Training Model for CA_1...

Epoch 1/100
50/50 [==============================] - 2s 43ms/step - loss: 0.7298 - val_loss: 0.7735
Epoch 2/100
50/50 [==============================] - 2s 36ms/step - loss: 0.7169 - val_loss: 0.7554
Epoch 3/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6976 - val_loss: 0.7284
Epoch 4/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6727 - val_loss: 0.6869
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6313 - val_loss: 0.6308
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5885 - val_loss: 0.5666
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5416 - val_loss: 0.5129
Epoch 8/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4914 - val_loss: 0.4618
Epoch 9/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4476 - val_loss: 0.4237
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4313 - val_loss: 0.4017
Epoch 11/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4084 - val_loss: 0.3828
Epoch 12/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4035 - val_loss: 0.3800
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3945 - val_loss: 0.3661
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3909 - val_loss: 0.3636
Epoch 15/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3858 - val_loss: 0.3609
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3897 - val_loss: 0.3592
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3824 - val_loss: 0.3634
Epoch 18/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3777 - val_loss: 0.3476
Epoch 19/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3786 - val_loss: 0.3458
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3744 - val_loss: 0.3426
Epoch 21/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3714 - val_loss: 0.3397
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3673 - val_loss: 0.3376
Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3716 - val_loss: 0.3329
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3633 - val_loss: 0.3441
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3641 - val_loss: 0.3295
Epoch 26/100

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50/50 [==============================] - 2s 35ms/step - loss: 0.3600 - val_loss: 0.3300
Epoch 27/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3594 - val_loss: 0.3247
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3561 - val_loss: 0.3482
Epoch 29/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3512 - val_loss: 0.3216
Epoch 30/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3536 - val_loss: 0.3224
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3497 - val_loss: 0.3273
Epoch 32/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3468 - val_loss: 0.3185
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3473 - val_loss: 0.3214
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3450 - val_loss: 0.3168
Epoch 35/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3425 - val_loss: 0.3169
Epoch 36/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3398 - val_loss: 0.3188
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3387 - val_loss: 0.3151
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3360 - val_loss: 0.3124
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3338 - val_loss: 0.3155
Epoch 40/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3333 - val_loss: 0.3105
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3302 - val_loss: 0.3088
Epoch 42/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3271 - val_loss: 0.3059
Epoch 43/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3232 - val_loss: 0.3088
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3267 - val_loss: 0.3034
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3233 - val_loss: 0.3035
Epoch 46/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3217 - val_loss: 0.3016
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3181 - val_loss: 0.3028
Epoch 48/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3173 - val_loss: 0.2978
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3176 - val_loss: 0.2962
Epoch 50/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3114 - val_loss: 0.2997
Epoch 51/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3137 - val_loss: 0.2933
Epoch 52/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3134 - val_loss: 0.2936
Epoch 53/100
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50/50 [==============================] - 2s 36ms/step - loss: 0.3109 - val_loss: 0.2987
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3111 - val_loss: 0.2929
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3048 - val_loss: 0.2891
Epoch 56/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3075 - val_loss: 0.2882
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3051 - val_loss: 0.3003
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3075 - val_loss: 0.2947
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3044 - val_loss: 0.2832
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3055 - val_loss: 0.2908
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3037 - val_loss: 0.2810
Epoch 62/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3026 - val_loss: 0.2800
Epoch 63/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3019 - val_loss: 0.2851
Epoch 64/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3010 - val_loss: 0.2812
Epoch 65/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2978 - val_loss: 0.2792
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2995 - val_loss: 0.2829
Epoch 67/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2954 - val_loss: 0.2788
Epoch 68/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2982 - val_loss: 0.2818
Epoch 69/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2946 - val_loss: 0.2942
Epoch 70/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2958 - val_loss: 0.2757
Epoch 71/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2943 - val_loss: 0.2754
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2958 - val_loss: 0.2833
Epoch 73/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2936 - val_loss: 0.2817
Epoch 74/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2940 - val_loss: 0.2818
Epoch 75/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2933 - val_loss: 0.2786
Epoch 76/100
50/50 [==============================] - 2s 46ms/step - loss: 0.2946 - val_loss: 0.2798
Epoch 77/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2933 - val_loss: 0.2724
Epoch 78/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2906 - val_loss: 0.2833
Epoch 79/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2913 - val_loss: 0.2948
Epoch 80/100
```

```
50/50 [==============================] - 2s 39ms/step - loss: 0.2909 - val_loss: 0.2739
Epoch 81/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2894 - val_loss: 0.2804
Epoch 82/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2878 - val_loss: 0.2798
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2931 - val_loss: 0.2806
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2881 - val_loss: 0.2906
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2900 - val_loss: 0.2926
Epoch 86/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2872 - val_loss: 0.2758
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2897 - val_loss: 0.2762
Epoch 88/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2869 - val_loss: 0.2722
Epoch 89/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2884 - val_loss: 0.2742
Epoch 90/100
50/50 [==============================] - 2s 40ms/step - loss: 0.2874 - val_loss: 0.2791
Epoch 91/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2867 - val_loss: 0.2763
Epoch 92/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2866 - val_loss: 0.2838
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2879 - val_loss: 0.2729
Epoch 94/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2866 - val_loss: 0.2768
Epoch 95/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2836 - val_loss: 0.2746
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2888 - val_loss: 0.2716
Epoch 97/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2846 - val_loss: 0.2820
Epoch 98/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2848 - val_loss: 0.2808
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2845 - val_loss: 0.2759
Epoch 100/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2858 - val_loss: 0.2723
```

Model Loss CA_1

Simple LSTM Model for CA_1
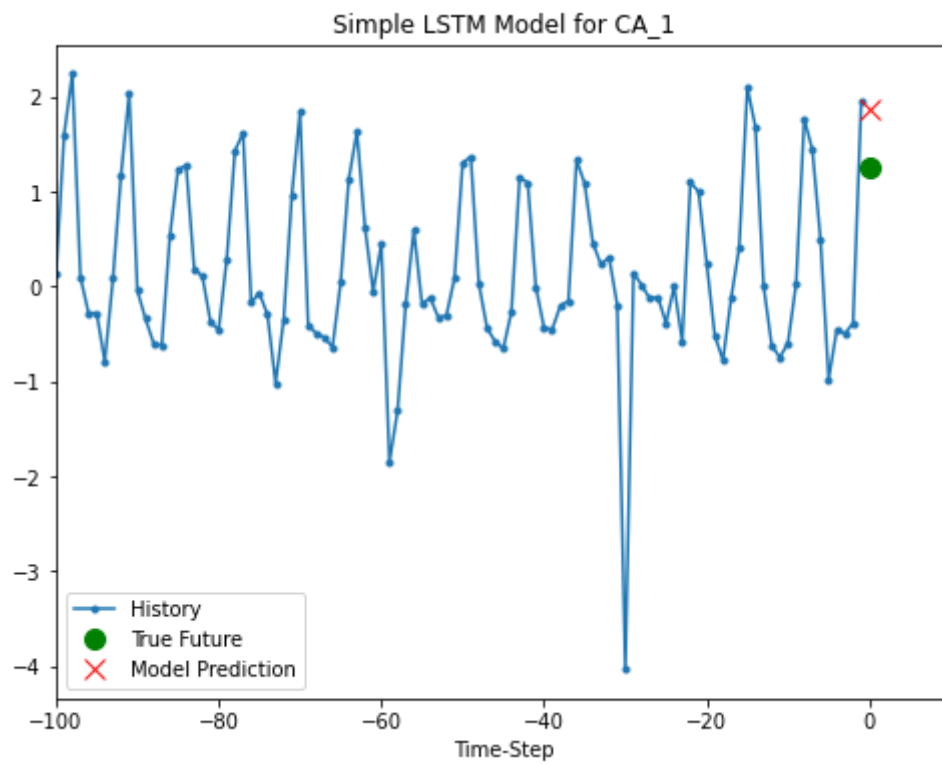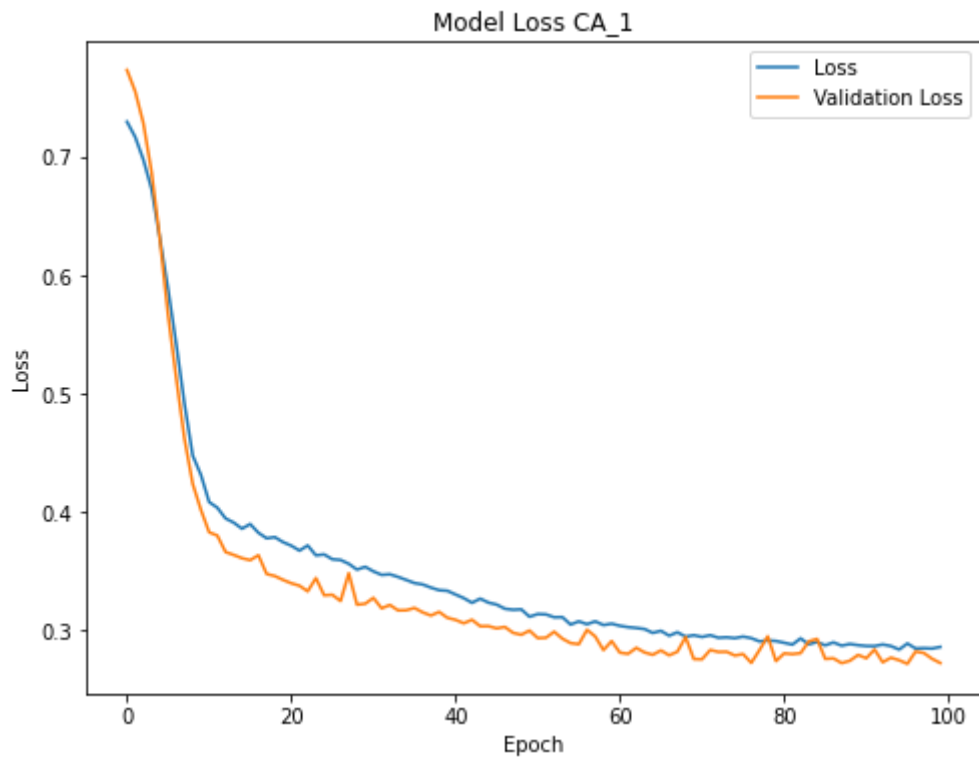
CA_1 - True Future: 5247
CA_1 - Model Prediction: 5851
CA_1 - Model Percentage Error: 11.51%
====================================
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Training Model for CA_2...

```
Epoch 1/100
50/50 [==============================] - 2s 41ms/step - loss: 0.7266 - val_loss: 1.2724
Epoch 2/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6972 - val_loss: 1.2262
Epoch 3/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6807 - val_loss: 1.2185
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6702 - val_loss: 1.1704
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6484 - val_loss: 1.1763
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6253 - val_loss: 1.1207
Epoch 7/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5978 - val_loss: 1.0470
Epoch 8/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5669 - val_loss: 1.0288
Epoch 9/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5293 - val_loss: 1.0084
Epoch 10/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4938 - val_loss: 1.0367
Epoch 11/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4738 - val_loss: 1.0103
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4578 - val_loss: 0.9570
Epoch 13/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4533 - val_loss: 0.9663
Epoch 14/100
50/50 [==============================] - 2s 35ms/step - loss: 0.4446 - val_loss: 0.9825
Epoch 15/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4364 - val_loss: 0.9915
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4328 - val_loss: 0.9860
Epoch 17/100
50/50 [==============================] - 2s 35ms/step - loss: 0.4191 - val_loss: 1.0173
Epoch 18/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4186 - val_loss: 1.0083
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4095 - val_loss: 0.9417
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3982 - val_loss: 0.9294
Epoch 21/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3917 - val_loss: 0.9166
Epoch 22/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3824 - val_loss: 0.8898
Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3709 - val_loss: 0.8951
Epoch 24/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3608 - val_loss: 0.9287
Epoch 25/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3561 - val_loss: 0.9308
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3478 - val_loss: 0.8983
Epoch 27/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3397 - val_loss: 0.9006
```

```
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3337 - val_loss: 0.8914
Epoch 29/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3255 - val_loss: 0.8604
Epoch 30/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3204 - val_loss: 0.8436
Epoch 31/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3174 - val_loss: 0.8175
Epoch 32/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3127 - val_loss: 0.7969
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3085 - val_loss: 0.7779
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3042 - val_loss: 0.7594
Epoch 35/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3023 - val_loss: 0.7574
Epoch 36/100
50/50 [==============================] - 2s 35ms/step - loss: 0.3001 - val_loss: 0.7311
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2960 - val_loss: 0.7193
Epoch 38/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2959 - val_loss: 0.7081
Epoch 39/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2901 - val_loss: 0.6920
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2890 - val_loss: 0.6829
Epoch 41/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2850 - val_loss: 0.6758
Epoch 42/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2857 - val_loss: 0.6644
Epoch 43/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2846 - val_loss: 0.6539
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2816 - val_loss: 0.6490
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2796 - val_loss: 0.6447
Epoch 46/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2776 - val_loss: 0.6378
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2797 - val_loss: 0.6340
Epoch 48/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2739 - val_loss: 0.6269
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2727 - val_loss: 0.6232
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2736 - val_loss: 0.6108
Epoch 51/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2692 - val_loss: 0.6041
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2694 - val_loss: 0.6043
Epoch 53/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2688 - val_loss: 0.6022
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2683 - val_loss: 0.6041
```

