Training Model for CA_1...

Epoch 1/100
50/50 [==============================] - 2s 43ms/step - loss: 0.6975 - val_loss: 0.6616
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5832 - val_loss: 0.4796
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4373 - val_loss: 0.3972
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3972 - val_loss: 0.3676
Epoch 5/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3796 - val_loss: 0.3532
Epoch 6/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3701 - val_loss: 0.3433
Epoch 7/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3557 - val_loss: 0.3223
Epoch 8/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3409 - val_loss: 0.3132
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3224 - val_loss: 0.3029
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3122 - val_loss: 0.2949
Epoch 11/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3026 - val_loss: 0.2982
Epoch 12/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3028 - val_loss: 0.2757
Epoch 13/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2969 - val_loss: 0.2914
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2939 - val_loss: 0.2797
Epoch 15/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2933 - val_loss: 0.2723
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2922 - val_loss: 0.2987
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2890 - val_loss: 0.2787
Epoch 18/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2862 - val_loss: 0.2803
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2889 - val_loss: 0.2873
Epoch 20/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2845 - val_loss: 0.2732
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2837 - val_loss: 0.2842
Epoch 22/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2845 - val_loss: 0.2755

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Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2857 - val_loss: 0.2771
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2853 - val_loss: 0.2872
Epoch 25/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2811 - val_loss: 0.2721
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2842 - val_loss: 0.2723
Epoch 27/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2834 - val_loss: 0.2833
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2809 - val_loss: 0.2800
Epoch 29/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2816 - val_loss: 0.2692
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2804 - val_loss: 0.2743
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2784 - val_loss: 0.2714
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2795 - val_loss: 0.2743
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2810 - val_loss: 0.2815
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2792 - val_loss: 0.2764
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2778 - val_loss: 0.2874
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2787 - val_loss: 0.2731
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2762 - val_loss: 0.2786
Epoch 38/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2774 - val_loss: 0.2716
Epoch 39/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2799 - val_loss: 0.2733
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2753 - val_loss: 0.2726
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2785 - val_loss: 0.2730
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2777 - val_loss: 0.2846
Epoch 43/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2768 - val_loss: 0.2809
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2724 - val_loss: 0.2794
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2768 - val_loss: 0.2759
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2758 - val_loss: 0.2784
```

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Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2750 - val_loss: 0.2851
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2755 - val_loss: 0.2823
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2739 - val_loss: 0.2979
Epoch 50/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2776 - val_loss: 0.2726
Epoch 51/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2733 - val_loss: 0.2738
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2737 - val_loss: 0.2883
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2739 - val_loss: 0.2796
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2722 - val_loss: 0.2801
Epoch 55/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2738 - val_loss: 0.2731
Epoch 56/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2708 - val_loss: 0.2851
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2744 - val_loss: 0.2724
Epoch 58/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2740 - val_loss: 0.2799
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2718 - val_loss: 0.2821
Epoch 60/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2723 - val_loss: 0.2817
Epoch 61/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2756 - val_loss: 0.2766
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2734 - val_loss: 0.2762
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2686 - val_loss: 0.2817
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2719 - val_loss: 0.2817
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3190 - val_loss: 0.3145
Epoch 66/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3022 - val_loss: 0.2883
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2829 - val_loss: 0.2731
Epoch 68/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2717 - val_loss: 0.2807
Epoch 69/100
50/50 [==============================] - 2s 41ms/step - loss: 0.2741 - val_loss: 0.2754
Epoch 70/100
50/50 [==============================] - 2s 41ms/step - loss: 0.2699 - val_loss: 0.2849
```

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Epoch 71/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2730 - val_loss: 0.2785
Epoch 72/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2708 - val_loss: 0.2734
Epoch 73/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2716 - val_loss: 0.2822
Epoch 74/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2707 - val_loss: 0.2788
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2695 - val_loss: 0.2795
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2715 - val_loss: 0.2803
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2679 - val_loss: 0.2774
Epoch 78/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2695 - val_loss: 0.2795
Epoch 79/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2692 - val_loss: 0.2760
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2678 - val_loss: 0.2981
Epoch 81/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2704 - val_loss: 0.2782
Epoch 82/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2663 - val_loss: 0.2746
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2695 - val_loss: 0.2778
Epoch 84/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2672 - val_loss: 0.2757
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2678 - val_loss: 0.2899
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2675 - val_loss: 0.2831
Epoch 87/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2717 - val_loss: 0.2724
Epoch 88/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2655 - val_loss: 0.2737
Epoch 89/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2674 - val_loss: 0.2813
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2666 - val_loss: 0.2775
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2673 - val_loss: 0.2712
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2638 - val_loss: 0.2784
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2684 - val_loss: 0.2733
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2640 - val_loss: 0.2747
```

Epoch 95/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2652 - val_loss: 0.2786
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2686 - val_loss: 0.2762
Epoch 97/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2642 - val_loss: 0.2788
Epoch 98/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2644 - val_loss: 0.2775
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2645 - val_loss: 0.2773
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2659 - val_loss: 0.2697
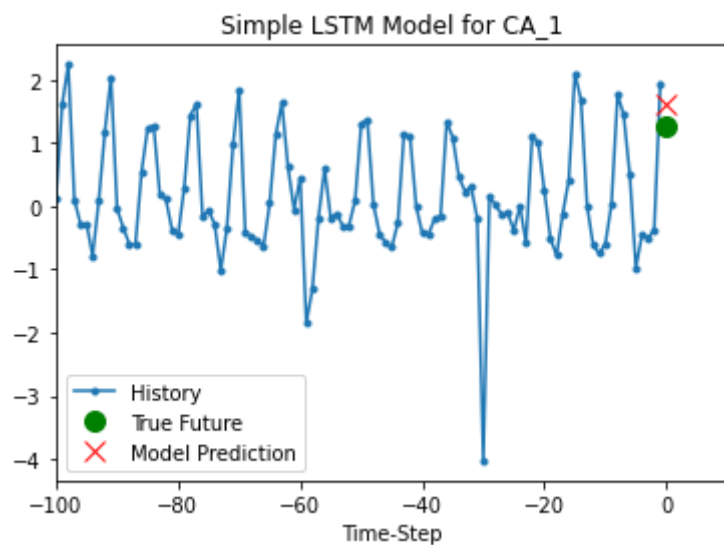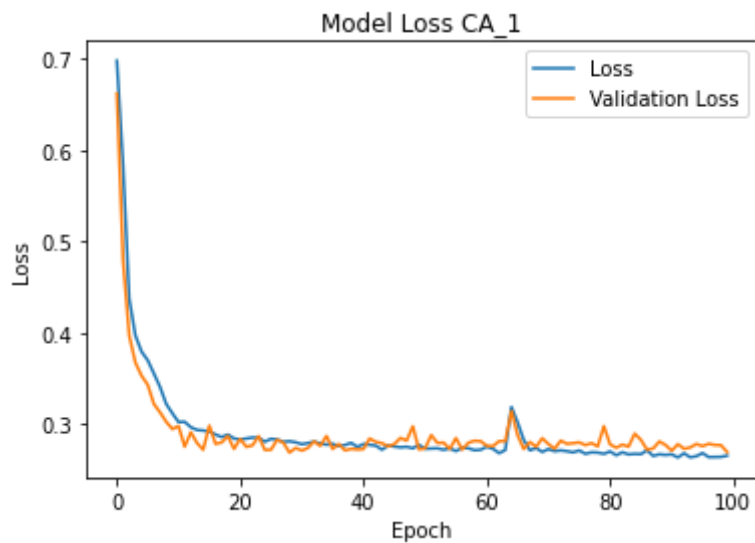
CA_1 - True Future: 5247
CA_1 - Model Prediction: 5582
CA_1 - Model Percentage Error: 6.38%
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Training Model for CA_2...

Epoch 1/100
50/50 [==============================] - 2s 43ms/step - loss: 0.6868 - val_loss: 1.1690
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5370 - val_loss: 1.1260
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4296 - val_loss: 0.8680
Epoch 4/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3486 - val_loss: 0.8817
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3072 - val_loss: 0.8448
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2894 - val_loss: 0.7520
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2758 - val_loss: 0.6715
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2708 - val_loss: 0.6547
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2653 - val_loss: 0.5996
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2606 - val_loss: 0.5875
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2578 - val_loss: 0.5455
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2525 - val_loss: 0.5578
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2513 - val_loss: 0.5364
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2478 - val_loss: 0.5433
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2466 - val_loss: 0.5176
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2437 - val_loss: 0.5254
Epoch 17/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2456 - val_loss: 0.4807
Epoch 18/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3479 - val_loss: 0.7736
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2930 - val_loss: 0.6340
Epoch 20/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2686 - val_loss: 0.5975
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2610 - val_loss: 0.5736
Epoch 22/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2572 - val_loss: 0.5754
Epoch 23/100

