

# Hopping Window Oil Prices Assignment Report

I have implemented a basic application that reads crude oil prices from a CSV file and implements a hopping window over it to calculate and visualize the mean and maximum values for the window. The data contains crude oil prices for West Texas Intermediate from Cushing, Oklahoma.

I set the configurations for the window size as 5 and hop size as 2. This makes the calculations as follows:

$$\text{Window Mean} = \frac{(\text{Price}(n-2) + \text{Price}(n-1) + \text{Price}(n) + \text{Price}(n+1) + \text{Price}(n+2))}{5}$$

$$\text{Window Max} = \text{Max}(\text{Price}(n-2), \text{Price}(n-1), \text{Price}(n), \text{Price}(n+1), \text{Price}(n+2))$$

The application runs over the data and calculates the mean and max using the hopping window logic at each point. The result looks as follows:

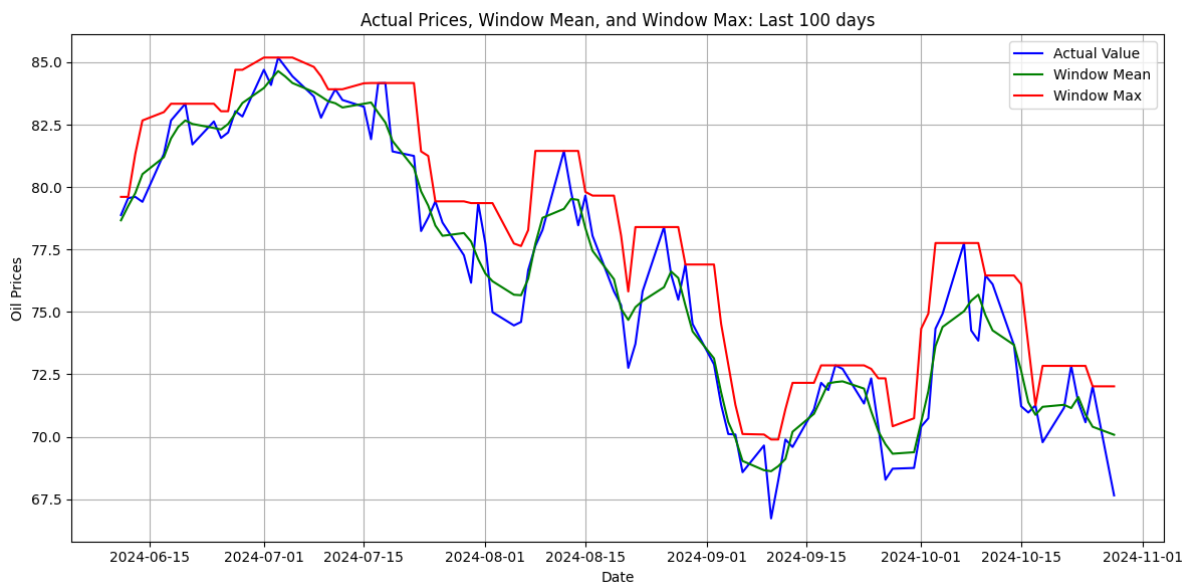
	DATE	DCOILWTICO	WINDOW_MEAN	WINDOW_MAX
0	2019-10-28	55.60	55.26	55.60
1	2019-10-29	55.34	54.95	55.60
2	2019-10-30	54.85	55.17	56.04
3	2019-10-31	54.02	55.32	56.33
4	2019-11-01	56.04	55.66	57.04
...	...	...	...	...
1301	2024-10-22	72.84	71.15	72.84
1302	2024-10-23	71.37	71.59	72.84
1303	2024-10-24	70.58	70.89	72.84
1304	2024-10-25	72.02	70.40	72.02
1305	2024-10-28	67.65	70.08	72.02

As we can see, it has calculated the mean and max values at each point within the window appropriately.

We further plotted the time-series graph with the oil price, window mean, and window max values.



To get a better view of how the windows work, I also plotted the data for the last 100 days.



As we can see in the above image, there is a clear distinction in the actual values against the window mean and window max values, while retaining the original graph trends.