```
Epoch 55/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2631 - val_loss: 0.6035
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2647 - val_loss: 0.6026
Epoch 57/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2627 - val_loss: 0.5996
Epoch 58/100
50/50 [==============================] - 2s 47ms/step - loss: 0.2630 - val_loss: 0.5995
Epoch 59/100
50/50 [==============================] - 3s 55ms/step - loss: 0.2610 - val_loss: 0.5999
Epoch 60/100
50/50 [==============================] - 3s 52ms/step - loss: 0.2598 - val_loss: 0.6021
Epoch 61/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2604 - val_loss: 0.6026
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2572 - val_loss: 0.5983
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2585 - val_loss: 0.6012
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2559 - val_loss: 0.5981
Epoch 65/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2554 - val_loss: 0.6079
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2544 - val_loss: 0.6040
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2548 - val_loss: 0.6087
Epoch 68/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2529 - val_loss: 0.6060
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2533 - val_loss: 0.6016
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2480 - val_loss: 0.6034
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2514 - val_loss: 0.6011
Epoch 72/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2505 - val_loss: 0.5964
Epoch 73/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2489 - val_loss: 0.5942
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2499 - val_loss: 0.5891
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2477 - val_loss: 0.5885
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2501 - val_loss: 0.5865
Epoch 77/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2488 - val_loss: 0.5882
Epoch 78/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2455 - val_loss: 0.5687
Epoch 79/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2457 - val_loss: 0.5598
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2476 - val_loss: 0.5514
Epoch 81/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2451 - val_loss: 0.5500
```

```
Epoch 82/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2439 - val_loss: 0.5409
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2470 - val_loss: 0.5352
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2437 - val_loss: 0.5344
Epoch 85/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2436 - val_loss: 0.5283
Epoch 86/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2431 - val_loss: 0.5252
Epoch 87/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2443 - val_loss: 0.5249
Epoch 88/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2425 - val_loss: 0.5221
Epoch 89/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2430 - val_loss: 0.5200
Epoch 90/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2424 - val_loss: 0.5220
Epoch 91/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2435 - val_loss: 0.5196
Epoch 92/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2428 - val_loss: 0.5218
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2434 - val_loss: 0.5201
Epoch 94/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2408 - val_loss: 0.5185
Epoch 95/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2412 - val_loss: 0.5154
Epoch 96/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2437 - val_loss: 0.5140
Epoch 97/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2394 - val_loss: 0.5111
Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2424 - val_loss: 0.5181
Epoch 99/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2417 - val_loss: 0.5120
Epoch 100/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2406 - val_loss: 0.5126
```

Model Loss CA_2

Simple LSTM Model for CA_2
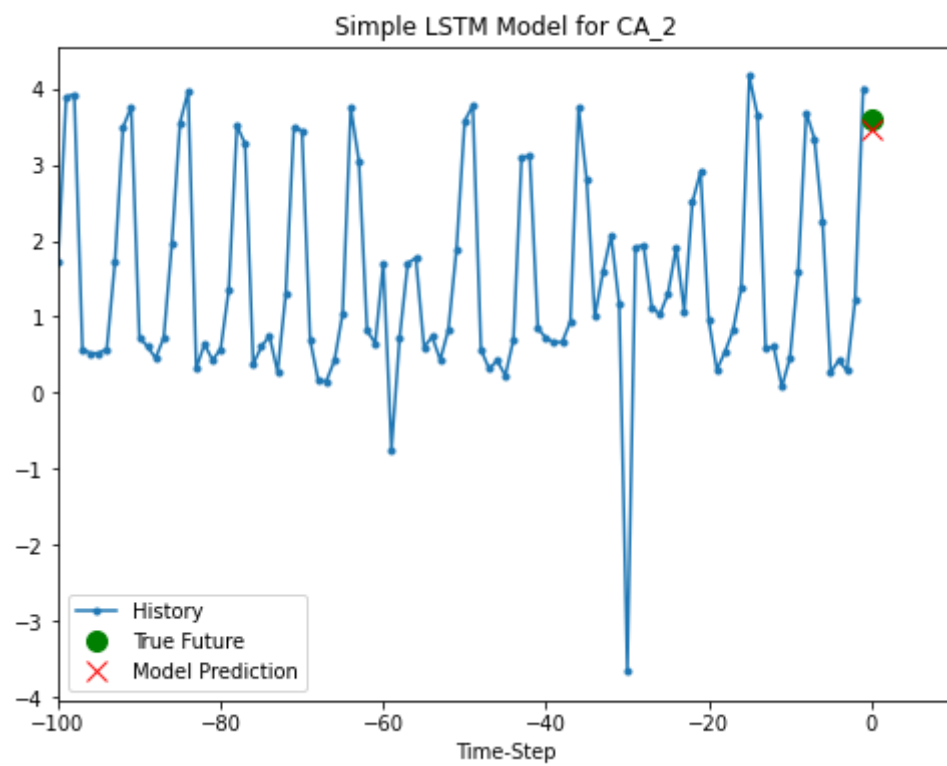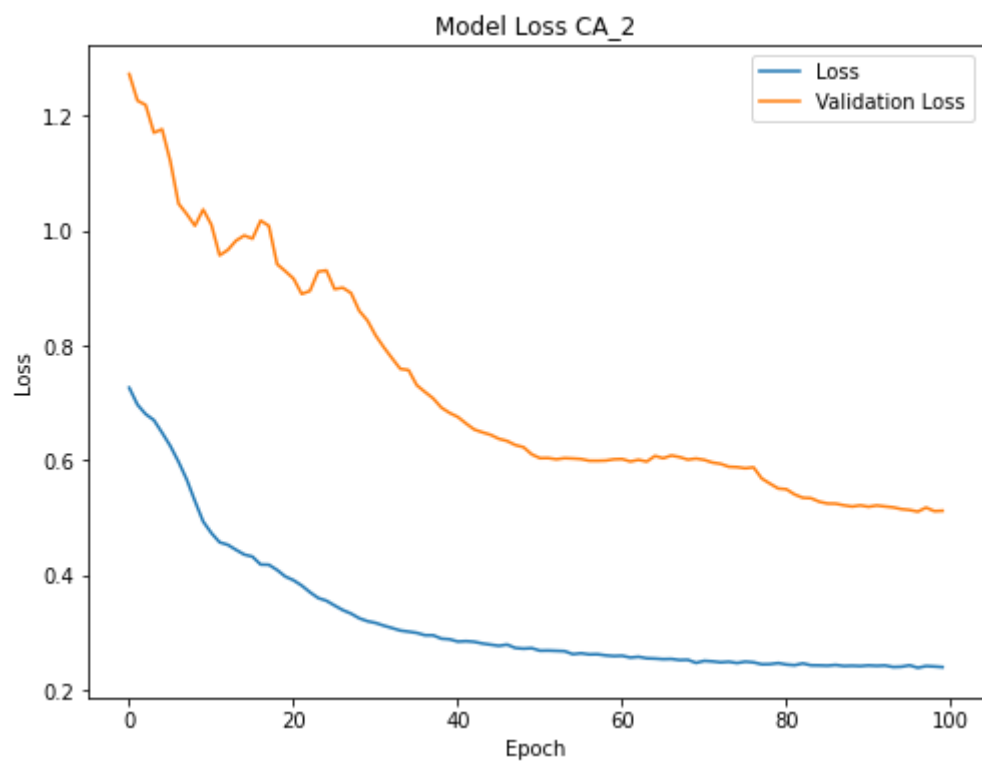
CA_2 - True Future: 5647
CA_2 - Model Prediction: 5529
CA_2 - Model Percentage Error: 2.09%
===================================
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Training Model for CA_3...

```
Epoch 1/100
50/50 [==============================] - 2s 43ms/step - loss: 0.6551 - val_loss: 0.6760
Epoch 2/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6181 - val_loss: 0.6734
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6098 - val_loss: 0.6609
Epoch 4/100
50/50 [==============================] - 2s 41ms/step - loss: 0.6028 - val_loss: 0.6519
Epoch 5/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5913 - val_loss: 0.6378
Epoch 6/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5856 - val_loss: 0.6194
Epoch 7/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5705 - val_loss: 0.5989
Epoch 8/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5508 - val_loss: 0.5837
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5360 - val_loss: 0.5697
Epoch 10/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5190 - val_loss: 0.5453
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5009 - val_loss: 0.5236
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4917 - val_loss: 0.5104
Epoch 13/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4816 - val_loss: 0.4998
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4704 - val_loss: 0.4867
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4634 - val_loss: 0.4767
Epoch 16/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4551 - val_loss: 0.4658
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4519 - val_loss: 0.4636
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4521 - val_loss: 0.4563
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4452 - val_loss: 0.4499
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4436 - val_loss: 0.4471
Epoch 21/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4417 - val_loss: 0.4417
Epoch 22/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4349 - val_loss: 0.4376
Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4358 - val_loss: 0.4310
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4325 - val_loss: 0.4279
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4304 - val_loss: 0.4250
Epoch 26/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4273 - val_loss: 0.4204
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4240 - val_loss: 0.4152
```

```
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4271 - val_loss: 0.4120
Epoch 29/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4154 - val_loss: 0.4060
Epoch 30/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4183 - val_loss: 0.4029
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4142 - val_loss: 0.4024
Epoch 32/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4118 - val_loss: 0.3985
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4094 - val_loss: 0.3915
Epoch 34/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4023 - val_loss: 0.3846
Epoch 35/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4072 - val_loss: 0.3813
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3960 - val_loss: 0.3740
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3972 - val_loss: 0.3699
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3920 - val_loss: 0.3655
Epoch 39/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3887 - val_loss: 0.3620
Epoch 40/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3852 - val_loss: 0.3577
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3795 - val_loss: 0.3513
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3768 - val_loss: 0.3497
Epoch 43/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3708 - val_loss: 0.3423
Epoch 44/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3665 - val_loss: 0.3370
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3656 - val_loss: 0.3320
Epoch 46/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3574 - val_loss: 0.3269
Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3555 - val_loss: 0.3218
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3484 - val_loss: 0.3175
Epoch 49/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3445 - val_loss: 0.3117
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3422 - val_loss: 0.3030
Epoch 51/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3345 - val_loss: 0.3003
Epoch 52/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3347 - val_loss: 0.2993
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3319 - val_loss: 0.2993
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3255 - val_loss: 0.2989
```

```
Epoch 55/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3285 - val_loss: 0.2968
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3254 - val_loss: 0.2952
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3225 - val_loss: 0.2904
Epoch 58/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3226 - val_loss: 0.2941
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3204 - val_loss: 0.2874
Epoch 60/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3175 - val_loss: 0.2893
Epoch 61/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3169 - val_loss: 0.2926
Epoch 62/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3149 - val_loss: 0.2897
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3156 - val_loss: 0.2882
Epoch 64/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3162 - val_loss: 0.2877
Epoch 65/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3130 - val_loss: 0.2841
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3122 - val_loss: 0.2795
Epoch 67/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3124 - val_loss: 0.2753
Epoch 68/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3123 - val_loss: 0.2772
Epoch 69/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3093 - val_loss: 0.2860
Epoch 70/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3071 - val_loss: 0.2834
Epoch 71/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3109 - val_loss: 0.2760
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3106 - val_loss: 0.2706
Epoch 73/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3068 - val_loss: 0.2771
Epoch 74/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3090 - val_loss: 0.2765
Epoch 75/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3089 - val_loss: 0.2753
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3075 - val_loss: 0.2749
Epoch 77/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3074 - val_loss: 0.2763
Epoch 78/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3046 - val_loss: 0.2932
Epoch 79/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3049 - val_loss: 0.2770
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3062 - val_loss: 0.2773
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3049 - val_loss: 0.2854
```