```
50/50 [==============================] - 2s 38ms/step - loss: 0.2547 - val_loss: 0.5686
Epoch 24/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2529 - val_loss: 0.5784
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2537 - val_loss: 0.5801
Epoch 26/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2517 - val_loss: 0.5560
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2483 - val_loss: 0.5769
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2489 - val_loss: 0.5597
Epoch 29/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2434 - val_loss: 0.5543
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2463 - val_loss: 0.5610
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2440 - val_loss: 0.5608
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2446 - val_loss: 0.5473
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2419 - val_loss: 0.5589
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2442 - val_loss: 0.5514
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2390 - val_loss: 0.5508
Epoch 36/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2402 - val_loss: 0.5677
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2457 - val_loss: 0.5565
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2392 - val_loss: 0.5647
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2409 - val_loss: 0.5553
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2388 - val_loss: 0.5405
Epoch 41/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2367 - val_loss: 0.5570
Epoch 42/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2351 - val_loss: 0.5556
Epoch 43/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2359 - val_loss: 0.5451
Epoch 44/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2378 - val_loss: 0.5400
Epoch 45/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2370 - val_loss: 0.5585
Epoch 46/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2363 - val_loss: 0.5488
Epoch 47/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.2346 - val_loss: 0.5695
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2340 - val_loss: 0.5471
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2360 - val_loss: 0.5740
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2348 - val_loss: 0.5543
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2344 - val_loss: 0.5700
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2345 - val_loss: 0.5357
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2360 - val_loss: 0.5788
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2328 - val_loss: 0.5672
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2336 - val_loss: 0.5431
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2322 - val_loss: 0.5545
Epoch 57/100
50/50 [==============================] - 2s 43ms/step - loss: 0.2319 - val_loss: 0.5633
Epoch 58/100
50/50 [==============================] - 2s 44ms/step - loss: 0.2316 - val_loss: 0.5438
Epoch 59/100
50/50 [==============================] - 2s 43ms/step - loss: 0.2306 - val_loss: 0.5468
Epoch 60/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2348 - val_loss: 0.5715
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2289 - val_loss: 0.5286
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2322 - val_loss: 0.5206
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2293 - val_loss: 0.5592
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2315 - val_loss: 0.5211
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2307 - val_loss: 0.5699
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2289 - val_loss: 0.5163
Epoch 67/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2324 - val_loss: 0.5189
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2284 - val_loss: 0.5229
Epoch 69/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2305 - val_loss: 0.5163
Epoch 70/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2300 - val_loss: 0.5043
Epoch 71/100
```

```
50/50 [==============================] - 2s 37ms/step - loss: 0.2297 - val_loss: 0.5266
Epoch 72/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2306 - val_loss: 0.5498
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2275 - val_loss: 0.5252
Epoch 74/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2302 - val_loss: 0.5109
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2277 - val_loss: 0.5206
Epoch 76/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2261 - val_loss: 0.5165
Epoch 77/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2290 - val_loss: 0.5201
Epoch 78/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2267 - val_loss: 0.5448
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2256 - val_loss: 0.5185
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2269 - val_loss: 0.5281
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2410 - val_loss: 0.5789
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2398 - val_loss: 0.4903
Epoch 83/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2339 - val_loss: 0.4829
Epoch 84/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2271 - val_loss: 0.5132
Epoch 85/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2260 - val_loss: 0.5297
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2256 - val_loss: 0.5143
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2284 - val_loss: 0.5247
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2240 - val_loss: 0.5250
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2278 - val_loss: 0.5380
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2246 - val_loss: 0.5160
Epoch 91/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2239 - val_loss: 0.5207
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2279 - val_loss: 0.5266
Epoch 93/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2248 - val_loss: 0.5222
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2251 - val_loss: 0.5250
Epoch 95/100
```

```
50/50 [==============================] - 2s 37ms/step - loss: 0.2249 - val_loss: 0.5338
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2242 - val_loss: 0.5162
Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2248 - val_loss: 0.5183
Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2229 - val_loss: 0.5234
Epoch 99/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2233 - val_loss: 0.5258
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2253 - val_loss: 0.5256
```


Model Loss CA_2

Simple LSTM Model for CA_2
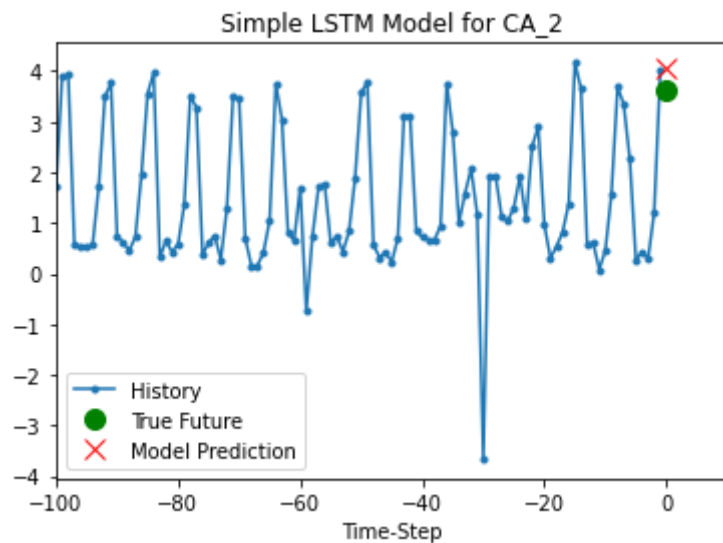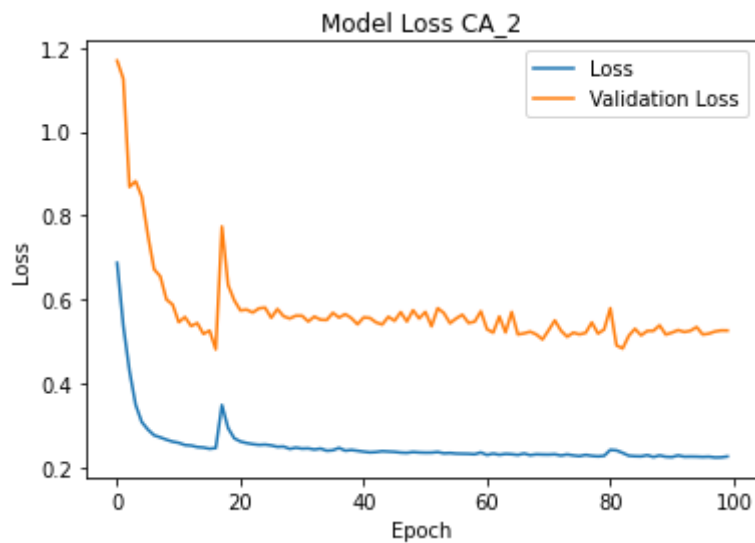
CA_2 - True Future: 5647
CA_2 - Model Prediction: 5993
CA_2 - Model Percentage Error: 6.13%
```
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```

Training Model for CA_3...

Epoch 1/100
50/50 [==============================] - 2s 42ms/step - loss: 0.6363 - val_loss: 0.6291
Epoch 2/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5700 - val_loss: 0.5860
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5153 - val_loss: 0.5376
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4857 - val_loss: 0.4841
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4622 - val_loss: 0.4577
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4438 - val_loss: 0.4230
Epoch 7/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4330 - val_loss: 0.3939
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4178 - val_loss: 0.3693
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4033 - val_loss: 0.3393
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3840 - val_loss: 0.3229
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3640 - val_loss: 0.3032
Epoch 12/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3509 - val_loss: 0.2998
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3388 - val_loss: 0.3142
Epoch 14/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3339 - val_loss: 0.2961
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3249 - val_loss: 0.2979
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3269 - val_loss: 0.2971
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3214 - val_loss: 0.2942
Epoch 18/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3187 - val_loss: 0.2964
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3195 - val_loss: 0.2980
Epoch 20/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3194 - val_loss: 0.2912
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3161 - val_loss: 0.3026
Epoch 22/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3174 - val_loss: 0.3017
Epoch 23/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3170 - val_loss: 0.2920

```
Epoch 24/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3137 - val_loss: 0.2938
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3448 - val_loss: 0.3106
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4086 - val_loss: 0.3090
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3457 - val_loss: 0.3078
Epoch 28/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3350 - val_loss: 0.3080
Epoch 29/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3229 - val_loss: 0.3018
Epoch 30/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3221 - val_loss: 0.2878
Epoch 31/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3175 - val_loss: 0.2910
Epoch 32/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3156 - val_loss: 0.2924
Epoch 33/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3142 - val_loss: 0.2872
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3136 - val_loss: 0.2840
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3142 - val_loss: 0.2964
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3073 - val_loss: 0.2807
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3061 - val_loss: 0.2756
Epoch 38/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3064 - val_loss: 0.2622
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3078 - val_loss: 0.2747
Epoch 40/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3050 - val_loss: 0.2779
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3038 - val_loss: 0.2689
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3021 - val_loss: 0.2712
Epoch 43/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3029 - val_loss: 0.2738
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2992 - val_loss: 0.2698
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3003 - val_loss: 0.2647
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3009 - val_loss: 0.2762
Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3002 - val_loss: 0.2642
```

Epoch 48/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3011 - val_loss: 0.2672
Epoch 49/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2998 - val_loss: 0.2650
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2982 - val_loss: 0.2712
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2987 - val_loss: 0.2807
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2996 - val_loss: 0.2726
Epoch 53/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2980 - val_loss: 0.2756
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2963 - val_loss: 0.2778
Epoch 55/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2984 - val_loss: 0.2721
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2992 - val_loss: 0.2708
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2967 - val_loss: 0.2829
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2976 - val_loss: 0.2792
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2982 - val_loss: 0.2735
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2958 - val_loss: 0.2743
Epoch 61/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2963 - val_loss: 0.2765
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2968 - val_loss: 0.2718
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2966 - val_loss: 0.2753
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2946 - val_loss: 0.2691
Epoch 65/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2948 - val_loss: 0.2787
Epoch 66/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2969 - val_loss: 0.2774
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2966 - val_loss: 0.2766
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2937 - val_loss: 0.2752
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2939 - val_loss: 0.2779
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2956 - val_loss: 0.2706
Epoch 71/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2950 - val_loss: 0.2757

```
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2930 - val_loss: 0.2764
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2938 - val_loss: 0.2744
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2928 - val_loss: 0.2773
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2934 - val_loss: 0.2736
Epoch 76/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2956 - val_loss: 0.2700
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2944 - val_loss: 0.2726
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2925 - val_loss: 0.2730
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2909 - val_loss: 0.2658
Epoch 80/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2930 - val_loss: 0.2713
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2920 - val_loss: 0.2738
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2935 - val_loss: 0.2817
Epoch 83/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2910 - val_loss: 0.2751
Epoch 84/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2916 - val_loss: 0.2800
Epoch 85/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4412 - val_loss: 0.6440
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5660 - val_loss: 0.6083
Epoch 87/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5243 - val_loss: 0.5708
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5089 - val_loss: 0.5790
Epoch 89/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4918 - val_loss: 0.5147
Epoch 90/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4918 - val_loss: 0.4900
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4776 - val_loss: 0.4591
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4677 - val_loss: 0.4413
Epoch 93/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4599 - val_loss: 0.4262
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4478 - val_loss: 0.4247
Epoch 95/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4405 - val_loss: 0.4202
```

