Exchange Rate Forecasting

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Project Background:

Nowadays, with more and more international students pursue their degrees in the U.S., foreign currency exchange rates play a more and more important role in students' lives. But not all of them have the idea that whether the exchange rates go up or down in the near future.

With the process of globalization, a lot more business people involve the international trading. Those people need to pay attention to exchange rates in order to decide to make payment right away or later, and hedge risk or not. Meanwhile, more and more people would like to have a taste of different culture. Thus, they must exchange their money to the local currency of their travel destination.

Moreover, many traders, especially individual traders, normally use their experience and intuition to beat the market in FOREX. However, intuition is not always reliable.

Knowing the trend of the exchange rates will not only help students and travelers save money from currency float, but also help businessmen to control risk and make profit, and individual traders to perform better in FOREX.

With modern technologies, such as machine learning algorithm and statistical models, we believe that predicting the trend of exchange rates for a short period shouldn't be mission impossible.

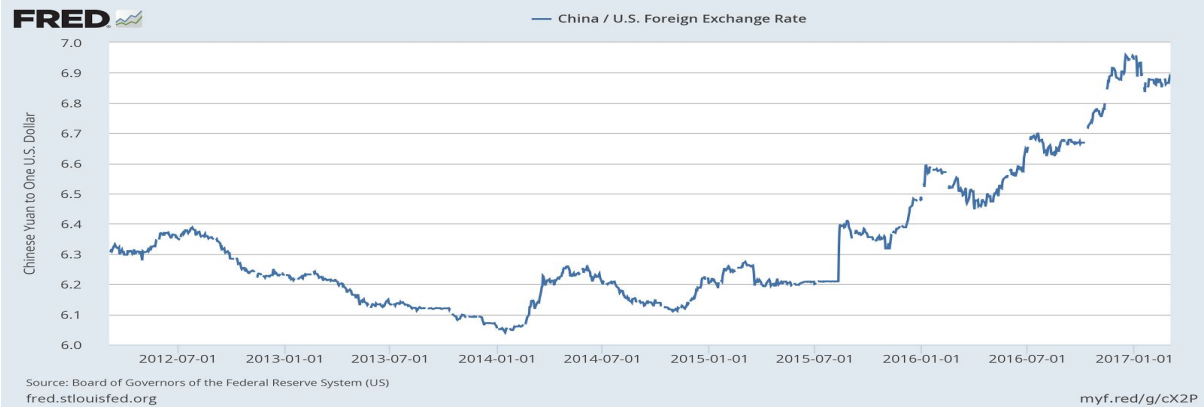
Project Description:

Our project will use machine learning algorithms and statistical models to predict the trend of currency exchange rates, which will help our audience: international students, foreign travelers, business people and traders to have a basic idea how the exchange rates will change in short term.

To illustrate our idea, we will focus on CNY to USD rate prediction in this project.

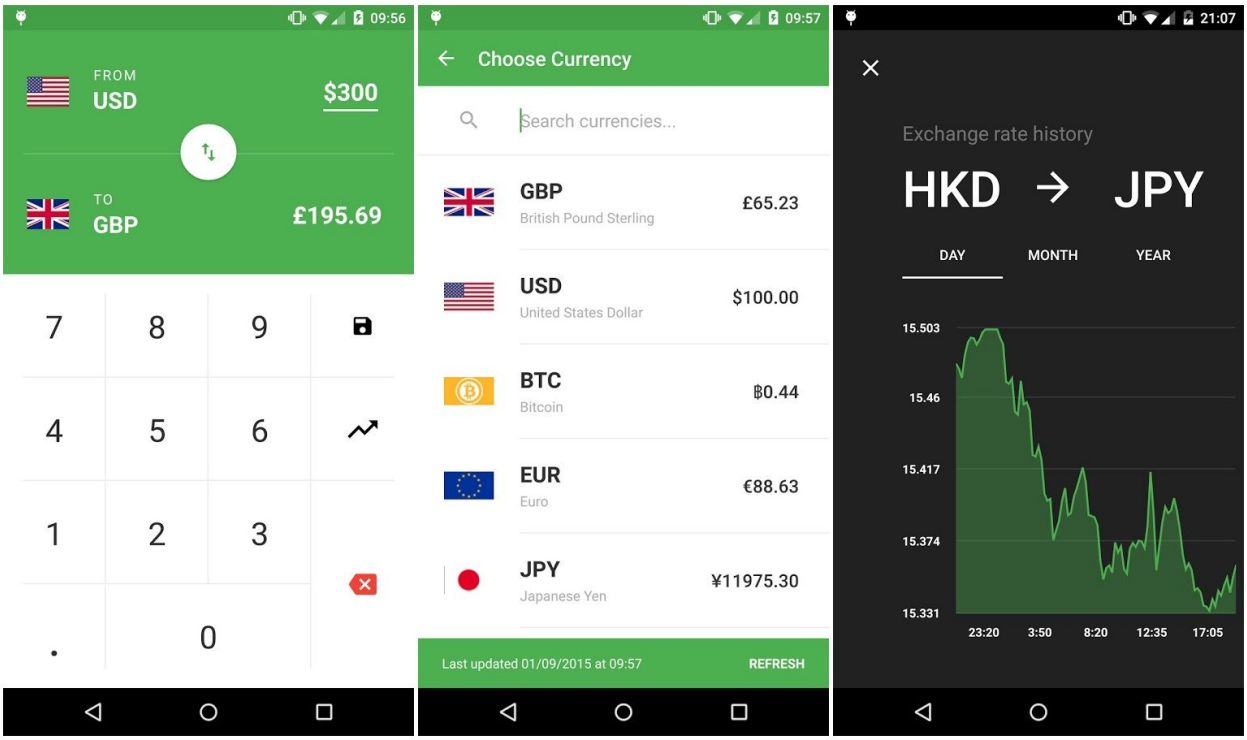
-Tools: Python, Swift, Xcode. Matlab and R (not sure yet)