```
Epoch 82/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3075 - val_loss: 0.2766
Epoch 83/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3046 - val_loss: 0.2820
Epoch 84/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3079 - val_loss: 0.2771
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3061 - val_loss: 0.2714
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3039 - val_loss: 0.2762
Epoch 87/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3064 - val_loss: 0.2725
Epoch 88/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3030 - val_loss: 0.2732
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3047 - val_loss: 0.2877
Epoch 90/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3025 - val_loss: 0.2735
Epoch 91/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3048 - val_loss: 0.2766
Epoch 92/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3037 - val_loss: 0.2714
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3017 - val_loss: 0.2730
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3053 - val_loss: 0.2699
Epoch 95/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3018 - val_loss: 0.2825
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3024 - val_loss: 0.2699
Epoch 97/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3017 - val_loss: 0.2758
Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3024 - val_loss: 0.2774
Epoch 99/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3018 - val_loss: 0.2750
Epoch 100/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3000 - val_loss: 0.2759
```

Model Loss CA_3

Simple LSTM Model for CA_3
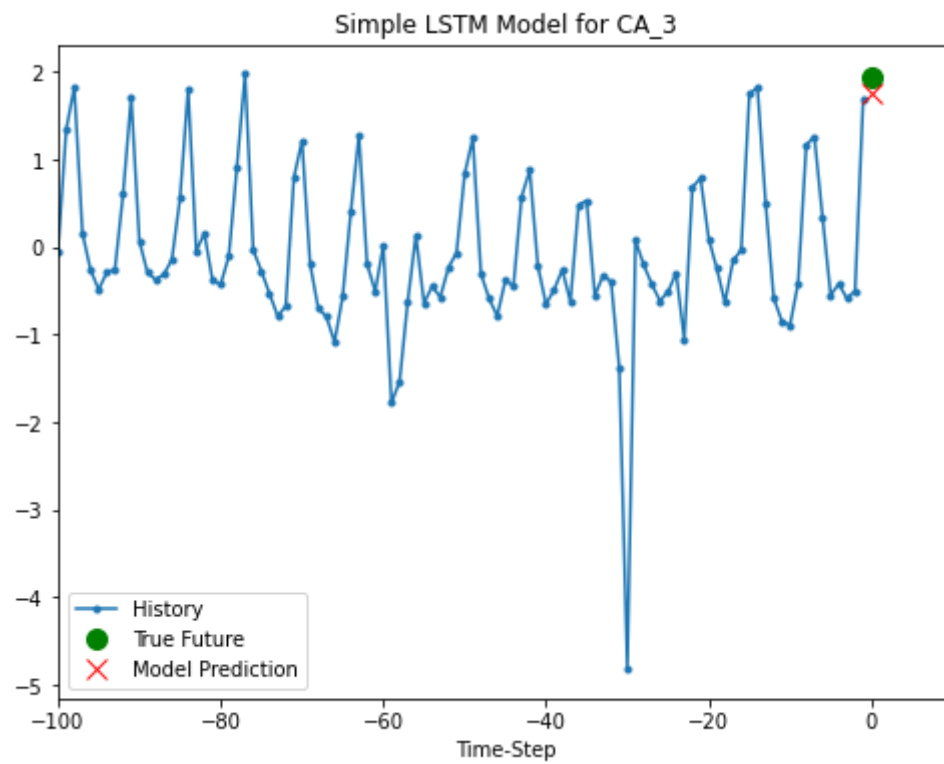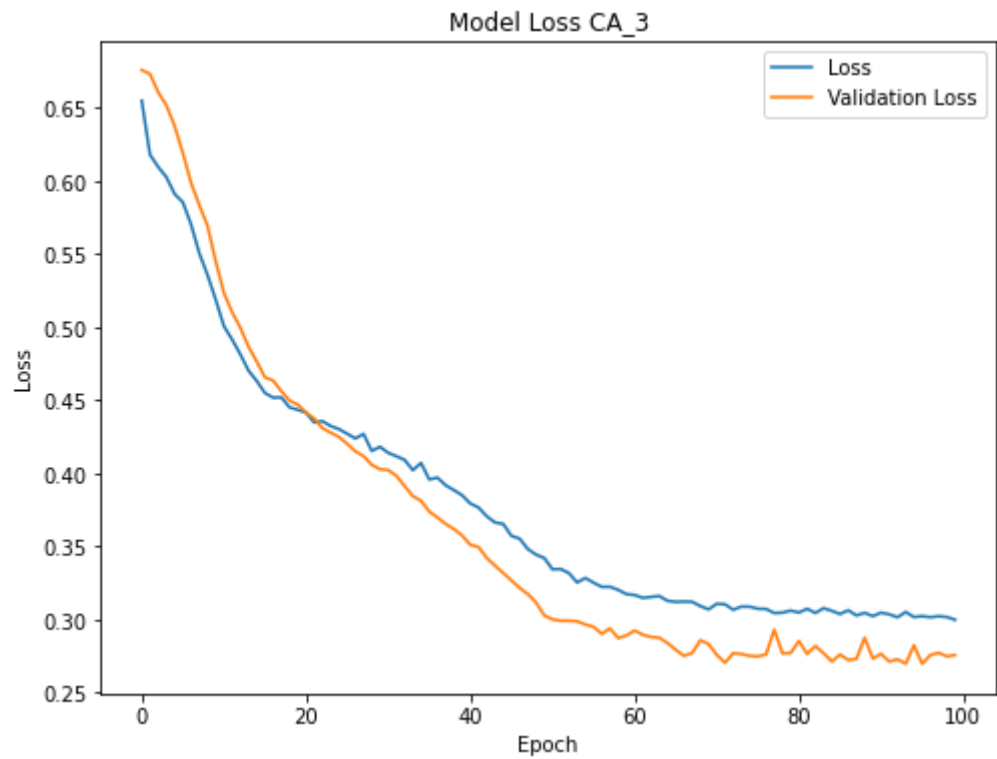
CA_3 - True Future: 8164
CA_3 - Model Prediction: 7943
CA_3 - Model Percentage Error: 2.71%
===================================
===================================

Training Model for CA_4...

```
Epoch 1/100
50/50 [==============================] - 2s 45ms/step - loss: 0.5808 - val_loss: 0.6003
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5179 - val_loss: 0.6192
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5079 - val_loss: 0.6165
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4969 - val_loss: 0.6298
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4965 - val_loss: 0.5771
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4827 - val_loss: 0.5639
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4760 - val_loss: 0.5646
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4627 - val_loss: 0.5502
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4594 - val_loss: 0.5224
Epoch 10/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4500 - val_loss: 0.5098
Epoch 11/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4444 - val_loss: 0.5082
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4365 - val_loss: 0.4925
Epoch 13/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4325 - val_loss: 0.4750
Epoch 14/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4272 - val_loss: 0.4833
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4217 - val_loss: 0.4896
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4221 - val_loss: 0.4657
Epoch 17/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4185 - val_loss: 0.4793
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4113 - val_loss: 0.4726
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4134 - val_loss: 0.4608
Epoch 20/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4097 - val_loss: 0.4712
Epoch 21/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4119 - val_loss: 0.4524
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4088 - val_loss: 0.4390
Epoch 23/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4062 - val_loss: 0.4746
Epoch 24/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4083 - val_loss: 0.4470
Epoch 25/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4025 - val_loss: 0.4568
Epoch 26/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4032 - val_loss: 0.4448
Epoch 27/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4002 - val_loss: 0.4629
```

```
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4003 - val_loss: 0.4399
Epoch 29/100
50/50 [==============================] - 2s 43ms/step - loss: 0.3984 - val_loss: 0.4743
Epoch 30/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3990 - val_loss: 0.4644
Epoch 31/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3955 - val_loss: 0.4627
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3965 - val_loss: 0.4518
Epoch 33/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3941 - val_loss: 0.4519
Epoch 34/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3937 - val_loss: 0.4635
Epoch 35/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3896 - val_loss: 0.4625
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3893 - val_loss: 0.4690
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3880 - val_loss: 0.4363
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3876 - val_loss: 0.4394
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3861 - val_loss: 0.4448
Epoch 40/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3836 - val_loss: 0.4443
Epoch 41/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3835 - val_loss: 0.4415
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3746 - val_loss: 0.4393
Epoch 43/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3761 - val_loss: 0.4336
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3746 - val_loss: 0.4237
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3723 - val_loss: 0.4404
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3654 - val_loss: 0.4064
Epoch 47/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3628 - val_loss: 0.3950
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3575 - val_loss: 0.3835
Epoch 49/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3515 - val_loss: 0.3999
Epoch 50/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3514 - val_loss: 0.3925
Epoch 51/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3494 - val_loss: 0.3883
Epoch 52/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3463 - val_loss: 0.3965
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3437 - val_loss: 0.4004
Epoch 54/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3423 - val_loss: 0.3815
```

```
Epoch 55/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3416 - val_loss: 0.3899
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3390 - val_loss: 0.3937
Epoch 57/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3365 - val_loss: 0.3631
Epoch 58/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3388 - val_loss: 0.3963
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3371 - val_loss: 0.3756
Epoch 60/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3333 - val_loss: 0.3799
Epoch 61/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3321 - val_loss: 0.3902
Epoch 62/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3314 - val_loss: 0.3867
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3324 - val_loss: 0.3800
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3342 - val_loss: 0.4100
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3346 - val_loss: 0.4155
Epoch 66/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3378 - val_loss: 0.3820
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3308 - val_loss: 0.4443
Epoch 68/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3336 - val_loss: 0.3896
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3313 - val_loss: 0.3899
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3337 - val_loss: 0.4296
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3407 - val_loss: 0.3774
Epoch 72/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3310 - val_loss: 0.4029
Epoch 73/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3737 - val_loss: 0.5998
Epoch 74/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4669 - val_loss: 0.5645
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4393 - val_loss: 0.5567
Epoch 76/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4250 - val_loss: 0.5199
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4094 - val_loss: 0.4959
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4078 - val_loss: 0.4933
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4029 - val_loss: 0.4879
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3968 - val_loss: 0.4840
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3999 - val_loss: 0.4765
```

```
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3935 - val_loss: 0.4699
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3964 - val_loss: 0.4712
Epoch 84/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3900 - val_loss: 0.4575
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3875 - val_loss: 0.4522
Epoch 86/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3877 - val_loss: 0.4527
Epoch 87/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3878 - val_loss: 0.4515
Epoch 88/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3829 - val_loss: 0.4494
Epoch 89/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3783 - val_loss: 0.4521
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3823 - val_loss: 0.4473
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3757 - val_loss: 0.4455
Epoch 92/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3748 - val_loss: 0.4475
Epoch 93/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3729 - val_loss: 0.4412
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3710 - val_loss: 0.4421
Epoch 95/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3682 - val_loss: 0.4443
Epoch 96/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3716 - val_loss: 0.4320
Epoch 97/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3646 - val_loss: 0.4179
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3641 - val_loss: 0.4248
Epoch 99/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3621 - val_loss: 0.4255
Epoch 100/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3608 - val_loss: 0.4230
```

Model Loss CA_4

Simple LSTM Model for CA_4
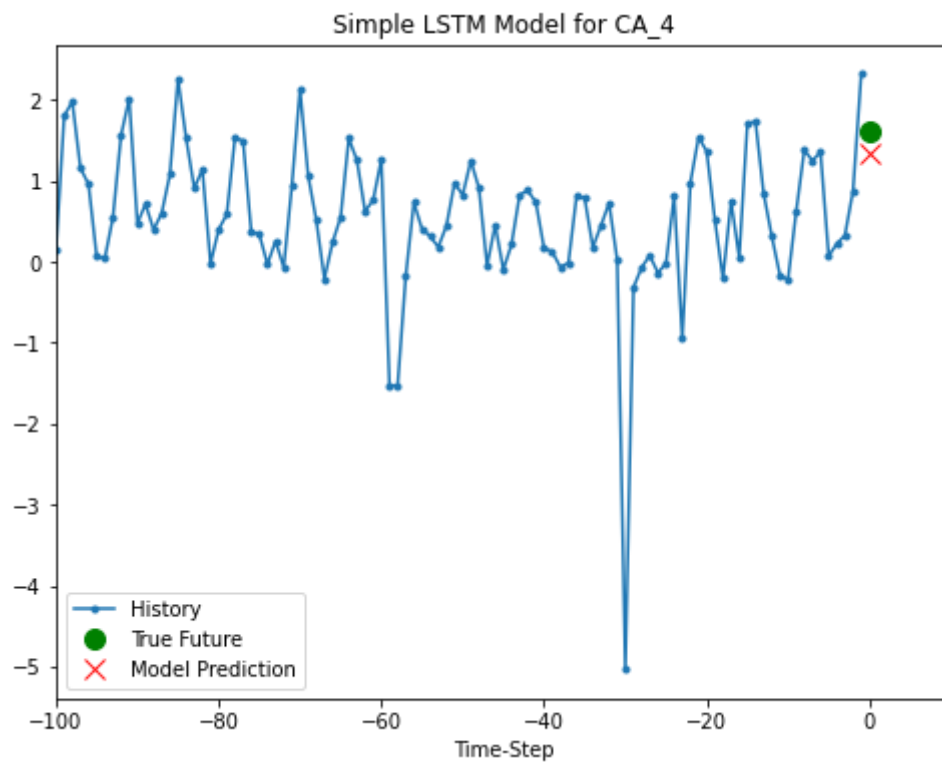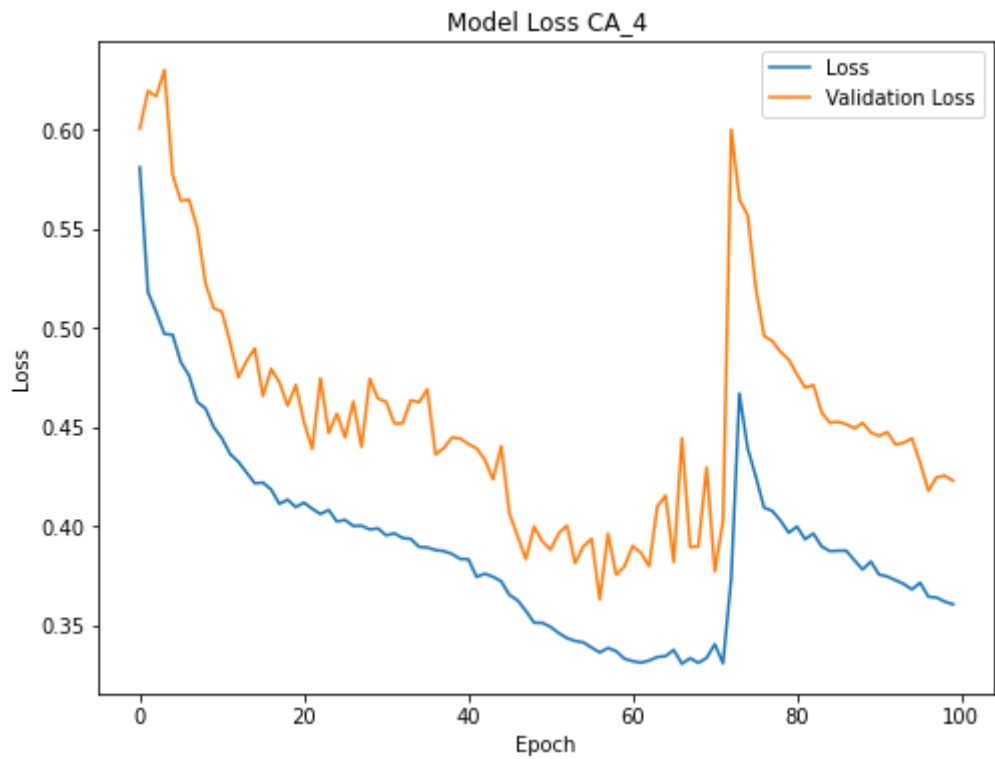
CA_4 - True Future: 2787
CA_4 - Model Prediction: 2673
CA_4 - Model Percentage Error: 4.09%
===================================
===================================

Training Model for TX_1...