Epoch 96/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4342 - val_loss: 0.4188
Epoch 97/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4281 - val_loss: 0.4109
Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4223 - val_loss: 0.4058
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4206 - val_loss: 0.4016
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4183 - val_loss: 0.3954

Model Loss CA_3

Simple LSTM Model for CA_3
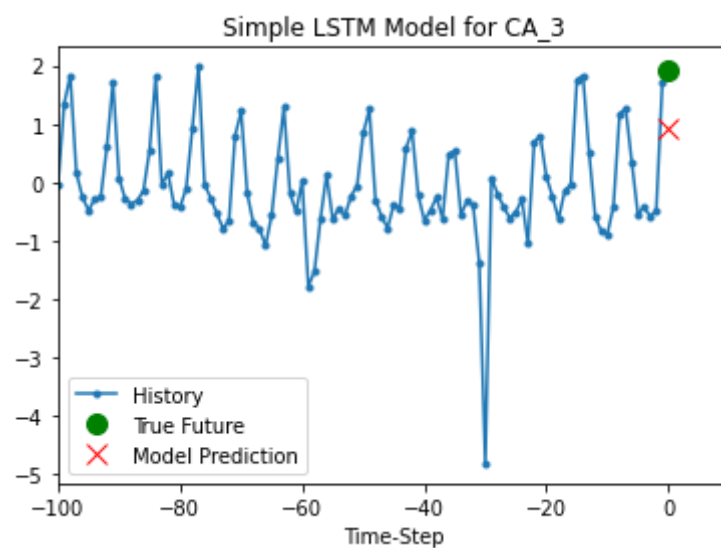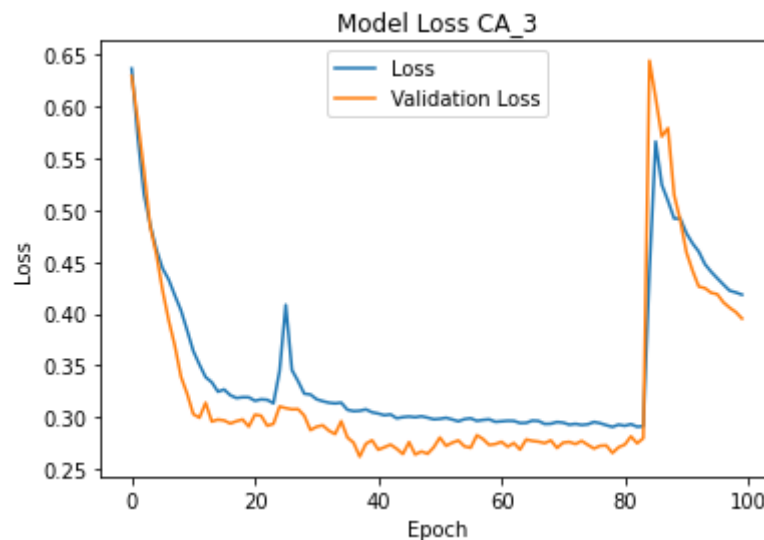
CA_3 - True Future: 8164
CA_3 - Model Prediction: 6948
CA_3 - Model Percentage Error: 14.89%
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Training Model for CA_4...

```
Epoch 1/100
50/50 [==============================] - 2s 44ms/step - loss: 0.5457 - val_loss: 0.6430
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5127 - val_loss: 0.5890
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4715 - val_loss: 0.6200
Epoch 4/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4387 - val_loss: 0.4874
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4243 - val_loss: 0.4886
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4108 - val_loss: 0.5290
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4030 - val_loss: 0.4975
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3965 - val_loss: 0.4750
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3919 - val_loss: 0.4950
Epoch 10/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3864 - val_loss: 0.4738
Epoch 11/100
50/50 [==============================] - 2s 46ms/step - loss: 0.3787 - val_loss: 0.4620
Epoch 12/100
50/50 [==============================] - 3s 54ms/step - loss: 0.3716 - val_loss: 0.4631
Epoch 13/100
50/50 [==============================] - 3s 61ms/step - loss: 0.3605 - val_loss: 0.4228
Epoch 14/100
50/50 [==============================] - 2s 47ms/step - loss: 0.3541 - val_loss: 0.4226
Epoch 15/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3478 - val_loss: 0.3969
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3461 - val_loss: 0.3882
Epoch 17/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3438 - val_loss: 0.3922
Epoch 18/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3372 - val_loss: 0.3874
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3343 - val_loss: 0.3791
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3344 - val_loss: 0.3868
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3321 - val_loss: 0.3761
Epoch 22/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3336 - val_loss: 0.3874
Epoch 23/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3312 - val_loss: 0.4244
Epoch 24/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.3311 - val_loss: 0.3811
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3289 - val_loss: 0.3809
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3297 - val_loss: 0.4132
Epoch 27/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3267 - val_loss: 0.3806
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3287 - val_loss: 0.4069
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3402 - val_loss: 0.3896
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3334 - val_loss: 0.3653
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3305 - val_loss: 0.3769
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3238 - val_loss: 0.3757
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3234 - val_loss: 0.3769
Epoch 34/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3228 - val_loss: 0.3889
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3733 - val_loss: 0.4290
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3376 - val_loss: 0.4103
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3329 - val_loss: 0.3868
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3317 - val_loss: 0.3757
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3269 - val_loss: 0.3751
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3255 - val_loss: 0.3908
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3232 - val_loss: 0.3775
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3242 - val_loss: 0.3903
Epoch 43/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4429 - val_loss: 0.6958
Epoch 44/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5014 - val_loss: 0.5572
Epoch 45/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4847 - val_loss: 0.5801
Epoch 46/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4833 - val_loss: 0.5768
Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4778 - val_loss: 0.5814
Epoch 48/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.4819 - val_loss: 0.5779
Epoch 49/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4827 - val_loss: 0.5887
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4737 - val_loss: 0.5628
Epoch 51/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4775 - val_loss: 0.5720
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4776 - val_loss: 0.5750
Epoch 53/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4758 - val_loss: 0.5674
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4734 - val_loss: 0.5850
Epoch 55/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4750 - val_loss: 0.5863
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4726 - val_loss: 0.5848
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4773 - val_loss: 0.5874
Epoch 58/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4730 - val_loss: 0.5899
Epoch 59/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4738 - val_loss: 0.5710
Epoch 60/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4726 - val_loss: 0.5681
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4721 - val_loss: 0.5727
Epoch 62/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4692 - val_loss: 0.5965
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4768 - val_loss: 0.5514
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4694 - val_loss: 0.5879
Epoch 65/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4709 - val_loss: 0.5737
Epoch 66/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4709 - val_loss: 0.5751
Epoch 67/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4693 - val_loss: 0.5698
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4720 - val_loss: 0.5972
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4667 - val_loss: 0.5646
Epoch 70/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4710 - val_loss: 0.5737
Epoch 71/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4691 - val_loss: 0.5905
Epoch 72/100
```

50/50 [==============================] - 2s 38ms/step - loss: 0.4691 - val_loss: 0.5832
Epoch 73/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4688 - val_loss: 0.5918
Epoch 74/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4693 - val_loss: 0.5627
Epoch 75/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4716 - val_loss: 0.5776
Epoch 76/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4711 - val_loss: 0.5739
Epoch 77/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4672 - val_loss: 0.5761
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4669 - val_loss: 0.5901
Epoch 79/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4677 - val_loss: 0.6023
Epoch 80/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4640 - val_loss: 0.6143
Epoch 81/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4707 - val_loss: 0.5842
Epoch 82/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4666 - val_loss: 0.5715
Epoch 83/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4693 - val_loss: 0.5633
Epoch 84/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4651 - val_loss: 0.6245
Epoch 85/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4650 - val_loss: 0.5654
Epoch 86/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4690 - val_loss: 0.5776
Epoch 87/100
50/50 [==============================] - 2s 44ms/step - loss: 0.4654 - val_loss: 0.6128
Epoch 88/100
50/50 [==============================] - 2s 43ms/step - loss: 0.4634 - val_loss: 0.6004
Epoch 89/100
50/50 [==============================] - 2s 42ms/step - loss: 0.4647 - val_loss: 0.5835
Epoch 90/100
50/50 [==============================] - 2s 48ms/step - loss: 0.4627 - val_loss: 0.5805
Epoch 91/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4645 - val_loss: 0.5546
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4632 - val_loss: 0.5665
Epoch 93/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4627 - val_loss: 0.5661
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4635 - val_loss: 0.6086
Epoch 95/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4661 - val_loss: 0.6012
Epoch 96/100

```
50/50 [==============================] - 2s 38ms/step - loss: 0.4614 - val_loss: 0.5581
Epoch 97/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4642 - val_loss: 0.5707
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4619 - val_loss: 0.6225
Epoch 99/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4605 - val_loss: 0.5910
Epoch 100/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4637 - val_loss: 0.5714
```