-Data: We obtain the exchange rate data from FRED ECONOMIC DATA (https://fred.stlouisfed.org/series/DEXCHUS) and also Yahoo Finance. Here is the graph of last 5 years exchange rate:

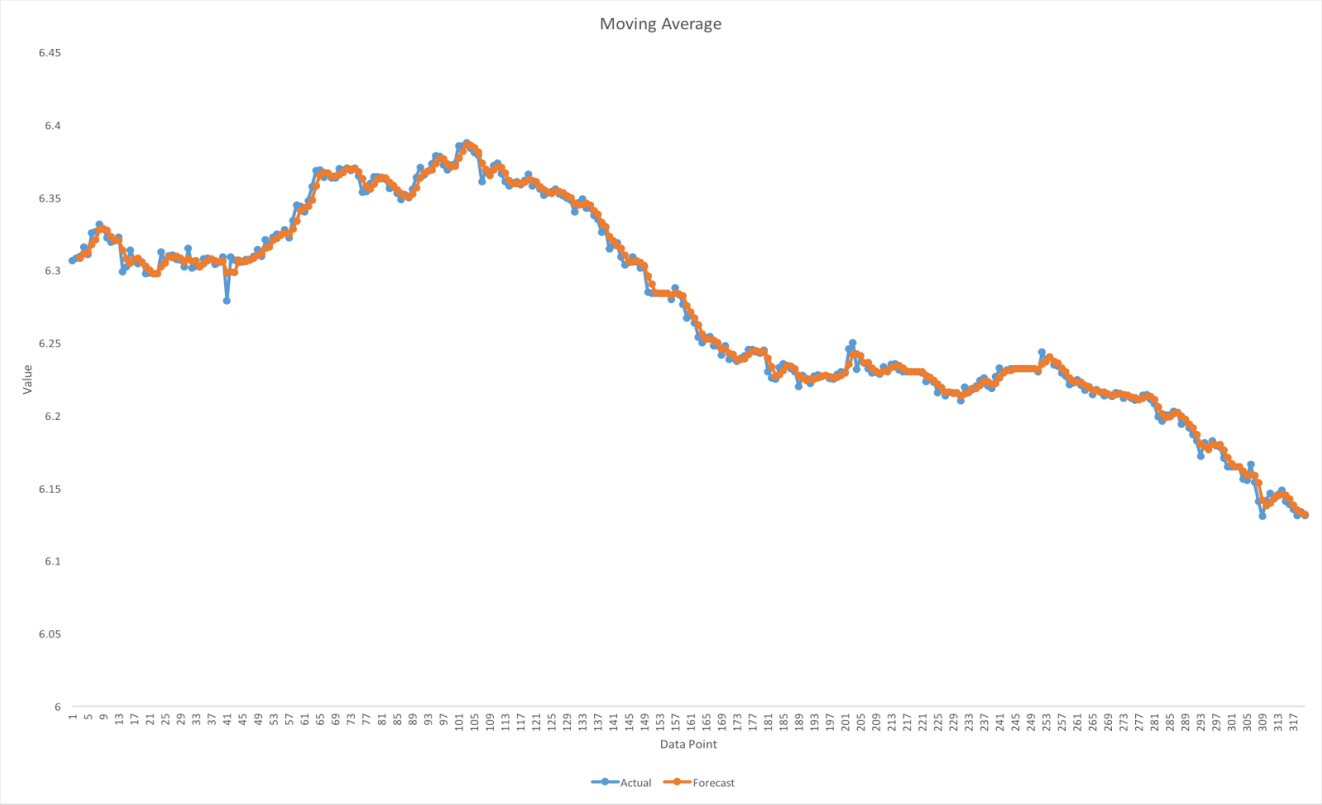


-Algorithms: based on our research, the models that we will use includes but not limited to Support Vector Regression (SVR), Least Absolute Shrinkage and Selection Operator (LASSO) and Bayesian Additive Regression Trees (BART), ARIMA and its derivatives, and Neural Network.

-Realization: we may develop an iOS app to present our idea and let users interact with it.



-Simulate: to illustrate our idea, we used data from the website listed above to simulate the forecasting process. Here, we chose a simple statistic model: moving average(MA), to forecast 2012-2013 currency exchange rate trend. If the rate (CNY to USD) is above the moving average, we expect it will fall in the future. Thus, we shall wait and then change CNY to USD to save money. In the other case, if the rate is below the moving average, we expect it will go up in the future, we should do the exchange as soon as possible.



Reference:

Daniya Tlegenova, Forecasting Exchange Rates Using Time Series Analysis: The sample of the currency of Kazakhstan
https://arxiv.org/abs/1508.07534

Theophilos Papadimitriou, Forecasting the NOK/USD Exchange Rate with Machine Learning Techniques
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2387710

Eleftherios Soulas, Online Machine Learning Algorithms For Currency Exchange Prediction

http://www.cs.nyu.edu/media/publications/TR2013-953.pdf

Peter G. Zhang, Time Series Forecasting Using a Hybrid ARIMA and Neural Network Model

Project Challenge:

-Model may not work. Based on our research, long term forecasting is impossible due to stochastic process of the market. Plus, external factors, such as politics or economic policies (especially black swan events), have a great impact on FOREX. Therefore, choose a reasonable period to predict is a challenge.

-No app development experience. Both of us don't have any app development experience right now. The app design and programming would be a big challenge for us.

Project Timeline:

03/09: Proposal Due
03/09-03/30: Learning iOS development
03/30-04/20: Training the model and test the model.
04/20-05/04: Improve it recursively.