```
Epoch 1/100
50/50 [==============================] - 2s 45ms/step - loss: 0.7115 - val_loss: 0.7182
Epoch 2/100
50/50 [==============================] - 2s 38ms/step - loss: 0.7103 - val_loss: 0.7052
Epoch 3/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6950 - val_loss: 0.7067
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6960 - val_loss: 0.6977
Epoch 5/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6940 - val_loss: 0.6894
Epoch 6/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6811 - val_loss: 0.6861
Epoch 7/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6758 - val_loss: 0.6825
Epoch 8/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6723 - val_loss: 0.6706
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6560 - val_loss: 0.6654
Epoch 10/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6496 - val_loss: 0.6494
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6360 - val_loss: 0.6430
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6230 - val_loss: 0.6226
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6122 - val_loss: 0.6057
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5981 - val_loss: 0.5834
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5896 - val_loss: 0.5638
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5769 - val_loss: 0.5411
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5697 - val_loss: 0.5452
Epoch 18/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5668 - val_loss: 0.5332
Epoch 19/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5627 - val_loss: 0.5130
Epoch 20/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5540 - val_loss: 0.5187
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5531 - val_loss: 0.5040
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5468 - val_loss: 0.4964
Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5371 - val_loss: 0.4886
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5309 - val_loss: 0.4744
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5237 - val_loss: 0.4616
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5134 - val_loss: 0.4486
Epoch 27/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5029 - val_loss: 0.4417
```

```
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4915 - val_loss: 0.4278
Epoch 29/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4809 - val_loss: 0.4147
Epoch 30/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4676 - val_loss: 0.4011
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4534 - val_loss: 0.3869
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4408 - val_loss: 0.3813
Epoch 33/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4311 - val_loss: 0.3682
Epoch 34/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4181 - val_loss: 0.3583
Epoch 35/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4072 - val_loss: 0.3507
Epoch 36/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3990 - val_loss: 0.3451
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3914 - val_loss: 0.3485
Epoch 38/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3903 - val_loss: 0.3052
Epoch 39/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4522 - val_loss: 0.3949
Epoch 40/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4390 - val_loss: 0.3545
Epoch 41/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4176 - val_loss: 0.3445
Epoch 42/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4086 - val_loss: 0.3354
Epoch 43/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3963 - val_loss: 0.3297
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3959 - val_loss: 0.3314
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4429 - val_loss: 0.3501
Epoch 46/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4037 - val_loss: 0.3262
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3927 - val_loss: 0.3182
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3855 - val_loss: 0.3336
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.7020 - val_loss: 0.6624
Epoch 50/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6566 - val_loss: 0.6082
Epoch 51/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6146 - val_loss: 0.5732
Epoch 52/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5772 - val_loss: 0.5323
Epoch 53/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5460 - val_loss: 0.4848
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5144 - val_loss: 0.4282
```

```
Epoch 55/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4883 - val_loss: 0.4134
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4835 - val_loss: 0.4194
Epoch 57/100
50/50 [==============================] - 2s 41ms/step - loss: 0.4731 - val_loss: 0.4147
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4636 - val_loss: 0.4101
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4592 - val_loss: 0.3984
Epoch 60/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4487 - val_loss: 0.3957
Epoch 61/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4443 - val_loss: 0.3772
Epoch 62/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4352 - val_loss: 0.3728
Epoch 63/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4272 - val_loss: 0.3714
Epoch 64/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4309 - val_loss: 0.3612
Epoch 65/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4215 - val_loss: 0.3470
Epoch 66/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4149 - val_loss: 0.3449
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4068 - val_loss: 0.3350
Epoch 68/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4039 - val_loss: 0.3286
Epoch 69/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4006 - val_loss: 0.3239
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3965 - val_loss: 0.3165
Epoch 71/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3912 - val_loss: 0.3124
Epoch 72/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3888 - val_loss: 0.3054
Epoch 73/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3848 - val_loss: 0.3087
Epoch 74/100
50/50 [==============================] - 3s 55ms/step - loss: 0.3853 - val_loss: 0.2982
Epoch 75/100
50/50 [==============================] - 3s 65ms/step - loss: 0.3819 - val_loss: 0.3011
Epoch 76/100
50/50 [==============================] - 3s 50ms/step - loss: 0.3847 - val_loss: 0.2948
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4243 - val_loss: 0.3601
Epoch 78/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3949 - val_loss: 0.3078
Epoch 79/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3804 - val_loss: 0.2972
Epoch 80/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3773 - val_loss: 0.2951
Epoch 81/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3830 - val_loss: 0.2979
```

```
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4505 - val_loss: 0.3258
Epoch 83/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3925 - val_loss: 0.3044
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3794 - val_loss: 0.2982
Epoch 85/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3811 - val_loss: 0.2961
Epoch 86/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3753 - val_loss: 0.2994
Epoch 87/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3763 - val_loss: 0.2947
Epoch 88/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3781 - val_loss: 0.2948
Epoch 89/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3783 - val_loss: 0.2969
Epoch 90/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3768 - val_loss: 0.2915
Epoch 91/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3787 - val_loss: 0.2947
Epoch 92/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3750 - val_loss: 0.2951
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3767 - val_loss: 0.3028
Epoch 94/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3712 - val_loss: 0.2939
Epoch 95/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3734 - val_loss: 0.4521
Epoch 96/100
50/50 [==============================] - 2s 37ms/step - loss: 0.7006 - val_loss: 0.5691
Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5579 - val_loss: 0.4987
Epoch 98/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5204 - val_loss: 0.4350
Epoch 99/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4847 - val_loss: 0.3981
Epoch 100/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4640 - val_loss: 0.3620
```

Model Loss TX_1

Simple LSTM Model for TX_1
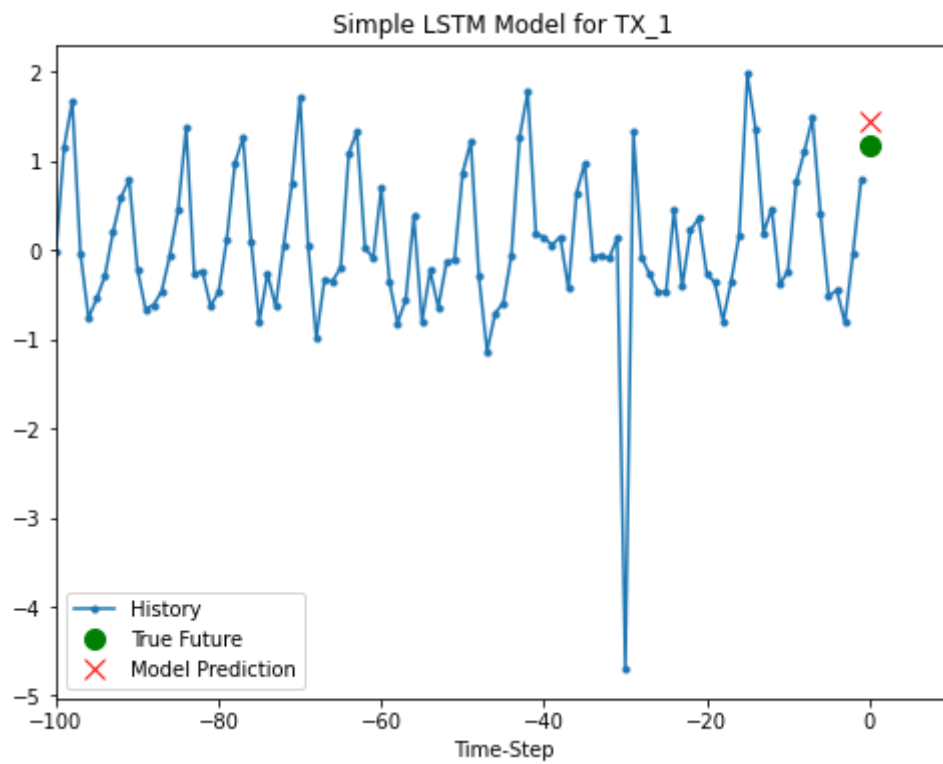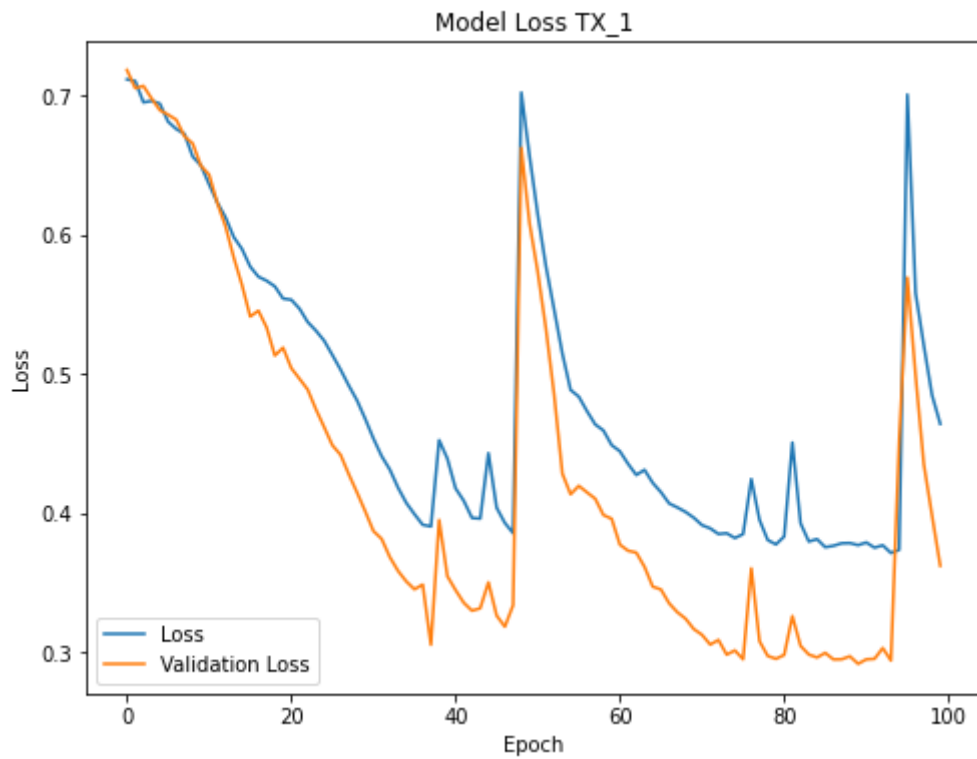
TX_1 - True Future: 3639
TX_1 - Model Prediction: 3803
TX_1 - Model Percentage Error: 4.51%
====================================
====================================

Training Model for TX_2...