Model Loss CA_4

Simple LSTM Model for CA_4
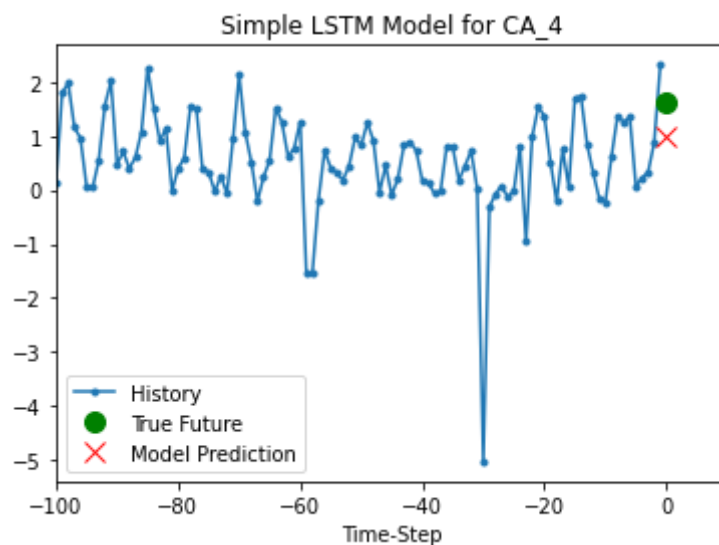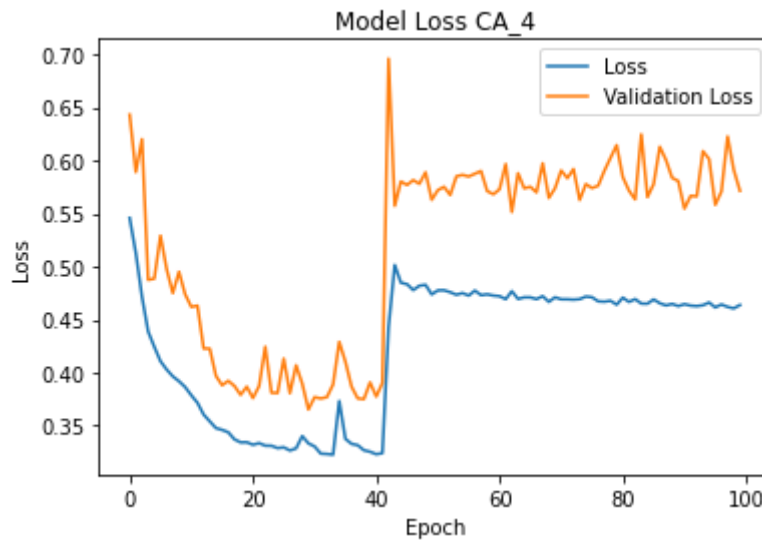
CA_4 - True Future: 2787
CA_4 - Model Prediction: 2520
CA_4 - Model Percentage Error: 9.58%
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Training Model for TX_1...

```
Epoch 1/100
50/50 [==============================] - 2s 45ms/step - loss: 0.6987 - val_loss: 0.6680
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6452 - val_loss: 0.5967
Epoch 3/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6002 - val_loss: 0.5502
Epoch 4/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5571 - val_loss: 0.4830
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5365 - val_loss: 0.4510
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5084 - val_loss: 0.4137
Epoch 7/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4740 - val_loss: 0.4088
Epoch 8/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4361 - val_loss: 0.3516
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4179 - val_loss: 0.3211
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4039 - val_loss: 0.3318
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4761 - val_loss: 0.6691
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5853 - val_loss: 0.4507
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4840 - val_loss: 0.4205
Epoch 14/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4620 - val_loss: 0.3903
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4463 - val_loss: 0.3718
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4271 - val_loss: 0.3441
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4124 - val_loss: 0.3218
Epoch 18/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3977 - val_loss: 0.3243
Epoch 19/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3819 - val_loss: 0.3149
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3770 - val_loss: 0.3027
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3743 - val_loss: 0.3127
Epoch 22/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3673 - val_loss: 0.2958
Epoch 23/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3679 - val_loss: 0.2970
Epoch 24/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3679 - val_loss: 0.2930
```

```
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3637 - val_loss: 0.2972
Epoch 26/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3633 - val_loss: 0.3109
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3626 - val_loss: 0.2908
Epoch 28/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3590 - val_loss: 0.2903
Epoch 29/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6244 - val_loss: 0.6680
Epoch 30/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6051 - val_loss: 0.5015
Epoch 31/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5513 - val_loss: 0.5381
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5640 - val_loss: 0.4934
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5326 - val_loss: 0.4858
Epoch 34/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4986 - val_loss: 0.4191
Epoch 35/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4834 - val_loss: 0.3898
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4699 - val_loss: 0.3878
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4622 - val_loss: 0.3583
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4548 - val_loss: 0.3502
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4470 - val_loss: 0.3382
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4410 - val_loss: 0.3273
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4313 - val_loss: 0.3156
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4198 - val_loss: 0.3108
Epoch 43/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4097 - val_loss: 0.3094
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4036 - val_loss: 0.3082
Epoch 45/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3913 - val_loss: 0.3165
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3861 - val_loss: 0.3060
Epoch 47/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3800 - val_loss: 0.3057
Epoch 48/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3734 - val_loss: 0.2922
```

```
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3706 - val_loss: 0.2883
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3678 - val_loss: 0.2868
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3651 - val_loss: 0.2983
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3642 - val_loss: 0.2878
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3627 - val_loss: 0.2863
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3610 - val_loss: 0.2853
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3641 - val_loss: 0.2834
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3604 - val_loss: 0.2860
Epoch 57/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3614 - val_loss: 0.2953
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3622 - val_loss: 0.2853
Epoch 59/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3594 - val_loss: 0.2921
Epoch 60/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3590 - val_loss: 0.2868
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3590 - val_loss: 0.3016
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3553 - val_loss: 0.2898
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3602 - val_loss: 0.2972
Epoch 64/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3556 - val_loss: 0.2858
Epoch 65/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3583 - val_loss: 0.3018
Epoch 66/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3593 - val_loss: 0.3199
Epoch 67/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3563 - val_loss: 0.2947
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3516 - val_loss: 0.2818
Epoch 69/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3577 - val_loss: 0.2873
Epoch 70/100
50/50 [==============================] - 2s 43ms/step - loss: 0.3516 - val_loss: 0.2875
Epoch 71/100
50/50 [==============================] - 2s 46ms/step - loss: 0.3557 - val_loss: 0.2868
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3552 - val_loss: 0.2835
```

```
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3506 - val_loss: 0.2983
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3592 - val_loss: 0.2884
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3519 - val_loss: 0.2807
Epoch 76/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3526 - val_loss: 0.2861
Epoch 77/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3546 - val_loss: 0.2910
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3495 - val_loss: 0.2854
Epoch 79/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3518 - val_loss: 0.2861
Epoch 80/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3505 - val_loss: 0.2868
Epoch 81/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3491 - val_loss: 0.2843
Epoch 82/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3527 - val_loss: 0.2807
Epoch 83/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3496 - val_loss: 0.2880
Epoch 84/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3552 - val_loss: 0.2817
Epoch 85/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3479 - val_loss: 0.2862
Epoch 86/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3525 - val_loss: 0.2840
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3485 - val_loss: 0.2858
Epoch 88/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3546 - val_loss: 0.2832
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3502 - val_loss: 0.2800
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3494 - val_loss: 0.2847
Epoch 91/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3510 - val_loss: 0.2872
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3512 - val_loss: 0.2906
Epoch 93/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3471 - val_loss: 0.2934
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3482 - val_loss: 0.2915
Epoch 95/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3508 - val_loss: 0.2884
Epoch 96/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3561 - val_loss: 0.2844
```

Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3451 - val_loss: 0.2840
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3487 - val_loss: 0.2845
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3474 - val_loss: 0.2903
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3479 - val_loss: 0.2840

Model Loss TX_1

Simple LSTM Model for TX_1
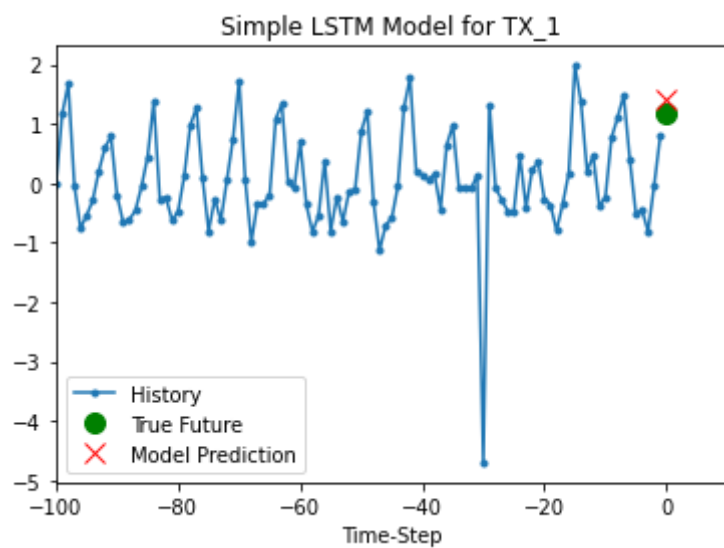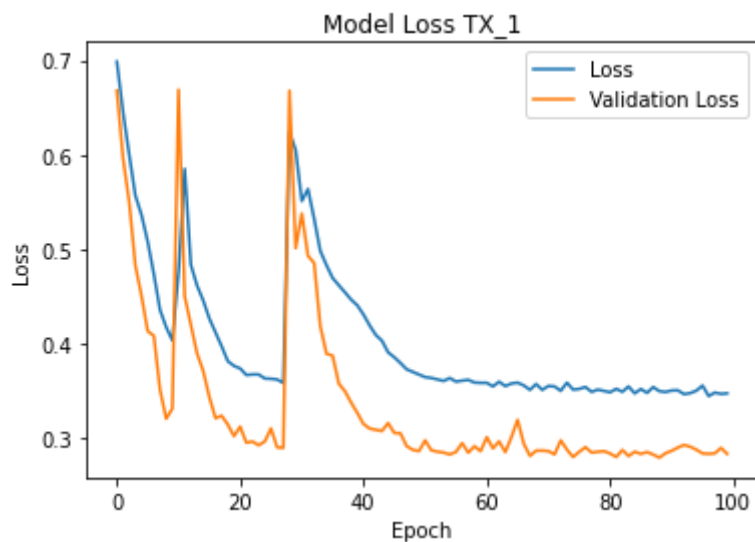
TX_1 - True Future: 3639
TX_1 - Model Prediction: 3778
TX_1 - Model Percentage Error: 3.82%
===================================
===================================

Training Model for TX_2...

