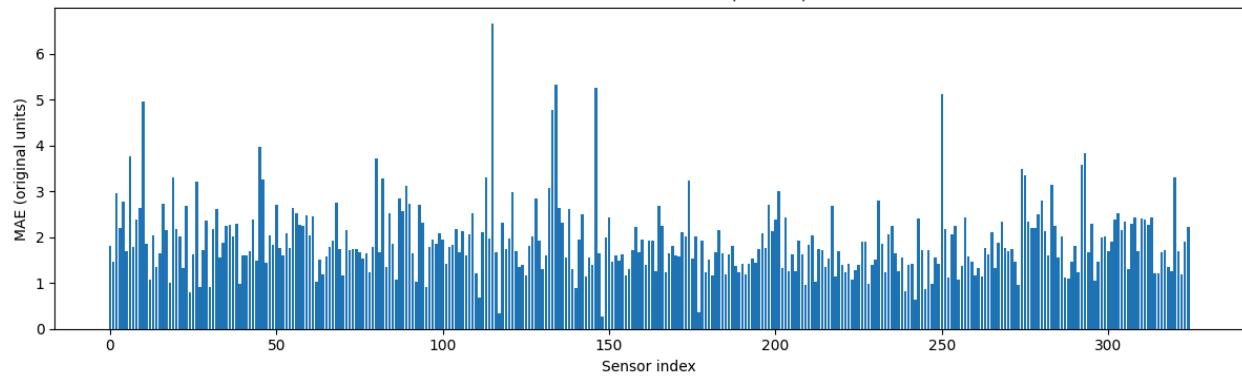
Test MAE (original units): 1.9151

Test RMSE (original units): 3.6935

DCRNN - 1-step forecast (Sensor 0)



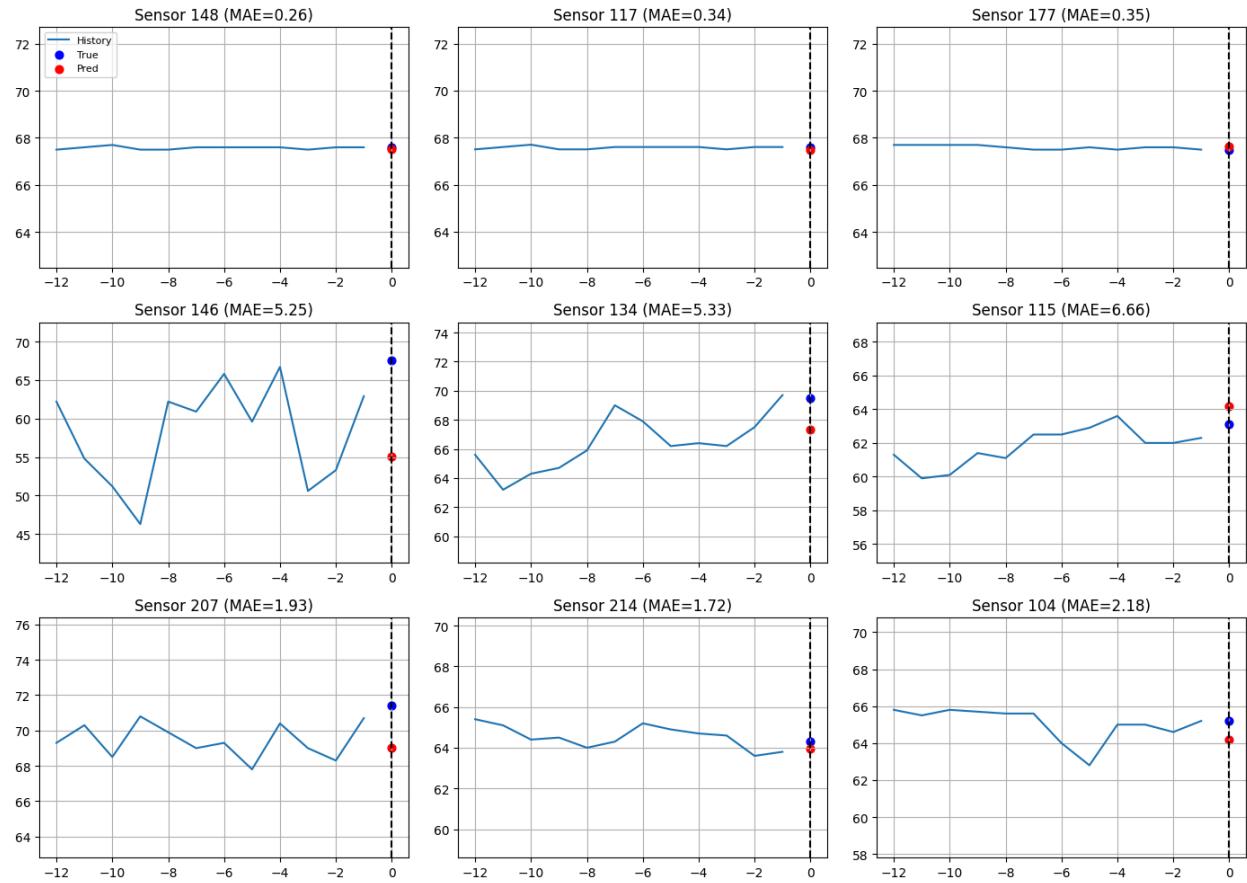
Per-sensor MAE on test set (DCRNN)