```
Epoch 1/100
50/50 [==============================] - 2s 42ms/step - loss: 0.7633 - val_loss: 0.6874
Epoch 2/100
50/50 [==============================] - 2s 37ms/step - loss: 0.7176 - val_loss: 0.6860
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.7095 - val_loss: 0.6830
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.7070 - val_loss: 0.6720
Epoch 5/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6993 - val_loss: 0.6689
Epoch 6/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6918 - val_loss: 0.6675
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6888 - val_loss: 0.6569
Epoch 8/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6834 - val_loss: 0.6466
Epoch 9/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6664 - val_loss: 0.6352
Epoch 10/100
50/50 [==============================] - 2s 40ms/step - loss: 0.6567 - val_loss: 0.6135
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6409 - val_loss: 0.5952
Epoch 12/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6264 - val_loss: 0.5787
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6078 - val_loss: 0.5580
Epoch 14/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5934 - val_loss: 0.5460
Epoch 15/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5741 - val_loss: 0.5310
Epoch 16/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5646 - val_loss: 0.5148
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5499 - val_loss: 0.5029
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5454 - val_loss: 0.4924
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5359 - val_loss: 0.4843
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5305 - val_loss: 0.4795
Epoch 21/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5248 - val_loss: 0.4739
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5224 - val_loss: 0.4674
Epoch 23/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5148 - val_loss: 0.4656
Epoch 24/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5050 - val_loss: 0.4560
Epoch 25/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5064 - val_loss: 0.4533
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4980 - val_loss: 0.4445
Epoch 27/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4941 - val_loss: 0.4374
```

```
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4857 - val_loss: 0.4329
Epoch 29/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4805 - val_loss: 0.4275
Epoch 30/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4780 - val_loss: 0.4272
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4695 - val_loss: 0.4165
Epoch 32/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4640 - val_loss: 0.4119
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4616 - val_loss: 0.4063
Epoch 34/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4515 - val_loss: 0.4005
Epoch 35/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4548 - val_loss: 0.3956
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4409 - val_loss: 0.3892
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4424 - val_loss: 0.3850
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4322 - val_loss: 0.3810
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4292 - val_loss: 0.3772
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4234 - val_loss: 0.3785
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4207 - val_loss: 0.3687
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4154 - val_loss: 0.3629
Epoch 43/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4085 - val_loss: 0.3589
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4019 - val_loss: 0.3550
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3996 - val_loss: 0.3544
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3933 - val_loss: 0.3519
Epoch 47/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3925 - val_loss: 0.3406
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3825 - val_loss: 0.3474
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3844 - val_loss: 0.3368
Epoch 50/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3726 - val_loss: 0.3356
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3764 - val_loss: 0.3326
Epoch 52/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3743 - val_loss: 0.3239
Epoch 53/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3730 - val_loss: 0.3305
Epoch 54/100
50/50 [==============================] - 3s 53ms/step - loss: 0.3654 - val_loss: 0.3200
```

```
Epoch 55/100
50/50 [==============================] - 2s 45ms/step - loss: 0.3706 - val_loss: 0.3260
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3686 - val_loss: 0.3289
Epoch 57/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3642 - val_loss: 0.3282
Epoch 58/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3659 - val_loss: 0.3286
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3652 - val_loss: 0.3297
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3614 - val_loss: 0.3191
Epoch 61/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3660 - val_loss: 0.3311
Epoch 62/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3629 - val_loss: 0.3211
Epoch 63/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3606 - val_loss: 0.3286
Epoch 64/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3594 - val_loss: 0.3253
Epoch 65/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3609 - val_loss: 0.3293
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3605 - val_loss: 0.3246
Epoch 67/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3611 - val_loss: 0.3284
Epoch 68/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3567 - val_loss: 0.3222
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3619 - val_loss: 0.3249
Epoch 70/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3564 - val_loss: 0.3229
Epoch 71/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3569 - val_loss: 0.3207
Epoch 72/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3578 - val_loss: 0.3271
Epoch 73/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3585 - val_loss: 0.3155
Epoch 74/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3593 - val_loss: 0.3210
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3546 - val_loss: 0.3160
Epoch 76/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3541 - val_loss: 0.3244
Epoch 77/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3589 - val_loss: 0.3222
Epoch 78/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3559 - val_loss: 0.3276
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3776 - val_loss: 0.3359
Epoch 80/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3637 - val_loss: 0.3113
Epoch 81/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3582 - val_loss: 0.3104
```

```
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3573 - val_loss: 0.3184
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3572 - val_loss: 0.3170
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3523 - val_loss: 0.3158
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3546 - val_loss: 0.3256
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3525 - val_loss: 0.3216
Epoch 87/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3571 - val_loss: 0.3224
Epoch 88/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3651 - val_loss: 0.3209
Epoch 89/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3524 - val_loss: 0.3196
Epoch 90/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3542 - val_loss: 0.3191
Epoch 91/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3506 - val_loss: 0.3193
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3530 - val_loss: 0.3155
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3521 - val_loss: 0.3099
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3516 - val_loss: 0.3114
Epoch 95/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3484 - val_loss: 0.3086
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3535 - val_loss: 0.3115
Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3484 - val_loss: 0.3161
Epoch 98/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3485 - val_loss: 0.3371
Epoch 99/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3519 - val_loss: 0.3225
Epoch 100/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3535 - val_loss: 0.3137
```

Model Loss TX_2

Simple LSTM Model for TX_2
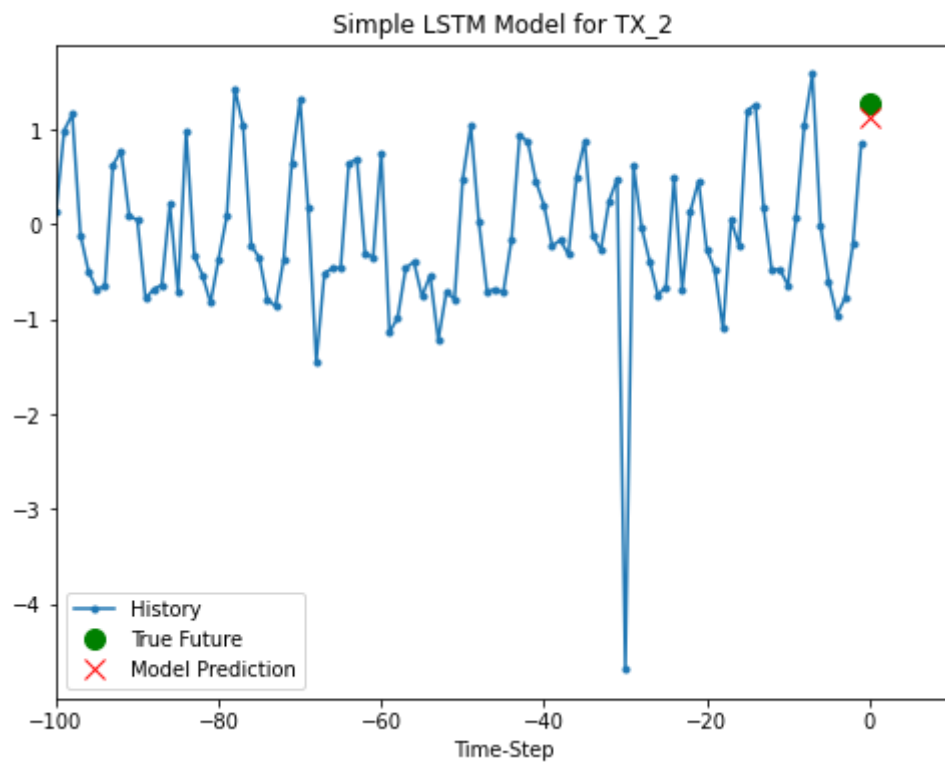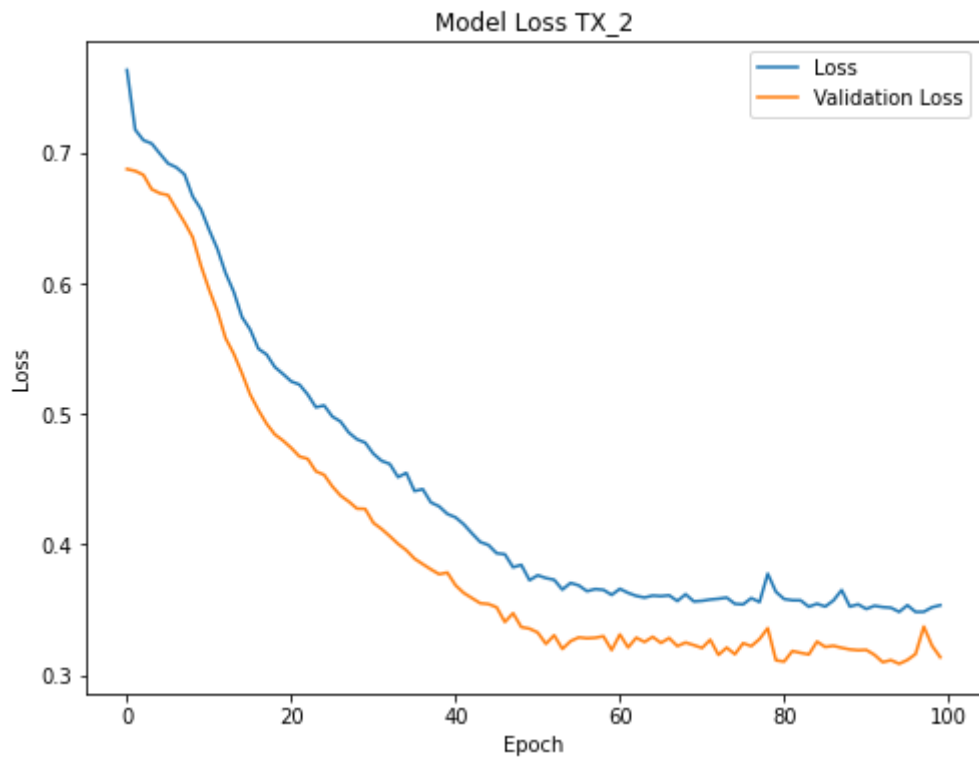
TX_2 - True Future: 4794
TX_2 - Model Prediction: 4672
TX_2 - Model Percentage Error: 2.54%
==================================
==================================

Training Model for TX_3...

```
Epoch 1/100
50/50 [==============================] - 2s 44ms/step - loss: 0.6910 - val_loss: 0.6853
Epoch 2/100
50/50 [==============================] - 2s 41ms/step - loss: 0.6440 - val_loss: 0.6426
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6368 - val_loss: 0.6418
Epoch 4/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6356 - val_loss: 0.6497
Epoch 5/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6387 - val_loss: 0.6430
Epoch 6/100
50/50 [==============================] - 2s 40ms/step - loss: 0.6305 - val_loss: 0.6341
Epoch 7/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6261 - val_loss: 0.6329
Epoch 8/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6232 - val_loss: 0.6246
Epoch 9/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6149 - val_loss: 0.6105
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.6036 - val_loss: 0.6224
Epoch 11/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5958 - val_loss: 0.6156
Epoch 12/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5897 - val_loss: 0.5808
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5766 - val_loss: 0.5823
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5695 - val_loss: 0.6036
Epoch 15/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5635 - val_loss: 0.5810
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5539 - val_loss: 0.5717
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5545 - val_loss: 0.5720
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5475 - val_loss: 0.5608
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5452 - val_loss: 0.5716
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5341 - val_loss: 0.5568
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5324 - val_loss: 0.5773
Epoch 22/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5318 - val_loss: 0.5558
Epoch 23/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5247 - val_loss: 0.5381
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5150 - val_loss: 0.5374
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5193 - val_loss: 0.5350
Epoch 26/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5124 - val_loss: 0.5381
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5106 - val_loss: 0.5318
```

```
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5030 - val_loss: 0.5295
Epoch 29/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5043 - val_loss: 0.5282
Epoch 30/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5031 - val_loss: 0.5248
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4964 - val_loss: 0.5329
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4952 - val_loss: 0.5231
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4928 - val_loss: 0.5201
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4876 - val_loss: 0.5196
Epoch 35/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4886 - val_loss: 0.5140
Epoch 36/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4844 - val_loss: 0.5129
Epoch 37/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4838 - val_loss: 0.5137
Epoch 38/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4806 - val_loss: 0.5069
Epoch 39/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4765 - val_loss: 0.5058
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4735 - val_loss: 0.5037
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4750 - val_loss: 0.4965
Epoch 42/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4671 - val_loss: 0.4917
Epoch 43/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4642 - val_loss: 0.4848
Epoch 44/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4625 - val_loss: 0.4792
Epoch 45/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4577 - val_loss: 0.4885
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4510 - val_loss: 0.4686
Epoch 47/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4452 - val_loss: 0.4696
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4425 - val_loss: 0.4611
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4354 - val_loss: 0.4649
Epoch 50/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4305 - val_loss: 0.4593
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4274 - val_loss: 0.4662
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4253 - val_loss: 0.4563
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4158 - val_loss: 0.4384
Epoch 54/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4120 - val_loss: 0.4416
```

```
Epoch 55/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4025 - val_loss: 0.4393
Epoch 56/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3976 - val_loss: 0.4455
Epoch 57/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3941 - val_loss: 0.4410
Epoch 58/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3878 - val_loss: 0.4388
Epoch 59/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3869 - val_loss: 0.4367
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3844 - val_loss: 0.4306
Epoch 61/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3831 - val_loss: 0.4276
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3805 - val_loss: 0.4245
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3846 - val_loss: 0.4224
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3798 - val_loss: 0.4261
Epoch 65/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3799 - val_loss: 0.4271
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3781 - val_loss: 0.4163
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3764 - val_loss: 0.4174
Epoch 68/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6739 - val_loss: 0.7700
Epoch 69/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6188 - val_loss: 0.6368
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5879 - val_loss: 0.6087
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5620 - val_loss: 0.5885
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5516 - val_loss: 0.5654
Epoch 73/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5391 - val_loss: 0.5472
Epoch 74/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5284 - val_loss: 0.5401
Epoch 75/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5223 - val_loss: 0.5262
Epoch 76/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5186 - val_loss: 0.5215
Epoch 77/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5113 - val_loss: 0.5105
Epoch 78/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5096 - val_loss: 0.5102
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5063 - val_loss: 0.4989
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5063 - val_loss: 0.4923
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5039 - val_loss: 0.4929
```