Epoch 1/100

```
50/50 [==============================] - 2s 43ms/step - loss: 0.7041 - val_loss: 0.6324
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6358 - val_loss: 0.5526
Epoch 3/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5569 - val_loss: 0.4775
Epoch 4/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5077 - val_loss: 0.4488
Epoch 5/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4794 - val_loss: 0.4112
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4477 - val_loss: 0.3846
Epoch 7/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4290 - val_loss: 0.3695
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4088 - val_loss: 0.3581
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3907 - val_loss: 0.3385
Epoch 10/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3827 - val_loss: 0.3268
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3798 - val_loss: 0.3126
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3745 - val_loss: 0.3123
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3687 - val_loss: 0.3146
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3678 - val_loss: 0.3216
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3664 - val_loss: 0.3121
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3641 - val_loss: 0.3133
Epoch 17/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3570 - val_loss: 0.3109
Epoch 18/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3594 - val_loss: 0.3195
Epoch 19/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5323 - val_loss: 0.6391
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6477 - val_loss: 0.5942
Epoch 21/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6275 - val_loss: 0.5908
Epoch 22/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6151 - val_loss: 0.5997
Epoch 23/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6253 - val_loss: 0.5905
Epoch 24/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6176 - val_loss: 0.5904
Epoch 25/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.6128 - val_loss: 0.6162
Epoch 26/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6096 - val_loss: 0.5589
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6020 - val_loss: 0.5592
Epoch 28/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6017 - val_loss: 0.5735
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5910 - val_loss: 0.5675
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5861 - val_loss: 0.5177
Epoch 31/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5731 - val_loss: 0.5098
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5574 - val_loss: 0.4830
Epoch 33/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5468 - val_loss: 0.4766
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5338 - val_loss: 0.4520
Epoch 35/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5145 - val_loss: 0.4381
Epoch 36/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4943 - val_loss: 0.4272
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4812 - val_loss: 0.4193
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4610 - val_loss: 0.4102
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4416 - val_loss: 0.4064
Epoch 40/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4254 - val_loss: 0.3779
Epoch 41/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4117 - val_loss: 0.3817
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4032 - val_loss: 0.3684
Epoch 43/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4056 - val_loss: 0.3896
Epoch 44/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3989 - val_loss: 0.3640
Epoch 45/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3970 - val_loss: 0.3545
Epoch 46/100
50/50 [==============================] - 2s 45ms/step - loss: 0.3973 - val_loss: 0.3417
Epoch 47/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3934 - val_loss: 0.3601
Epoch 48/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3973 - val_loss: 0.3592
Epoch 49/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.3946 - val_loss: 0.3755
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3903 - val_loss: 0.3371
Epoch 51/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3919 - val_loss: 0.3451
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3902 - val_loss: 0.3336
Epoch 53/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3905 - val_loss: 0.3339
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3901 - val_loss: 0.3306
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3862 - val_loss: 0.3304
Epoch 56/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3872 - val_loss: 0.3332
Epoch 57/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3851 - val_loss: 0.3211
Epoch 58/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3882 - val_loss: 0.3257
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3822 - val_loss: 0.3494
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3906 - val_loss: 0.3255
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3816 - val_loss: 0.3331
Epoch 62/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3857 - val_loss: 0.3434
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3834 - val_loss: 0.3240
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3766 - val_loss: 0.3340
Epoch 65/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3825 - val_loss: 0.3465
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3822 - val_loss: 0.7002
Epoch 67/100
50/50 [==============================] - 2s 38ms/step - loss: 0.7280 - val_loss: 0.6433
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6642 - val_loss: 0.5914
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6209 - val_loss: 0.5657
Epoch 70/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5916 - val_loss: 0.5429
Epoch 71/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5671 - val_loss: 0.5215
Epoch 72/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5522 - val_loss: 0.4884
Epoch 73/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.5407 - val_loss: 0.4839
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5363 - val_loss: 0.4838
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5243 - val_loss: 0.4741
Epoch 76/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5216 - val_loss: 0.4570
Epoch 77/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5131 - val_loss: 0.4581
Epoch 78/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5073 - val_loss: 0.4864
Epoch 79/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5034 - val_loss: 0.4552
Epoch 80/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4961 - val_loss: 0.4458
Epoch 81/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4958 - val_loss: 0.4349
Epoch 82/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4850 - val_loss: 0.4371
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4821 - val_loss: 0.4295
Epoch 84/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4740 - val_loss: 0.4104
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4621 - val_loss: 0.4054
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4500 - val_loss: 0.3932
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4453 - val_loss: 0.3865
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4354 - val_loss: 0.3739
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4286 - val_loss: 0.3676
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4202 - val_loss: 0.3791
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4187 - val_loss: 0.3492
Epoch 92/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4108 - val_loss: 0.3423
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4002 - val_loss: 0.3479
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4024 - val_loss: 0.3305
Epoch 95/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4000 - val_loss: 0.3362
Epoch 96/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3997 - val_loss: 0.3279
Epoch 97/100
```

```
50/50 [==============================] - 2s 39ms/step - loss: 0.3943 - val_loss: 0.3297
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3961 - val_loss: 0.3335
Epoch 99/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4183 - val_loss: 0.3677
Epoch 100/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3811 - val_loss: 0.3286
```


Model Loss TX_2

Simple LSTM Model for TX_2
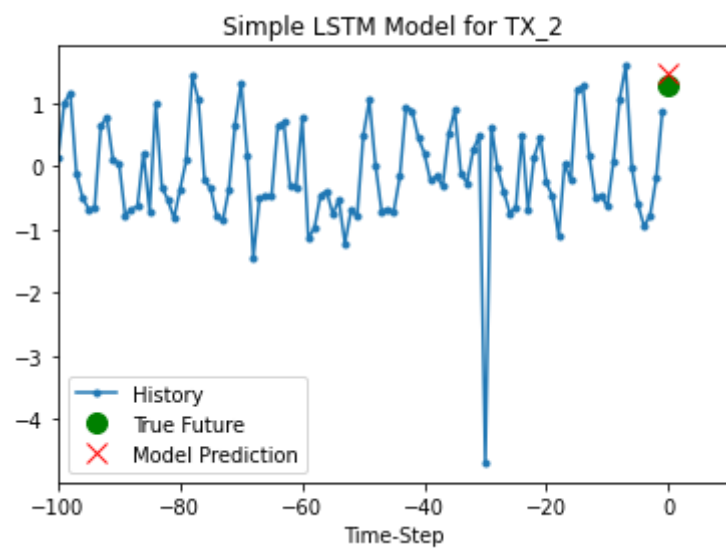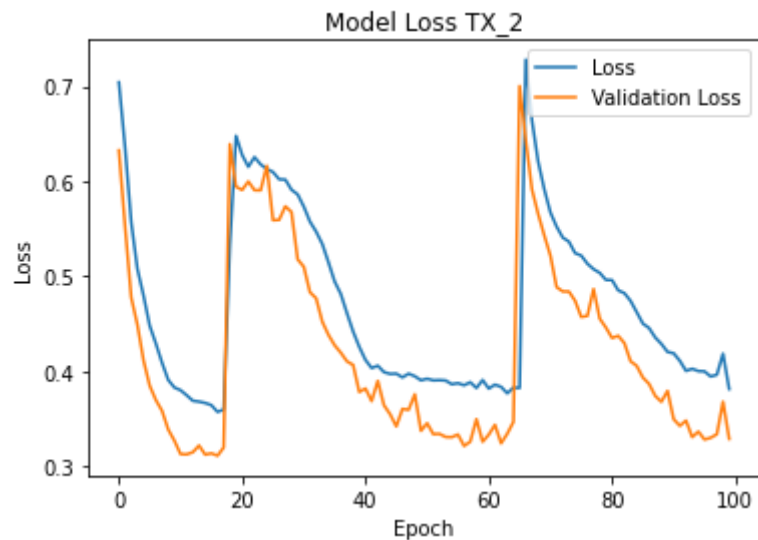
TX_2 - True Future: 4794
TX_2 - Model Prediction: 4939
TX_2 - Model Percentage Error: 3.02%
====================================
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Training Model for TX_3...

```
Epoch 1/100
50/50 [==============================] - 3s 51ms/step - loss: 0.6369 - val_loss: 0.6159
```

```
Epoch 2/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5614 - val_loss: 0.5668
Epoch 3/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5169 - val_loss: 0.5455
Epoch 4/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4930 - val_loss: 0.4992
Epoch 5/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4825 - val_loss: 0.4894
Epoch 6/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4660 - val_loss: 0.4570
Epoch 7/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4371 - val_loss: 0.4359
Epoch 8/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4038 - val_loss: 0.4001
Epoch 9/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3892 - val_loss: 0.3826
Epoch 10/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3919 - val_loss: 0.3954
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4452 - val_loss: 1.1595
Epoch 12/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6446 - val_loss: 0.7173
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5895 - val_loss: 0.7126
Epoch 14/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5788 - val_loss: 0.7448
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5759 - val_loss: 0.6702
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5634 - val_loss: 0.6731
Epoch 17/100
50/50 [==============================] - 2s 40ms/step - loss: 0.5573 - val_loss: 0.6792
Epoch 18/100
50/50 [==============================] - 3s 54ms/step - loss: 0.5546 - val_loss: 0.6863
Epoch 19/100
50/50 [==============================] - 3s 54ms/step - loss: 0.5492 - val_loss: 0.6666
Epoch 20/100
50/50 [==============================] - 2s 47ms/step - loss: 0.5463 - val_loss: 0.6659
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5425 - val_loss: 0.6283
Epoch 22/100
50/50 [==============================] - 2s 43ms/step - loss: 0.5388 - val_loss: 0.6441
Epoch 23/100
50/50 [==============================] - 2s 48ms/step - loss: 0.5370 - val_loss: 0.6311
Epoch 24/100
50/50 [==============================] - 2s 42ms/step - loss: 0.5358 - val_loss: 0.6413
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5313 - val_loss: 0.6099
```

```
Epoch 26/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5339 - val_loss: 0.6188
Epoch 27/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5315 - val_loss: 0.6224
Epoch 28/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5247 - val_loss: 0.5986
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5226 - val_loss: 0.5930
Epoch 30/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5228 - val_loss: 0.5830
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5185 - val_loss: 0.5782
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5162 - val_loss: 0.5680
Epoch 33/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5111 - val_loss: 0.5489
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5049 - val_loss: 0.5631
Epoch 35/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5048 - val_loss: 0.5577
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4922 - val_loss: 0.5258
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4891 - val_loss: 0.5235
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4814 - val_loss: 0.5023
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4788 - val_loss: 0.5087
Epoch 40/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4735 - val_loss: 0.4957
Epoch 41/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4699 - val_loss: 0.5083
Epoch 42/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4691 - val_loss: 0.4891
Epoch 43/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4605 - val_loss: 0.4829
Epoch 44/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4600 - val_loss: 0.4840
Epoch 45/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4577 - val_loss: 0.4795
Epoch 46/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4526 - val_loss: 0.4696
Epoch 47/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4481 - val_loss: 0.4693
Epoch 48/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4488 - val_loss: 0.4672
Epoch 49/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4445 - val_loss: 0.4540
```

```
Epoch 50/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4384 - val_loss: 0.4513
Epoch 51/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4387 - val_loss: 0.4430
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4364 - val_loss: 0.4366
Epoch 53/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4315 - val_loss: 0.4380
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4305 - val_loss: 0.4338
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4353 - val_loss: 0.4523
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4695 - val_loss: 0.4623
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4379 - val_loss: 0.4354
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4255 - val_loss: 0.4509
Epoch 59/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4199 - val_loss: 0.4552
Epoch 60/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4157 - val_loss: 0.4368
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4146 - val_loss: 0.4432
Epoch 62/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4191 - val_loss: 0.4277
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4115 - val_loss: 0.4104
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4081 - val_loss: 0.4178
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4055 - val_loss: 0.4273
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4266 - val_loss: 0.4336
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5015 - val_loss: 0.5506
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5022 - val_loss: 0.5340
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4743 - val_loss: 0.5158
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4473 - val_loss: 0.5003
Epoch 71/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4326 - val_loss: 0.4549
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4184 - val_loss: 0.4853
Epoch 73/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4683 - val_loss: 0.4903
```

```
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4464 - val_loss: 0.4581
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4258 - val_loss: 0.4420
Epoch 76/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4845 - val_loss: 0.6364
Epoch 77/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5302 - val_loss: 0.6020
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5160 - val_loss: 0.5907
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5016 - val_loss: 0.5466
Epoch 80/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4840 - val_loss: 0.5326
Epoch 81/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4771 - val_loss: 0.5216
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4646 - val_loss: 0.5189
Epoch 83/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4519 - val_loss: 0.5084
Epoch 84/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4436 - val_loss: 0.4891
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4342 - val_loss: 0.4952
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4292 - val_loss: 0.4909
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4285 - val_loss: 0.4832
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4143 - val_loss: 0.4657
Epoch 89/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4121 - val_loss: 0.4612
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4023 - val_loss: 0.4506
Epoch 91/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3994 - val_loss: 0.4521
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3976 - val_loss: 0.4361
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3900 - val_loss: 0.4378
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3856 - val_loss: 0.4454
Epoch 95/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4075 - val_loss: 0.4438
Epoch 96/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3955 - val_loss: 0.4087
Epoch 97/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3831 - val_loss: 0.4196
```

Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3952 - val_loss: 0.4013
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3785 - val_loss: 0.4278
Epoch 100/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3767 - val_loss: 0.4216

Model Loss TX_3

Simple LSTM Model for TX_3
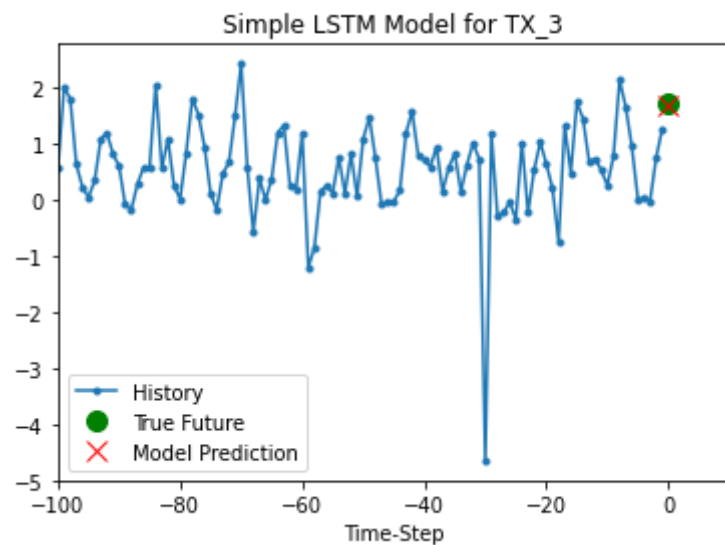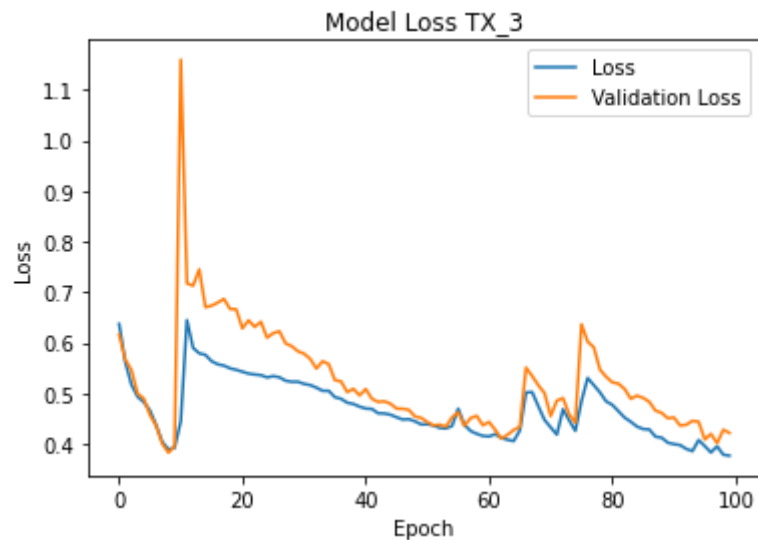
TX_3 - True Future: 4286
TX_3 - Model Prediction: 4274
TX_3 - Model Percentage Error: 0.28%
====================================
====================================

Training Model for WI_1...

Epoch 1/100
50/50 [==============================] - 3s 51ms/step - loss: 0.5333 - val_loss: 0.8894
Epoch 2/100

```
50/50 [==============================] - 2s 43ms/step - loss: 0.4895 - val_loss: 0.8233
Epoch 3/100
50/50 [==============================] - 2s 44ms/step - loss: 0.4569 - val_loss: 0.7441
Epoch 4/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4095 - val_loss: 0.6941
Epoch 5/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3736 - val_loss: 0.6744
Epoch 6/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3572 - val_loss: 0.6880
Epoch 7/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3486 - val_loss: 0.6765
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3396 - val_loss: 0.6460
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3250 - val_loss: 0.6464
Epoch 10/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3224 - val_loss: 0.5376
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3026 - val_loss: 0.5006
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2929 - val_loss: 0.5122
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2759 - val_loss: 0.4304
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2674 - val_loss: 0.4350
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2606 - val_loss: 0.4427
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2509 - val_loss: 0.4398
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2531 - val_loss: 0.4130
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2489 - val_loss: 0.4240
Epoch 19/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2436 - val_loss: 0.4376
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2535 - val_loss: 0.4304
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2445 - val_loss: 0.4157
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2447 - val_loss: 0.3873
Epoch 23/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2397 - val_loss: 0.4033
Epoch 24/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2423 - val_loss: 0.4067
Epoch 25/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2439 - val_loss: 0.3950
Epoch 26/100
```

50/50 [==============================] - 2s 38ms/step - loss: 0.5209 - val_loss: 1.3636
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4653 - val_loss: 0.9828
Epoch 28/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4421 - val_loss: 0.9256
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4335 - val_loss: 0.9149
Epoch 30/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4296 - val_loss: 0.9105
Epoch 31/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4237 - val_loss: 0.8751
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4139 - val_loss: 0.8079
Epoch 33/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4095 - val_loss: 0.7726
Epoch 34/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4042 - val_loss: 0.7576
Epoch 35/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4004 - val_loss: 0.7300
Epoch 36/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3943 - val_loss: 0.7212
Epoch 37/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3903 - val_loss: 0.7265
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3866 - val_loss: 0.7321
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3822 - val_loss: 0.7231
Epoch 40/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3775 - val_loss: 0.7358
Epoch 41/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3726 - val_loss: 0.7156
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3670 - val_loss: 0.6886
Epoch 43/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3580 - val_loss: 0.6740
Epoch 44/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3579 - val_loss: 0.6761
Epoch 45/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3497 - val_loss: 0.6357
Epoch 46/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3420 - val_loss: 0.6275
Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3369 - val_loss: 0.6075
Epoch 48/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3350 - val_loss: 0.6314
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3286 - val_loss: 0.6195
Epoch 50/100

```
50/50 [==============================] - 2s 39ms/step - loss: 0.3276 - val_loss: 0.6190
Epoch 51/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3230 - val_loss: 0.6764
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3208 - val_loss: 0.6924
Epoch 53/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3195 - val_loss: 0.6347
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3175 - val_loss: 0.6672
Epoch 55/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3127 - val_loss: 0.6780
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3135 - val_loss: 0.6538
Epoch 57/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3128 - val_loss: 0.6177
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3097 - val_loss: 0.6625
Epoch 59/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3099 - val_loss: 0.6036
Epoch 60/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3071 - val_loss: 0.6080
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3062 - val_loss: 0.6145
Epoch 62/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3045 - val_loss: 0.6165
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3056 - val_loss: 0.6259
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3040 - val_loss: 0.5940
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2994 - val_loss: 0.5727
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2989 - val_loss: 0.5810
Epoch 67/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2988 - val_loss: 0.5940
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2985 - val_loss: 0.5390
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2939 - val_loss: 0.5392
Epoch 70/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2953 - val_loss: 0.5341
Epoch 71/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2946 - val_loss: 0.5345
Epoch 72/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2917 - val_loss: 0.5681
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2875 - val_loss: 0.5380
Epoch 74/100
```

```
50/50 [==============================] - 2s 38ms/step - loss: 0.2916 - val_loss: 0.5211
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2863 - val_loss: 0.5232
Epoch 76/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2850 - val_loss: 0.5418
Epoch 77/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2852 - val_loss: 0.5098
Epoch 78/100
50/50 [==============================] - 2s 44ms/step - loss: 0.2814 - val_loss: 0.5251
Epoch 79/100
50/50 [==============================] - 2s 46ms/step - loss: 0.2798 - val_loss: 0.5094
Epoch 80/100
50/50 [==============================] - 2s 46ms/step - loss: 0.2816 - val_loss: 0.5772
Epoch 81/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2771 - val_loss: 0.5570
Epoch 82/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2797 - val_loss: 0.5393
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2770 - val_loss: 0.5868
Epoch 84/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2773 - val_loss: 0.5426
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2736 - val_loss: 0.5476
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2735 - val_loss: 0.5428
Epoch 87/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2742 - val_loss: 0.5317
Epoch 88/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2715 - val_loss: 0.5104
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2717 - val_loss: 0.5777
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2705 - val_loss: 0.5672
Epoch 91/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2725 - val_loss: 0.6201
Epoch 92/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2711 - val_loss: 0.5567
Epoch 93/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2683 - val_loss: 0.5956
Epoch 94/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2698 - val_loss: 0.5844
Epoch 95/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2694 - val_loss: 0.5175
Epoch 96/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2663 - val_loss: 0.5184
Epoch 97/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2686 - val_loss: 0.5648
Epoch 98/100
```

```
50/50 [==============================] - 2s 37ms/step - loss: 0.2673 - val_loss: 0.5658
Epoch 99/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2667 - val_loss: 0.5203
Epoch 100/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2636 - val_loss: 0.5269
```


