

# Analyzing Forex Market Trends and L/S strategy on GBP/USD and USD/JPY

Data Engineering Final project

**MG-GY 8411** 

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### **Data Collection and Procession**

#### 1. Data information

Currency pair: EUR/USD, GBP/CHF, USD/CAD, EUR/CHF, EUR/CAD, GBP/EUR, GBP/USD, GBP/CAD, USD/CHF, USD/JPY

Data Fetching Frequency: Fetch every second, and set 6 minutes as a loop, repeat 50 loops (5 hours) to classify 8 currency pairs. Based on GBP/USD and USD/JPY, simulate long and short trends to evaluate the performance and profitability in next 3 hours.

#### 1. Data Storage

Collections: Each currency pair has its own collection in MongoDB.

Classification currency pairs in classification\_results.csv

#### 1. Data Analysis

Using function 'insert\_forex\_data\_and\_calculate\_stats' get Mean, Max, Min, and Volatility
Using 'calculate\_keltner\_bands' and 'calc\_fd' function get upper and lower Keltner bands and Fractal Dimension
Regression and classification part:

Using 'create\_synth\_pair' function get average value of mean, max, min, vol and fd for 40th and 50th loop Using 'run\_pycaret\_experiment' function get best model at 40th and 50th loop

Using 'calculate\_mae\_for\_currency\_pairs' get the MAE

Long/Short strategy on GBP/USD and USD/JPY:

Using 'analyze\_slope\_for\_pairs' function get the slope of GBP/USD and USD/JPY



# Use real-time data from Polygon and PyCaret for the regression & classification

Load and AggregateData:
 After fetch 40th and 50th loops of real time currency pairs, get latest 20 data points.

Get the average value of mean, max, min, vol and fd. Store into MongoDB 'synth pair stats'

- Model Building with PyCaret:
   Using the aggregate data, set target is mean value.
   Automatically filter the best models with PyCaret.
- Get value MAE to classify CPs:
   Use selected model get predicted mean value.
   Using predicted mean value and real mean value get MAE.
   Sort the mae, the three smallest are forecastable. Next 2 currency pairs are undefined. Others are non forecastable.
- Conclusion for classification: GBP/USD: forecastable USD/JPY: non forecastable

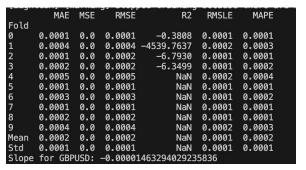


## L/S strategy on GBPUSD and USDJPY

- Choose the Long and Short CPs:
   Using last 20 data points (2 hours) and get slope based on PyCaret
   Slope for GBPUSD: -0.000014, Slope for USDJPY: -0.00027
   Long position: GBPUSD, Short position: USDJPY
- Adjusted initial trade to balance the ratio to 1: \$50 for long and short, divide by 100 on USDJPY to simplify Initial rate for GBPUSD: 1.255010, USDJPY: 152.9180 Long 39.840320 units of GBPUSD and short 2683.4899 units of USDJPY
- 3. Hour 6, 7 and 8 ratio:

Hour 6: GBPUSD to USDJPY ratio: 1.2187216742, Profit Hour 7: GBPUSD to USDJPY ratio: 1.2169976626, Profit Hour 8: GBPUSD to USDJPY ratio: 1.2169976626, Profit

	initial	6th hour	7th hour	8th hour	Total	
P&L	0	0.2187%	0.2169%	0.2169%	0.6525%	
P&L			0.2169%	0.2169%	0.4338%	
P&L				0.2169%	0.2169%	
Total		0.2187%	0.4338%	0.65%	1.3032%	



	MAE	MSE	RMSE	R2	RMSLE	MAPE				
Fold										
0	0.0004	0.0	0.0004	-3.5785	0.0002	0.0003				
1	0.0006	0.0	0.0006	-17250.6952	0.0002	0.0004				
2	0.0007	0.0	0.0009	-1.0296	0.0004	0.0004				
3	0.0002	0.0	0.0002	-0.0103	0.0001	0.0002				
4	0.0002	0.0	0.0002	NaN	0.0001	0.0001				
5	0.0004	0.0	0.0004	NaN	0.0002	0.0003				
6	0.0003	0.0	0.0003	NaN	0.0001	0.0002				
7	0.0002	0.0	0.0002	NaN	0.0001	0.0001				
8	0.0003	0.0	0.0003	NaN	0.0001	0.0002				
9	0.0004	0.0	0.0004	NaN	0.0001	0.0002				
Mean	0.0004	0.0	0.0004	NaN	0.0002	0.0002				
Std	0.0002	0.0	0.0002	NaN	0.0001	0.0001				
Slope for USDJPY: -0.00027282039324442526										
Long position: GBPUSD, Short position: USDJPY										