```
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4954 - val_loss: 0.4930
Epoch 83/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4969 - val_loss: 0.4855
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4953 - val_loss: 0.4886
Epoch 85/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4902 - val_loss: 0.4944
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4885 - val_loss: 0.4888
Epoch 87/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4864 - val_loss: 0.4836
Epoch 88/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4846 - val_loss: 0.4888
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4808 - val_loss: 0.4822
Epoch 90/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4772 - val_loss: 0.4823
Epoch 91/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4786 - val_loss: 0.4823
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4756 - val_loss: 0.4858
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4702 - val_loss: 0.4827
Epoch 94/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4725 - val_loss: 0.4853
Epoch 95/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4699 - val_loss: 0.4770
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4705 - val_loss: 0.4868
Epoch 97/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4652 - val_loss: 0.4765
Epoch 98/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4652 - val_loss: 0.4817
Epoch 99/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4642 - val_loss: 0.4795
Epoch 100/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4598 - val_loss: 0.4750
```

Model Loss TX_3

Simple LSTM Model for TX_3
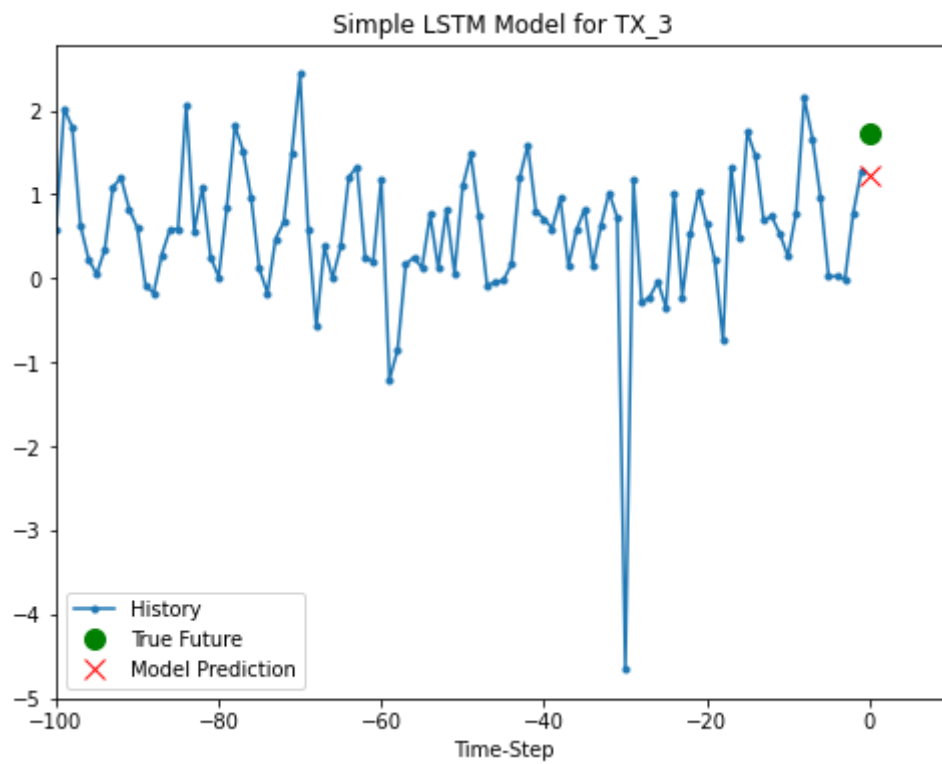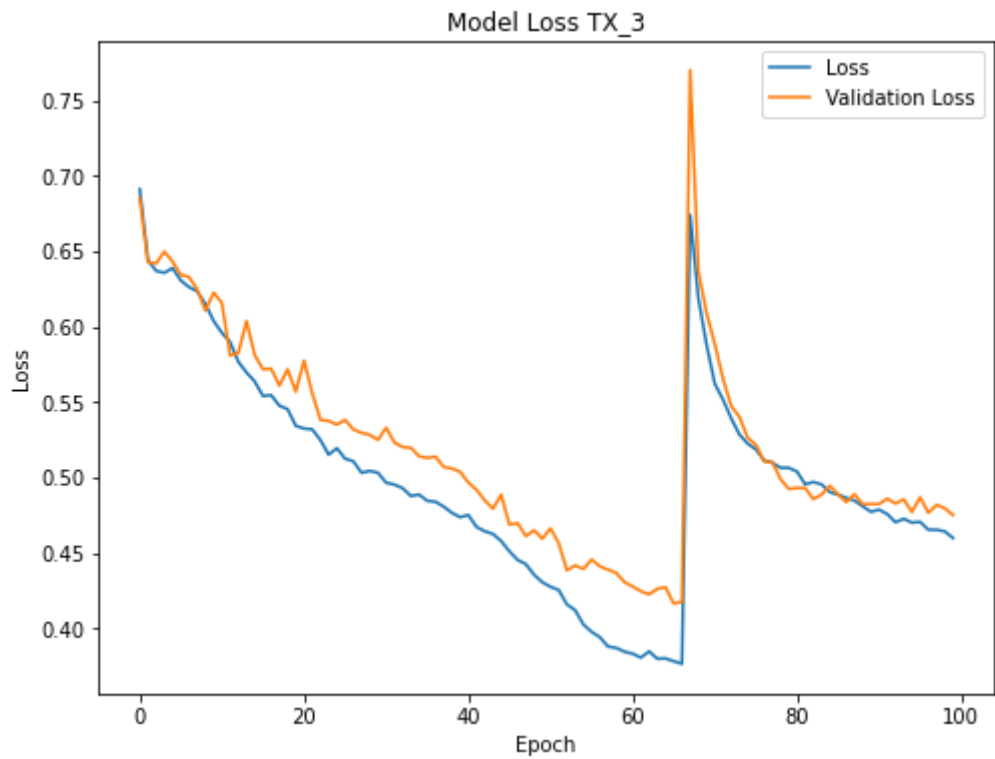
TX_3 - True Future: 4286
TX_3 - Model Prediction: 3957
TX_3 - Model Percentage Error: 7.68%
====================================
====================================

Training Model for WI_1...

```
Epoch 1/100
50/50 [==============================] - 3s 53ms/step - loss: 0.5609 - val_loss: 0.8278
Epoch 2/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5007 - val_loss: 0.8219
Epoch 3/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4831 - val_loss: 0.8233
Epoch 4/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4668 - val_loss: 0.8152
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4562 - val_loss: 0.8014
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4461 - val_loss: 0.7711
Epoch 7/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4343 - val_loss: 0.7451
Epoch 8/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4219 - val_loss: 0.7378
Epoch 9/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4052 - val_loss: 0.7326
Epoch 10/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3966 - val_loss: 0.7254
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3827 - val_loss: 0.6696
Epoch 12/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3677 - val_loss: 0.6417
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3635 - val_loss: 0.6530
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3589 - val_loss: 0.6484
Epoch 15/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3533 - val_loss: 0.6398
Epoch 16/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3515 - val_loss: 0.6390
Epoch 17/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3465 - val_loss: 0.6773
Epoch 18/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3478 - val_loss: 0.6617
Epoch 19/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3435 - val_loss: 0.6309
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3411 - val_loss: 0.6424
Epoch 21/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3369 - val_loss: 0.6385
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3368 - val_loss: 0.6333
Epoch 23/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3327 - val_loss: 0.6246
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3286 - val_loss: 0.6169
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3284 - val_loss: 0.6511
Epoch 26/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3256 - val_loss: 0.6127
Epoch 27/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3235 - val_loss: 0.6114
```

```
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3209 - val_loss: 0.6063
Epoch 29/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3173 - val_loss: 0.6065
Epoch 30/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3157 - val_loss: 0.5749
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3124 - val_loss: 0.5767
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3126 - val_loss: 0.5948
Epoch 33/100
50/50 [==============================] - 2s 42ms/step - loss: 0.3082 - val_loss: 0.5589
Epoch 34/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3055 - val_loss: 0.5558
Epoch 35/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3017 - val_loss: 0.5654
Epoch 36/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3065 - val_loss: 0.5426
Epoch 37/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2993 - val_loss: 0.5403
Epoch 38/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2986 - val_loss: 0.5279
Epoch 39/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2980 - val_loss: 0.5458
Epoch 40/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2942 - val_loss: 0.5482
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2948 - val_loss: 0.5435
Epoch 42/100
50/50 [==============================] - 2s 35ms/step - loss: 0.2906 - val_loss: 0.5176
Epoch 43/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2924 - val_loss: 0.5178
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2882 - val_loss: 0.5203
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2890 - val_loss: 0.5231
Epoch 46/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2858 - val_loss: 0.5072
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2872 - val_loss: 0.5017
Epoch 48/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2852 - val_loss: 0.4937
Epoch 49/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2838 - val_loss: 0.4939
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2867 - val_loss: 0.4952
Epoch 51/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2806 - val_loss: 0.4839
Epoch 52/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2829 - val_loss: 0.5066
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2808 - val_loss: 0.4945
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2783 - val_loss: 0.4779
```

```
Epoch 55/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2804 - val_loss: 0.4818
Epoch 56/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2790 - val_loss: 0.4915
Epoch 57/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2760 - val_loss: 0.4898
Epoch 58/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2773 - val_loss: 0.4912
Epoch 59/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2760 - val_loss: 0.4848
Epoch 60/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2762 - val_loss: 0.4862
Epoch 61/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2723 - val_loss: 0.4910
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2759 - val_loss: 0.4888
Epoch 63/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2709 - val_loss: 0.4892
Epoch 64/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2723 - val_loss: 0.4835
Epoch 65/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2714 - val_loss: 0.4705
Epoch 66/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2698 - val_loss: 0.4792
Epoch 67/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2701 - val_loss: 0.4809
Epoch 68/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2698 - val_loss: 0.4798
Epoch 69/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2679 - val_loss: 0.4911
Epoch 70/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2680 - val_loss: 0.4640
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2670 - val_loss: 0.4668
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2661 - val_loss: 0.4710
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2647 - val_loss: 0.4673
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2645 - val_loss: 0.4616
Epoch 75/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2653 - val_loss: 0.4732
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2610 - val_loss: 0.4714
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2614 - val_loss: 0.4768
Epoch 78/100
50/50 [==============================] - 2s 38ms/step - loss: 0.2608 - val_loss: 0.4626
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2611 - val_loss: 0.4737
Epoch 80/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2580 - val_loss: 0.4737
Epoch 81/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2587 - val_loss: 0.4522
```