Best sensors: [148 117 177]

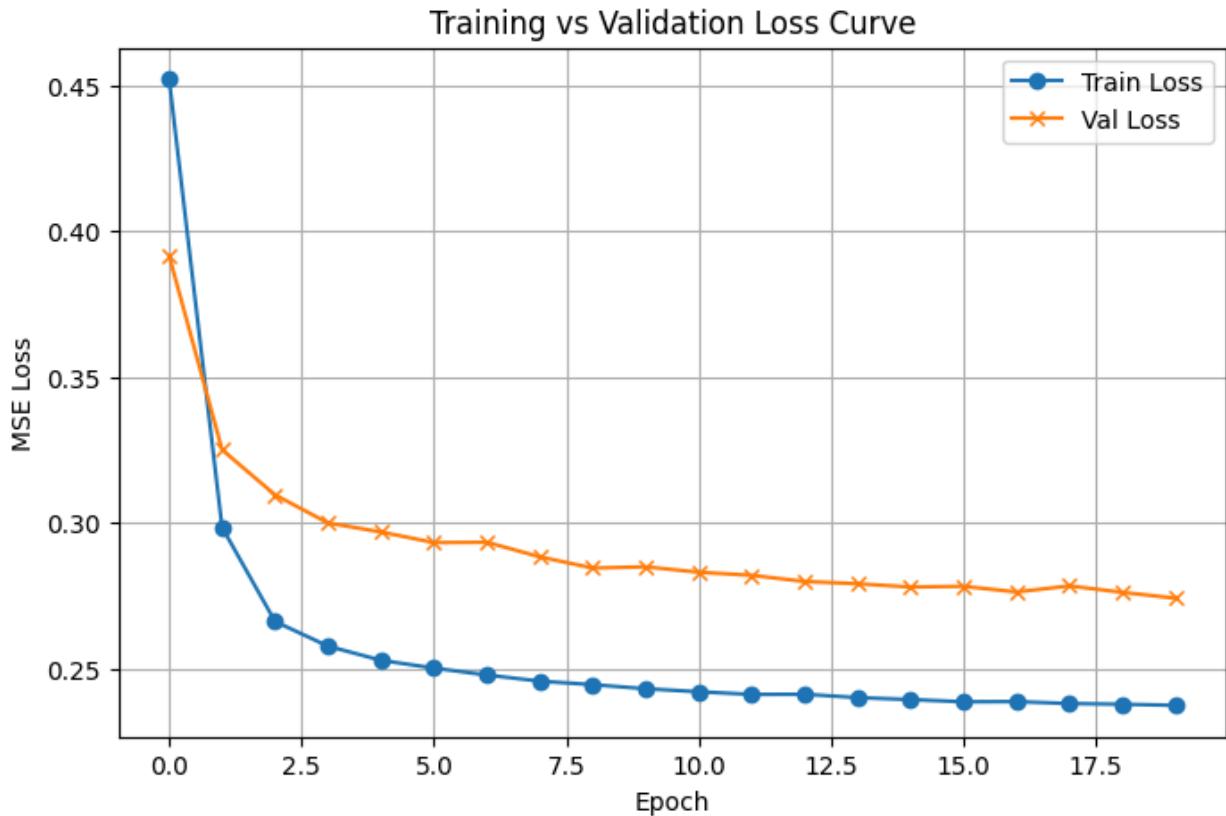
Worst sensors: [146 134 115]

Random sensors: [207 214 104]