Model Loss WI_1

Simple LSTM Model for WI_1
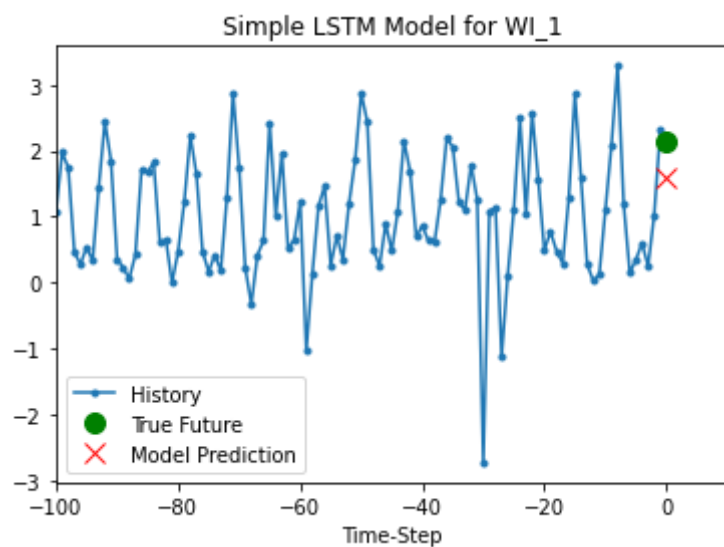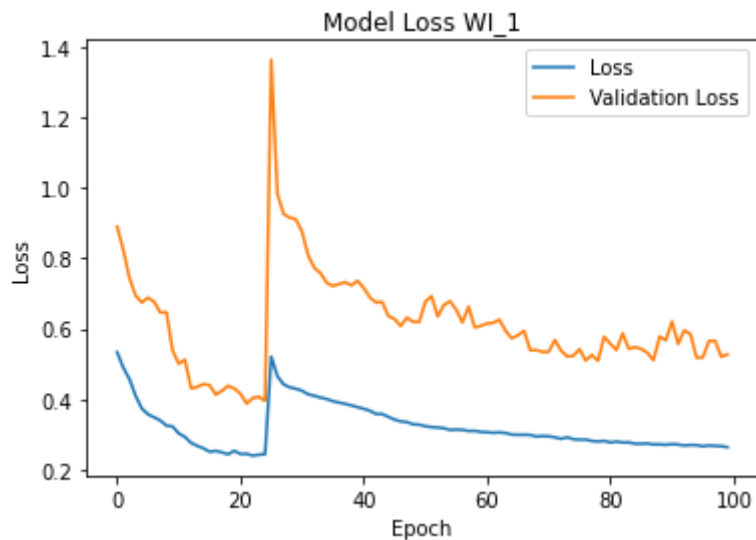
WI_1 - True Future: 4600
WI_1 - Model Prediction: 4087
WI_1 - Model Percentage Error: 11.15%
=====================================
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Training Model for WI_2...

```
Epoch 1/100
50/50 [==============================] - 2s 44ms/step - loss: 0.4320 - val_loss: 0.6407
Epoch 2/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3925 - val_loss: 0.6431
```

```
Epoch 3/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3845 - val_loss: 0.6591
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3774 - val_loss: 0.6659
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3762 - val_loss: 0.6509
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3707 - val_loss: 0.7041
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3632 - val_loss: 0.7402
Epoch 8/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3543 - val_loss: 0.8266
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3384 - val_loss: 0.9901
Epoch 10/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3359 - val_loss: 1.0022
Epoch 11/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3342 - val_loss: 1.0814
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3272 - val_loss: 1.1052
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3272 - val_loss: 1.1119
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3231 - val_loss: 1.1804
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3218 - val_loss: 1.1102
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3159 - val_loss: 1.2112
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3163 - val_loss: 1.2372
Epoch 18/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3122 - val_loss: 1.3008
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3115 - val_loss: 1.1856
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3112 - val_loss: 1.1720
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3091 - val_loss: 1.2517
Epoch 22/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3038 - val_loss: 1.1460
Epoch 23/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3020 - val_loss: 1.1399
Epoch 24/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3017 - val_loss: 1.3132
Epoch 25/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2997 - val_loss: 1.2173
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2986 - val_loss: 1.1704
```

```
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2959 - val_loss: 1.1529
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2947 - val_loss: 1.1599
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2929 - val_loss: 1.1570
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2931 - val_loss: 1.1461
Epoch 31/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2891 - val_loss: 1.1281
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2891 - val_loss: 1.0804
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2889 - val_loss: 1.2110
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2886 - val_loss: 0.9942
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2872 - val_loss: 1.0453
Epoch 36/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2825 - val_loss: 1.1220
Epoch 37/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2834 - val_loss: 0.9088
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2828 - val_loss: 0.9391
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2838 - val_loss: 0.8650
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2808 - val_loss: 0.8028
Epoch 41/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2849 - val_loss: 1.0095
Epoch 42/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2818 - val_loss: 0.8863
Epoch 43/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2774 - val_loss: 0.9161
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2793 - val_loss: 0.9865
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2759 - val_loss: 0.9453
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2746 - val_loss: 0.8244
Epoch 47/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2737 - val_loss: 0.7272
Epoch 48/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2758 - val_loss: 0.8042
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3680 - val_loss: 0.6389
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3692 - val_loss: 0.5888
```

```
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3594 - val_loss: 0.6859
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3501 - val_loss: 0.7497
Epoch 53/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3438 - val_loss: 0.7750
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3399 - val_loss: 0.7834
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3328 - val_loss: 0.7798
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3347 - val_loss: 0.7697
Epoch 57/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3282 - val_loss: 0.7525
Epoch 58/100
50/50 [==============================] - 2s 45ms/step - loss: 0.3290 - val_loss: 0.7004
Epoch 59/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3252 - val_loss: 0.8102
Epoch 60/100
50/50 [==============================] - 2s 45ms/step - loss: 0.3200 - val_loss: 0.7186
Epoch 61/100
50/50 [==============================] - 2s 43ms/step - loss: 0.3147 - val_loss: 0.7591
Epoch 62/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3153 - val_loss: 0.7720
Epoch 63/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3101 - val_loss: 0.7492
Epoch 64/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3073 - val_loss: 0.7184
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2992 - val_loss: 0.7064
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2971 - val_loss: 0.7671
Epoch 67/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2929 - val_loss: 0.7584
Epoch 68/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2893 - val_loss: 0.7214
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2881 - val_loss: 0.8524
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2840 - val_loss: 0.7721
Epoch 71/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2810 - val_loss: 0.7327
Epoch 72/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2814 - val_loss: 0.7241
Epoch 73/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2786 - val_loss: 0.6782
Epoch 74/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2777 - val_loss: 0.6797
```

```
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2752 - val_loss: 0.7111
Epoch 76/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2751 - val_loss: 0.6045
Epoch 77/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2737 - val_loss: 0.6200
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2719 - val_loss: 0.6832
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2725 - val_loss: 0.6278
Epoch 80/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2714 - val_loss: 0.6552
Epoch 81/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2675 - val_loss: 0.7456
Epoch 82/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2681 - val_loss: 0.6622
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2659 - val_loss: 0.7004
Epoch 84/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2675 - val_loss: 0.6989
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2648 - val_loss: 0.6583
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2653 - val_loss: 0.6799
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2625 - val_loss: 0.7492
Epoch 88/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2608 - val_loss: 0.6760
Epoch 89/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2627 - val_loss: 0.6373
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2609 - val_loss: 0.7501
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3860 - val_loss: 0.7511
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3695 - val_loss: 0.7440
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3584 - val_loss: 0.7251
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3522 - val_loss: 0.6889
Epoch 95/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3510 - val_loss: 0.7262
Epoch 96/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3475 - val_loss: 0.5983
Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2956 - val_loss: 0.6343
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2706 - val_loss: 0.6645
```