```
Epoch 82/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2557 - val_loss: 0.4718
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2593 - val_loss: 0.4671
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2538 - val_loss: 0.4616
Epoch 85/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2534 - val_loss: 0.4712
Epoch 86/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2551 - val_loss: 0.4608
Epoch 87/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2493 - val_loss: 0.4702
Epoch 88/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2530 - val_loss: 0.4597
Epoch 89/100
50/50 [==============================] - 3s 56ms/step - loss: 0.2517 - val_loss: 0.4634
Epoch 90/100
50/50 [==============================] - 3s 52ms/step - loss: 0.2519 - val_loss: 0.4567
Epoch 91/100
50/50 [==============================] - 2s 41ms/step - loss: 0.2495 - val_loss: 0.4619
Epoch 92/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2495 - val_loss: 0.4532
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2504 - val_loss: 0.4597
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.2486 - val_loss: 0.4661
Epoch 95/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2474 - val_loss: 0.4613
Epoch 96/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2466 - val_loss: 0.4565
Epoch 97/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2490 - val_loss: 0.4606
Epoch 98/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2464 - val_loss: 0.4627
Epoch 99/100
50/50 [==============================] - 2s 36ms/step - loss: 0.2456 - val_loss: 0.4672
Epoch 100/100
50/50 [==============================] - 2s 39ms/step - loss: 0.2466 - val_loss: 0.4573
```

Model Loss WI_1

Simple LSTM Model for WI_1
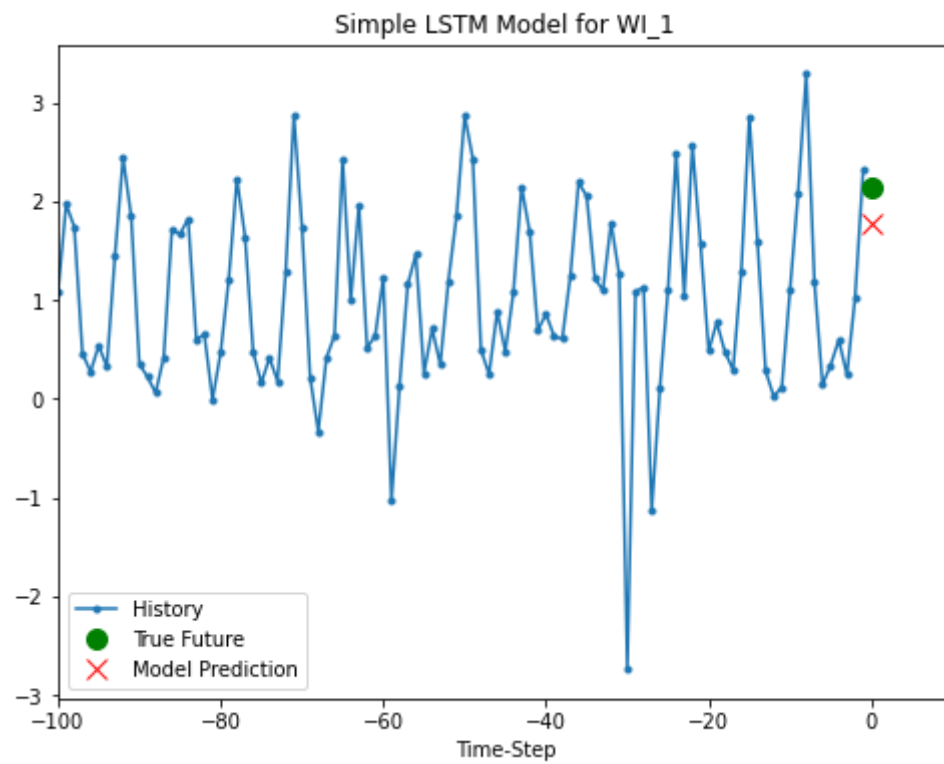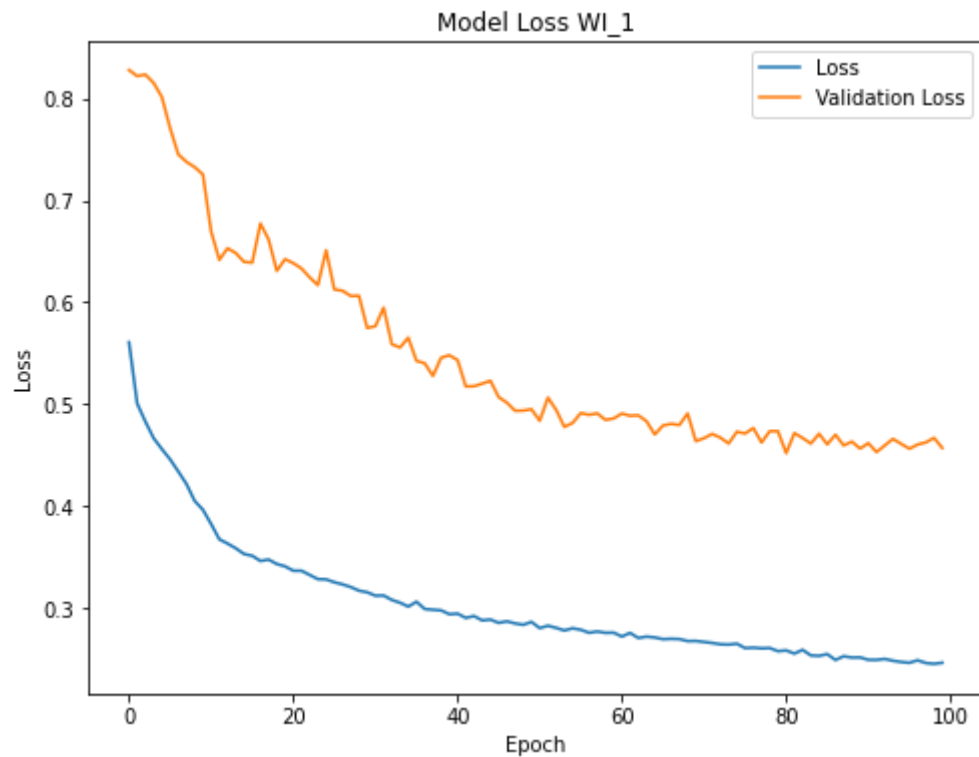
WI_1 - True Future: 4600
WI_1 - Model Prediction: 4250
WI_1 - Model Percentage Error: 7.61%
====================================
====================================

Training Model for WI_2...

```
Epoch 1/100
50/50 [==============================] - 2s 43ms/step - loss: 0.4611 - val_loss: 0.8171
Epoch 2/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4003 - val_loss: 0.7753
Epoch 3/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3884 - val_loss: 0.7484
Epoch 4/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3862 - val_loss: 0.7342
Epoch 5/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3828 - val_loss: 0.7256
Epoch 6/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3797 - val_loss: 0.7426
Epoch 7/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3807 - val_loss: 0.7434
Epoch 8/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3786 - val_loss: 0.7640
Epoch 9/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3802 - val_loss: 0.7438
Epoch 10/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3755 - val_loss: 0.7465
Epoch 11/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3738 - val_loss: 0.7826
Epoch 12/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3734 - val_loss: 0.7780
Epoch 13/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3679 - val_loss: 0.8124
Epoch 14/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3648 - val_loss: 0.8325
Epoch 15/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3583 - val_loss: 0.8442
Epoch 16/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3597 - val_loss: 0.8547
Epoch 17/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3543 - val_loss: 0.8784
Epoch 18/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3521 - val_loss: 0.9039
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3480 - val_loss: 0.9155
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3478 - val_loss: 0.8785
Epoch 21/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3433 - val_loss: 0.8946
Epoch 22/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3415 - val_loss: 0.8719
Epoch 23/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3400 - val_loss: 0.8280
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3358 - val_loss: 0.8273
Epoch 25/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3337 - val_loss: 0.8084
Epoch 26/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3337 - val_loss: 0.8204
Epoch 27/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3311 - val_loss: 0.8050
```

```
Epoch 28/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3314 - val_loss: 0.8224
Epoch 29/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3273 - val_loss: 0.8449
Epoch 30/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3278 - val_loss: 0.7741
Epoch 31/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3285 - val_loss: 0.8228
Epoch 32/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4261 - val_loss: 0.7696
Epoch 33/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3654 - val_loss: 0.7357
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3531 - val_loss: 0.7619
Epoch 35/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3481 - val_loss: 0.8073
Epoch 36/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3397 - val_loss: 0.8503
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3428 - val_loss: 0.8628
Epoch 38/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3355 - val_loss: 0.8388
Epoch 39/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3314 - val_loss: 0.8254
Epoch 40/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3274 - val_loss: 0.8305
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3275 - val_loss: 0.8388
Epoch 42/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3305 - val_loss: 0.8344
Epoch 43/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3237 - val_loss: 0.8672
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3230 - val_loss: 0.8458
Epoch 45/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3233 - val_loss: 0.8552
Epoch 46/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3245 - val_loss: 0.8145
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3285 - val_loss: 0.8423
Epoch 48/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3432 - val_loss: 0.7989
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3224 - val_loss: 0.8498
Epoch 50/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3191 - val_loss: 0.8318
Epoch 51/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3184 - val_loss: 0.8459
Epoch 52/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3247 - val_loss: 0.7922
Epoch 53/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3190 - val_loss: 0.8448
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3325 - val_loss: 0.8184
```

```
Epoch 55/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3791 - val_loss: 0.7180
Epoch 56/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3457 - val_loss: 0.7493
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3338 - val_loss: 0.7910
Epoch 58/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3343 - val_loss: 0.8030
Epoch 59/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3287 - val_loss: 0.8200
Epoch 60/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3260 - val_loss: 0.7906
Epoch 61/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3420 - val_loss: 0.8058
Epoch 62/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3210 - val_loss: 0.7938
Epoch 63/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3184 - val_loss: 0.8430
Epoch 64/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3130 - val_loss: 0.8382
Epoch 65/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3145 - val_loss: 0.8379
Epoch 66/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3139 - val_loss: 0.8423
Epoch 67/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3124 - val_loss: 0.8283
Epoch 68/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3118 - val_loss: 0.8207
Epoch 69/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3102 - val_loss: 0.8393
Epoch 70/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3720 - val_loss: 0.6238
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3862 - val_loss: 0.6071
Epoch 72/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3852 - val_loss: 0.6089
Epoch 73/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3841 - val_loss: 0.6372
Epoch 74/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3836 - val_loss: 0.6176
Epoch 75/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3835 - val_loss: 0.6196
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3832 - val_loss: 0.6297
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3833 - val_loss: 0.6334
Epoch 78/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3804 - val_loss: 0.6479
Epoch 79/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3811 - val_loss: 0.6522
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3804 - val_loss: 0.6527
Epoch 81/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3808 - val_loss: 0.6421
```

```
Epoch 82/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3798 - val_loss: 0.6491
Epoch 83/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3770 - val_loss: 0.6471
Epoch 84/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3800 - val_loss: 0.6582
Epoch 85/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3772 - val_loss: 0.6688
Epoch 86/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3771 - val_loss: 0.6936
Epoch 87/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3782 - val_loss: 0.6766
Epoch 88/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3755 - val_loss: 0.6908
Epoch 89/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3776 - val_loss: 0.6713
Epoch 90/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3756 - val_loss: 0.6944
Epoch 91/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3747 - val_loss: 0.6813
Epoch 92/100
50/50 [==============================] - 2s 39ms/step - loss: 0.3766 - val_loss: 0.6960
Epoch 93/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3724 - val_loss: 0.6893
Epoch 94/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3746 - val_loss: 0.7117
Epoch 95/100
50/50 [==============================] - 2s 40ms/step - loss: 0.3728 - val_loss: 0.7236
Epoch 96/100
50/50 [==============================] - 2s 38ms/step - loss: 0.3731 - val_loss: 0.6925
Epoch 97/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3737 - val_loss: 0.7145
Epoch 98/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3699 - val_loss: 0.7165
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3708 - val_loss: 0.7151
Epoch 100/100
50/50 [==============================] - 2s 41ms/step - loss: 0.3716 - val_loss: 0.7079
```

Model Loss WI_2

Simple LSTM Model for WI_2
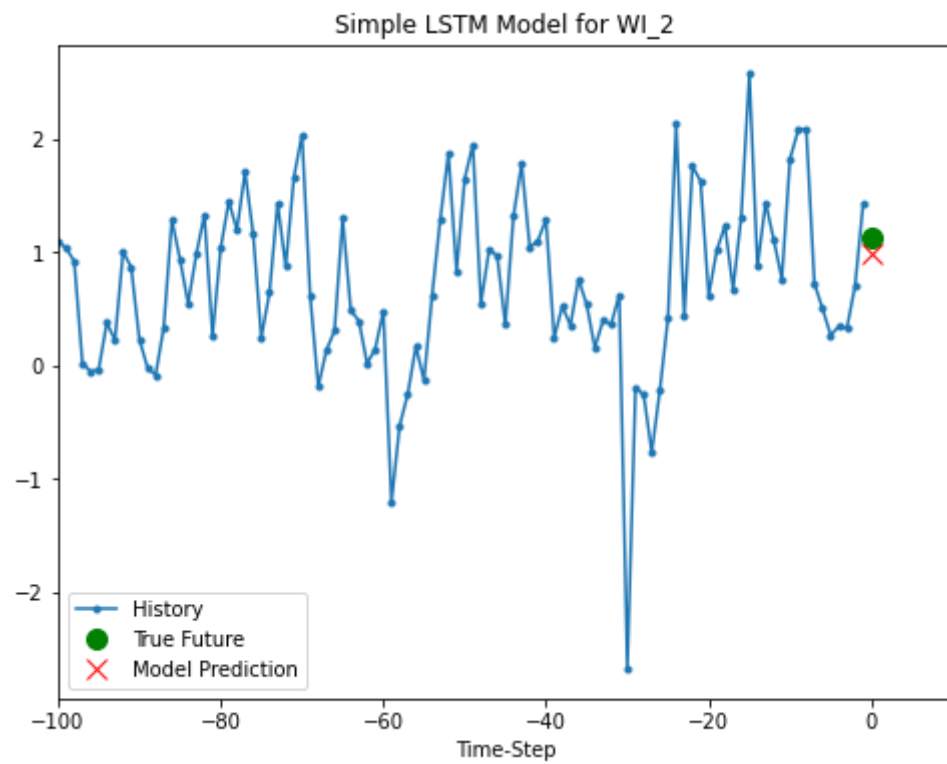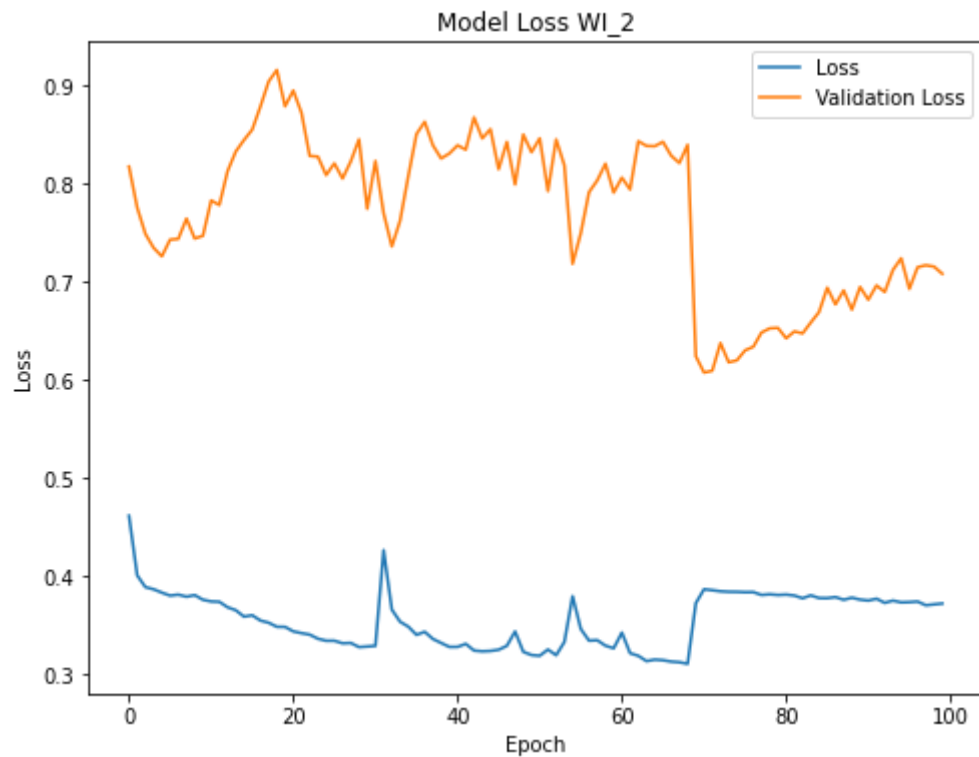
WI_2 - True Future: 4670
WI_2 - Model Prediction: 4494
WI_2 - Model Percentage Error: 3.77%
===================================
===================================

Training Model for WI_3...