DCRNN_PEMS_Bay_with_Adj_30mins.ipynb

```
DCRNN(  
    (cell): DCRNNCell(  
        (diff): DiffusionConv(  
            (dropout): Dropout(p=0.2, inplace=False)  
        )  
        (gru): GRUCell(64, 64)  
        (dropout): Dropout(p=0.2, inplace=False)  
    )  
    (fc_out): Linear(in_features=64, out_features=6, bias=True)  
)  
🔥 New best model saved!  
Epoch 20/20 | Train=0.237527 | Val=0.274243  
Training complete! Best Validation Loss: 0.2742429898560413
```

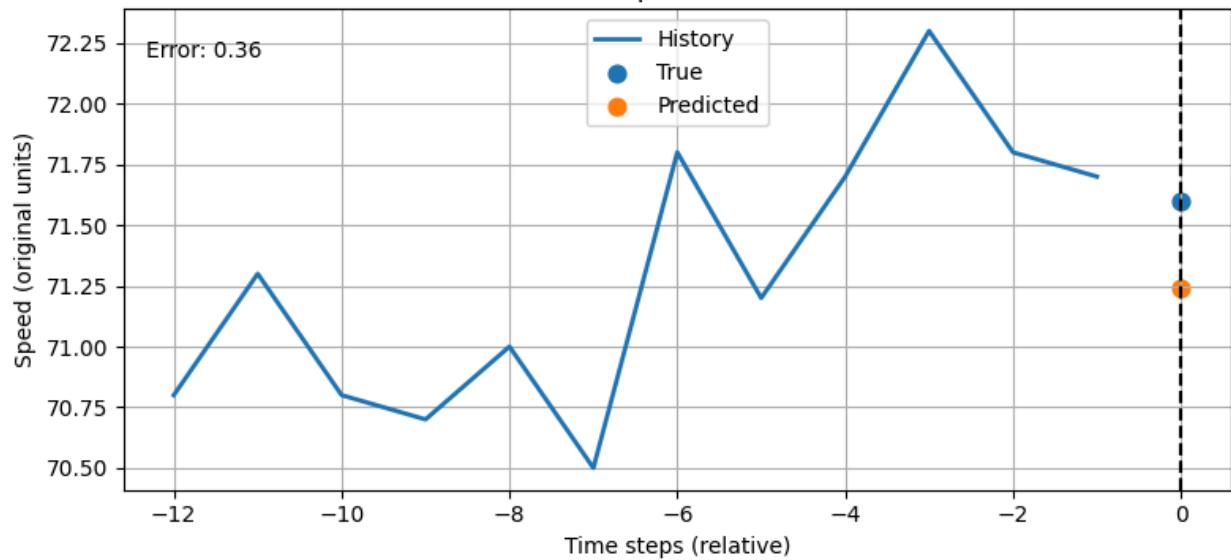


Test MSE (normalized): 0.3366550695600076

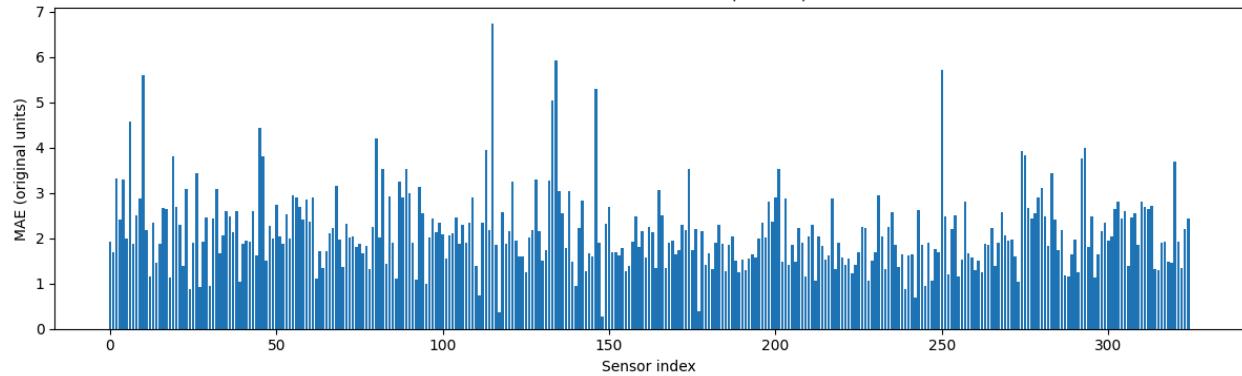
Test MAE (original units): 2.1368

Test RMSE (original units): 4.1964

DCRNN - 1-step forecast (Sensor 0)



Per-sensor MAE on test set (DCRNN)



Best sensors: [148 117 177]

Worst sensors: [250 134 115]

Random sensors: [205 173 121]

