Mid-Project Review - XchangeRatePredictor

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Highlights

- Findings from Analysis
  - The source API has a method which allows a date range to get the historic exchange rates. This method also provides rates for a base currency against different currencies in a single call. This means that multiple API calls are not needed to fetch daily exchange rate data.
  - Exploratory data analysis indicates that data cleaning is not required .
  - There are no exchange rates for holidays/weekends and such dates should be ignored.
- Modelling
  - Different ARIMA configurations were compared for USD-INR, USD-GBP and USD-EUR.
  - Best parameters were evaluated based on Mean Absolute Percentage Error.

Review Progress

- EC2 instance was successfully set up
- S3 bucket created
- The API for fetching exchange rate data is being called successfully and the source data is being stored in S3.
- RDS instance is setup
- Database schema created to store the ARIMA configuration for the best models from training

Demo – Results from the API call


```
{
  "base": "USD",
  "rates": {
    "2018-05-31": {
      "BGN": 1.6717668177,
      "NZD": 1.4258483631,
      "ILS": 3.5738097273,
      "RUB": 62.0359859817,
      "CAD": 1.2854090093,
      "USD": 1.0,
      "PHP": 52.5745790238,
      "CHF": 0.9852124113,
      "AUD": 1.3175485084,
      "JPY": 108.8383622532,
      "TRY": 4.4985041457,
      "HKD": 7.848363108,
      "MYR": 3.9799982905,
      "HRK": 6.3142148902,
      "CZK": 22.0506026156,
      "IDR": 13907.0005983417,
      "DKK": 6.3625950936,
      "NOK": 8.1524061886,
      "HUF": 272.5788528934,
      "GBP": 0.7494657663,
      "MXN": 19.8701598427,
      "THB": 32.0300880417,
      "ISK": 105.0517138217,
      "ZAR": 12.5678263099,
      "BRL": 3.7290366698,
      "SGD": 1.3382340371,
      "PLN": 3.6804855116,
      "INR": 67.3578938371,
      "KRW": 1078.0835968886,
      "RON": 3.9753825113,
      "CNY": 6.4066159501,
      "SEK": 8.7770749637,
      "EUR": 0.8547739123
    },
    "2019-01-14": {
      "BGN": 1.7055899538,
      "NZD": 1.4668178251,
      "ILS": 3.6578878521,
      "RUB": 67.2017092526,
      "CAD": 1.3278102381,
      "USD": 1.0,
      "PHP": 52.2473183919,
      "CHF": 0.9817737856,
```

Demo – ARIMA Model Evaluation

- The ARIMA models were compared with:
  - Training period: 2016-04-15 to 2019-04-04
  - Forecasting/evaluation period: 2019-04-05 to 2019-04-15
- MAPE Values for different ARIMA configurations:

P	D	Q	MAPE_INR	MAPE_EUR	MAPE_GBP
1	1	0	0.002546	0.005044	0.003415
0	1	0	0.002520	0.005117	0.003481
0	1	1	0.002548	0.005042	0.003399
2	1	0	0.002570	0.005109	0.002974
0	1	2	0.002531	0.005105	0.002937

- Best configuration for USD-INR: P = 0, D = 1, Q = 0
- Best configuration for USD-EUR: P = 0, D = 1, Q = 1
- Best configuration for USD-GBP: P = 0, D = 1, Q = 2

Lessons Learnt

- Logging:
  - Helps to debug things quickly.
  - It is more efficient to have logging built in along with the functional aspects of the code rather than including it later.
- Configurations
  - Just like logging, it helps to build configurations from the start rather than hard coding them in.
- The initial effort/time estimates can vary a lot from actuals if you are not familiar with the technology.

Recommendations

- Following stories should be picked up for the next sprint:
  - Compare different ARIMA configurations to evaluate the best models for each currency pair
  - Store the parameters for the best models in RDS database
  - Forecast the future exchange rates based on best models