```
Epoch 1/100
50/50 [==============================] - 2s 42ms/step - loss: 0.7151 - val_loss: 0.8196
Epoch 2/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6684 - val_loss: 0.8238
Epoch 3/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6562 - val_loss: 0.8140
Epoch 4/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6430 - val_loss: 0.8100
Epoch 5/100
50/50 [==============================] - 2s 39ms/step - loss: 0.6370 - val_loss: 0.7776
Epoch 6/100
50/50 [==============================] - 2s 38ms/step - loss: 0.6155 - val_loss: 0.7526
Epoch 7/100
50/50 [==============================] - 2s 36ms/step - loss: 0.6045 - val_loss: 0.7266
Epoch 8/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5925 - val_loss: 0.7190
Epoch 9/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5878 - val_loss: 0.7082
Epoch 10/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5787 - val_loss: 0.7017
Epoch 11/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5776 - val_loss: 0.6837
Epoch 12/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5745 - val_loss: 0.6815
Epoch 13/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5733 - val_loss: 0.6824
Epoch 14/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5692 - val_loss: 0.6647
Epoch 15/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5634 - val_loss: 0.6632
Epoch 16/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5681 - val_loss: 0.6591
Epoch 17/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5585 - val_loss: 0.6557
Epoch 18/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5627 - val_loss: 0.6420
Epoch 19/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5557 - val_loss: 0.6440
Epoch 20/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5541 - val_loss: 0.6360
Epoch 21/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5526 - val_loss: 0.6316
Epoch 22/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5458 - val_loss: 0.6322
Epoch 23/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5472 - val_loss: 0.6282
Epoch 24/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5430 - val_loss: 0.6224
Epoch 25/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5424 - val_loss: 0.6243
Epoch 26/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5405 - val_loss: 0.6163
Epoch 27/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5357 - val_loss: 0.6123
```

```
Epoch 28/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5332 - val_loss: 0.6061
Epoch 29/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5376 - val_loss: 0.6059
Epoch 30/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5332 - val_loss: 0.6072
Epoch 31/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5325 - val_loss: 0.6086
Epoch 32/100
50/50 [==============================] - 2s 38ms/step - loss: 0.5265 - val_loss: 0.6010
Epoch 33/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5264 - val_loss: 0.5955
Epoch 34/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5254 - val_loss: 0.5909
Epoch 35/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5296 - val_loss: 0.5890
Epoch 36/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5202 - val_loss: 0.5975
Epoch 37/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5242 - val_loss: 0.5851
Epoch 38/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5173 - val_loss: 0.5789
Epoch 39/100
50/50 [==============================] - 2s 35ms/step - loss: 0.5191 - val_loss: 0.5815
Epoch 40/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5176 - val_loss: 0.5758
Epoch 41/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5134 - val_loss: 0.5709
Epoch 42/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5085 - val_loss: 0.5628
Epoch 43/100
50/50 [==============================] - 2s 39ms/step - loss: 0.5136 - val_loss: 0.5621
Epoch 44/100
50/50 [==============================] - 2s 36ms/step - loss: 0.5034 - val_loss: 0.5467
Epoch 45/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5033 - val_loss: 0.5428
Epoch 46/100
50/50 [==============================] - 2s 37ms/step - loss: 0.5026 - val_loss: 0.5287
Epoch 47/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4950 - val_loss: 0.5234
Epoch 48/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4918 - val_loss: 0.5216
Epoch 49/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4929 - val_loss: 0.5168
Epoch 50/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4890 - val_loss: 0.5069
Epoch 51/100
50/50 [==============================] - 2s 40ms/step - loss: 0.4908 - val_loss: 0.5035
Epoch 52/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4858 - val_loss: 0.5089
Epoch 53/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4835 - val_loss: 0.5030
Epoch 54/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4815 - val_loss: 0.4936
```

```
Epoch 55/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4827 - val_loss: 0.4829
Epoch 56/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4810 - val_loss: 0.4854
Epoch 57/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4760 - val_loss: 0.4813
Epoch 58/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4739 - val_loss: 0.5027
Epoch 59/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4733 - val_loss: 0.4731
Epoch 60/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4695 - val_loss: 0.4816
Epoch 61/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4720 - val_loss: 0.4694
Epoch 62/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4680 - val_loss: 0.4671
Epoch 63/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4634 - val_loss: 0.4644
Epoch 64/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4695 - val_loss: 0.4604
Epoch 65/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4617 - val_loss: 0.4588
Epoch 66/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4610 - val_loss: 0.4565
Epoch 67/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4591 - val_loss: 0.4592
Epoch 68/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4572 - val_loss: 0.4551
Epoch 69/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4569 - val_loss: 0.4628
Epoch 70/100
50/50 [==============================] - 2s 35ms/step - loss: 0.4532 - val_loss: 0.4625
Epoch 71/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4547 - val_loss: 0.4559
Epoch 72/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4507 - val_loss: 0.4647
Epoch 73/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4515 - val_loss: 0.4575
Epoch 74/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4434 - val_loss: 0.4619
Epoch 75/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4421 - val_loss: 0.4546
Epoch 76/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4427 - val_loss: 0.4624
Epoch 77/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4350 - val_loss: 0.4452
Epoch 78/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4305 - val_loss: 0.4386
Epoch 79/100
50/50 [==============================] - 2s 37ms/step - loss: 0.4292 - val_loss: 0.4528
Epoch 80/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4257 - val_loss: 0.4405
Epoch 81/100
50/50 [==============================] - 2s 35ms/step - loss: 0.4218 - val_loss: 0.4438
```

```
Epoch 82/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4194 - val_loss: 0.4405
Epoch 83/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4168 - val_loss: 0.4629
Epoch 84/100
50/50 [==============================] - 2s 35ms/step - loss: 0.4164 - val_loss: 0.4477
Epoch 85/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4147 - val_loss: 0.4430
Epoch 86/100
50/50 [==============================] - 2s 39ms/step - loss: 0.4129 - val_loss: 0.4212
Epoch 87/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4078 - val_loss: 0.4271
Epoch 88/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4092 - val_loss: 0.4502
Epoch 89/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4030 - val_loss: 0.4431
Epoch 90/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4060 - val_loss: 0.4262
Epoch 91/100
50/50 [==============================] - 2s 36ms/step - loss: 0.4056 - val_loss: 0.4176
Epoch 92/100
50/50 [==============================] - 2s 38ms/step - loss: 0.4025 - val_loss: 0.4510
Epoch 93/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3989 - val_loss: 0.4259
Epoch 94/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3991 - val_loss: 0.4216
Epoch 95/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3960 - val_loss: 0.4435
Epoch 96/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3914 - val_loss: 0.4465
Epoch 97/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3895 - val_loss: 0.4374
Epoch 98/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3885 - val_loss: 0.4615
Epoch 99/100
50/50 [==============================] - 2s 37ms/step - loss: 0.3863 - val_loss: 0.4464
Epoch 100/100
50/50 [==============================] - 2s 36ms/step - loss: 0.3858 - val_loss: 0.4205
```

Model Loss WI_3

Simple LSTM Model for WI_3
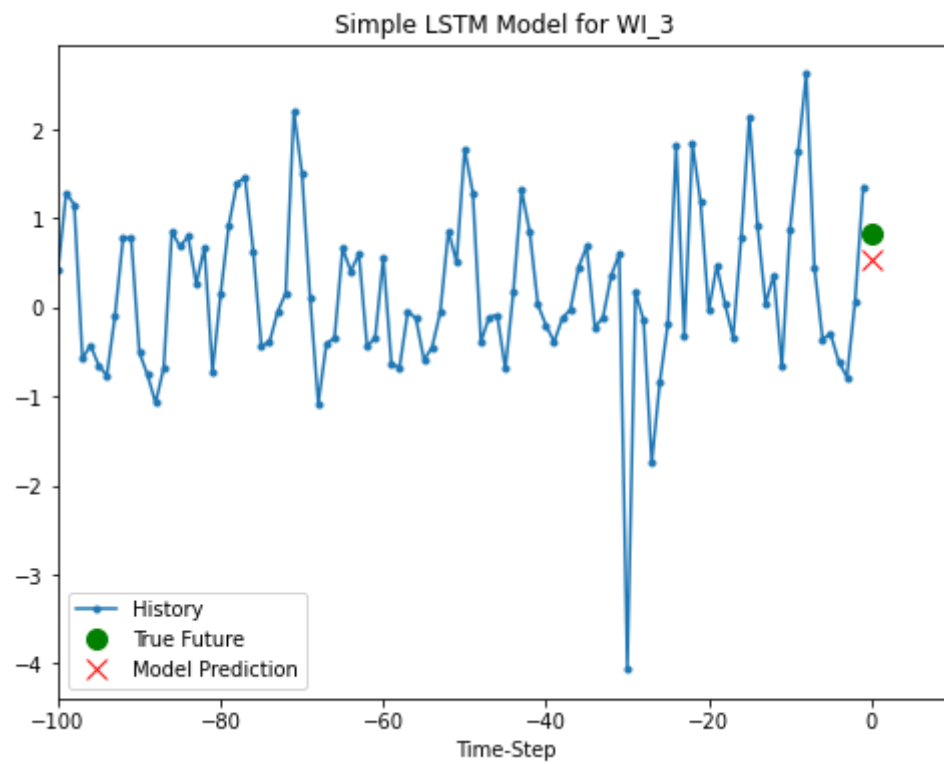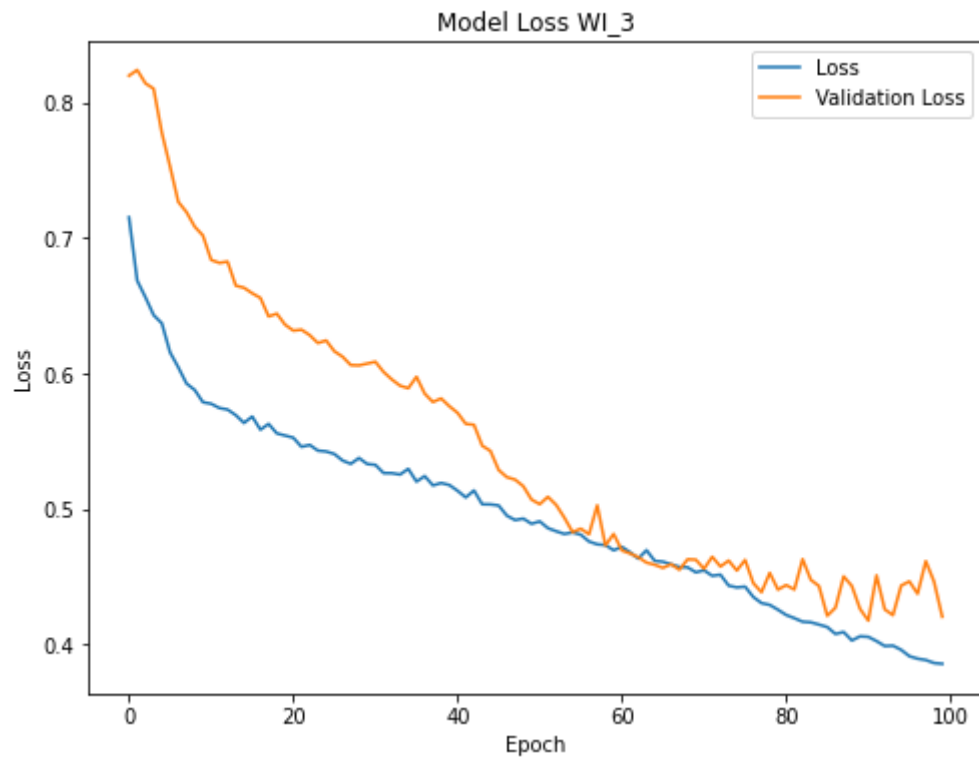
WI_3 - True Future: 3998
WI_3 - Model Prediction: 3765
WI_3 - Model Percentage Error: 5.83%
===================================
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