Epoch 99/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2658 - val_loss: 0.5914
Epoch 100/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2620 - val_loss: 0.6626

Model Loss WI_2

Simple LSTM Model for WI_2
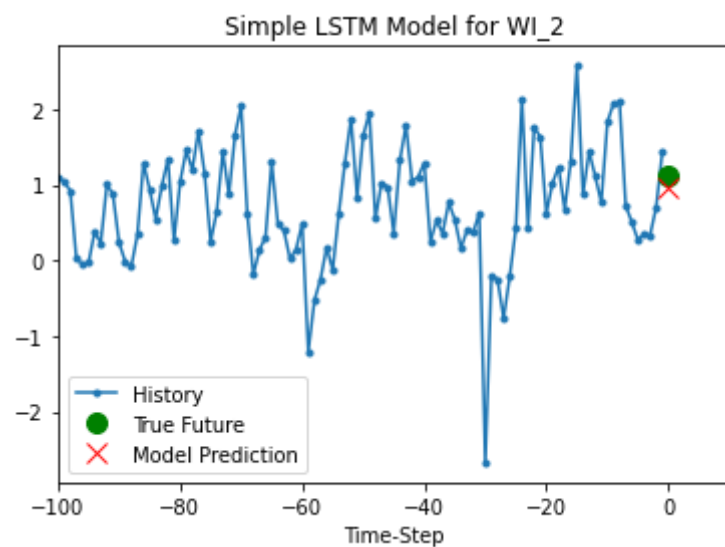
WI_2 - True Future: 4670
WI_2 - Model Prediction: 4453
WI_2 - Model Percentage Error: 4.65%
====================================
====================================

Training Model for WI_3...

Epoch 1/100
50/50 [==============================] - 2s 44ms/step - loss: 0.6952 - val_loss: 0.8191
Epoch 2/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6438 - val_loss: 0.7720
Epoch 3/100

```
50/50 [==============================] - 2s 37ms/step - loss: 0.5887 - val_loss: 0.6929
Epoch 4/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5733 - val_loss: 0.6738
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5658 - val_loss: 0.6423
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5587 - val_loss: 0.6541
Epoch 7/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5479 - val_loss: 0.6307
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5440 - val_loss: 0.6189
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5355 - val_loss: 0.6342
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5313 - val_loss: 0.6246
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5304 - val_loss: 0.6048
Epoch 12/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5234 - val_loss: 0.6218
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5210 - val_loss: 0.6174
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5109 - val_loss: 0.5714
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4952 - val_loss: 0.5729
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4899 - val_loss: 0.5172
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4856 - val_loss: 0.5183
Epoch 18/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4781 - val_loss: 0.5527
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4720 - val_loss: 0.5143
Epoch 20/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4660 - val_loss: 0.4926
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4604 - val_loss: 0.5096
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4553 - val_loss: 0.5029
Epoch 23/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4529 - val_loss: 0.5017
Epoch 24/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4443 - val_loss: 0.4731
Epoch 25/100
50/50 [==============================] - 3s 54ms/step - loss: 0.4374 - val_loss: 0.4803
Epoch 26/100
50/50 [==============================] - 3s 54ms/step - loss: 0.4348 - val_loss: 0.4516
Epoch 27/100
```

50/50 [==============================] - 2s 49ms/step - loss: 0.4268 - val_loss: 0.4531
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4247 - val_loss: 0.4740
Epoch 29/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4161 - val_loss: 0.4970
Epoch 30/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4174 - val_loss: 0.4511
Epoch 31/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4179 - val_loss: 0.4734
Epoch 32/100
50/50 [==============================] - 2s 45ms/step - loss: 0.4086 - val_loss: 0.4160
Epoch 33/100
50/50 [==============================] - 2s 42ms/step - loss: 0.4088 - val_loss: 0.4288
Epoch 34/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4118 - val_loss: 0.4434
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4033 - val_loss: 0.4316
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4069 - val_loss: 0.4480
Epoch 37/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4013 - val_loss: 0.4271
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4024 - val_loss: 0.4464
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3979 - val_loss: 0.4725
Epoch 40/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3985 - val_loss: 0.4357
Epoch 41/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3996 - val_loss: 0.4651
Epoch 42/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3972 - val_loss: 0.4749
Epoch 43/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3949 - val_loss: 0.4502
Epoch 44/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3912 - val_loss: 0.4362
Epoch 45/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3902 - val_loss: 0.4739
Epoch 46/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3854 - val_loss: 0.4564
Epoch 47/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3828 - val_loss: 0.4673
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3812 - val_loss: 0.4804
Epoch 49/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3788 - val_loss: 0.4482
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3771 - val_loss: 0.4565
Epoch 51/100

```
50/50 [==============================] - 2s 39ms/step - loss: 0.3775 - val_loss: 0.4380
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3735 - val_loss: 0.3971
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3718 - val_loss: 0.4115
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3677 - val_loss: 0.4348
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3693 - val_loss: 0.4395
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3676 - val_loss: 0.4123
Epoch 57/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3632 - val_loss: 0.4082
Epoch 58/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3607 - val_loss: 0.4314
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4681 - val_loss: 0.6767
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5094 - val_loss: 0.6038
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4976 - val_loss: 0.5738
Epoch 62/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4821 - val_loss: 0.5659
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4765 - val_loss: 0.5707
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4755 - val_loss: 0.5591
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4710 - val_loss: 0.5437
Epoch 66/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4668 - val_loss: 0.5278
Epoch 67/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4580 - val_loss: 0.5141
Epoch 68/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4559 - val_loss: 0.5142
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4493 - val_loss: 0.5248
Epoch 70/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4378 - val_loss: 0.5191
Epoch 71/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4359 - val_loss: 0.5298
Epoch 72/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4360 - val_loss: 0.5422
Epoch 73/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4270 - val_loss: 0.5614
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4292 - val_loss: 0.5536
Epoch 75/100
```

50/50 [==============================] - 2s 39ms/step - loss: 0.4258 - val_loss: 0.5418
Epoch 76/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4209 - val_loss: 0.5352
Epoch 77/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4187 - val_loss: 0.5901
Epoch 78/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4166 - val_loss: 0.5500
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4137 - val_loss: 0.5331
Epoch 80/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4088 - val_loss: 0.5617
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4098 - val_loss: 0.5736
Epoch 82/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4065 - val_loss: 0.5754
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4007 - val_loss: 0.5760
Epoch 84/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4003 - val_loss: 0.5588
Epoch 85/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3982 - val_loss: 0.5321
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3977 - val_loss: 0.5405
Epoch 87/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3952 - val_loss: 0.5205
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3897 - val_loss: 0.4959
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3902 - val_loss: 0.5686
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3911 - val_loss: 0.5368
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3903 - val_loss: 0.5040
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3863 - val_loss: 0.5077
Epoch 93/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3842 - val_loss: 0.5166
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3840 - val_loss: 0.4849
Epoch 95/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3828 - val_loss: 0.4725
Epoch 96/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5409 - val_loss: 0.6024
Epoch 97/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4940 - val_loss: 0.5537
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4555 - val_loss: 0.5126
Epoch 99/100

50/50 [==============================] - 2s 39ms/step - loss: 0.4427 - val_loss: 0.5388
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4383 - val_loss: 0.5008

Model Loss WI_3

Simple LSTM Model for WI_3
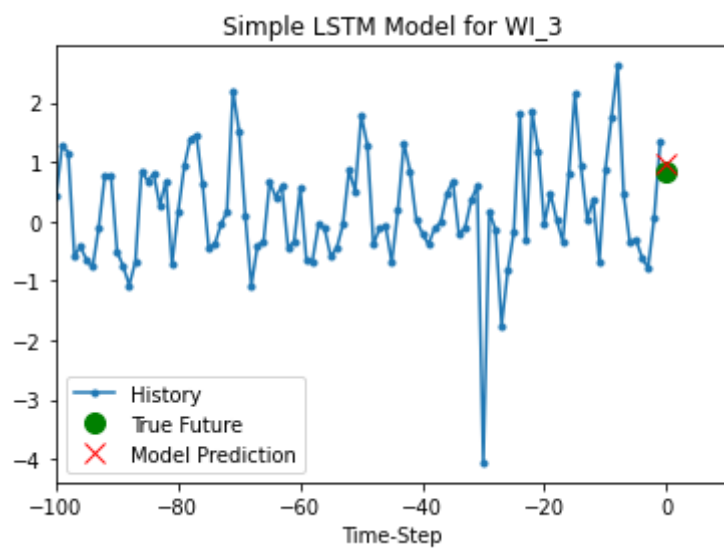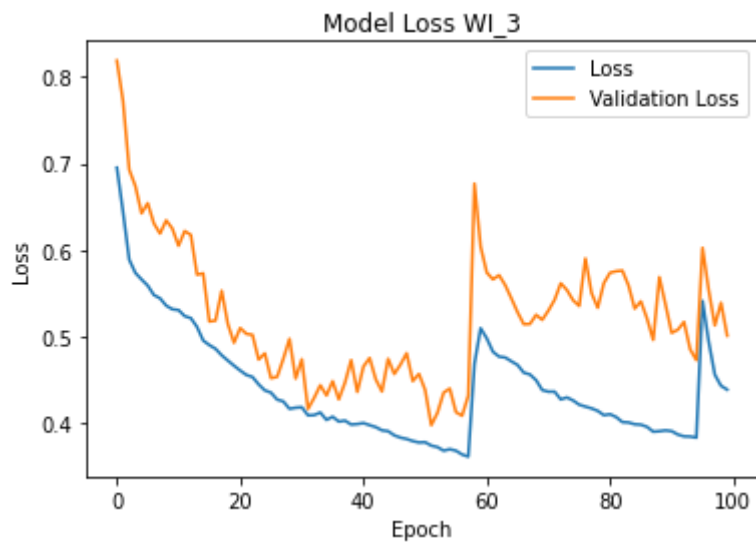
WI_3 - True Future: 3998
WI_3 - Model Prediction: 4109
WI_3 - Model Percentage Error: 2.78%
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