Our group made use of the data we got from the database provided and created a forecast model for JPY/USD using Exponential Smoothing. Which then a smoothened trend that is used to find the derivatives of the series was made using LOESS, a method that tunes down extreme data points that may occur due to systematic errors, but when the market really drops, the model will still react and notice the trend in order to take action.

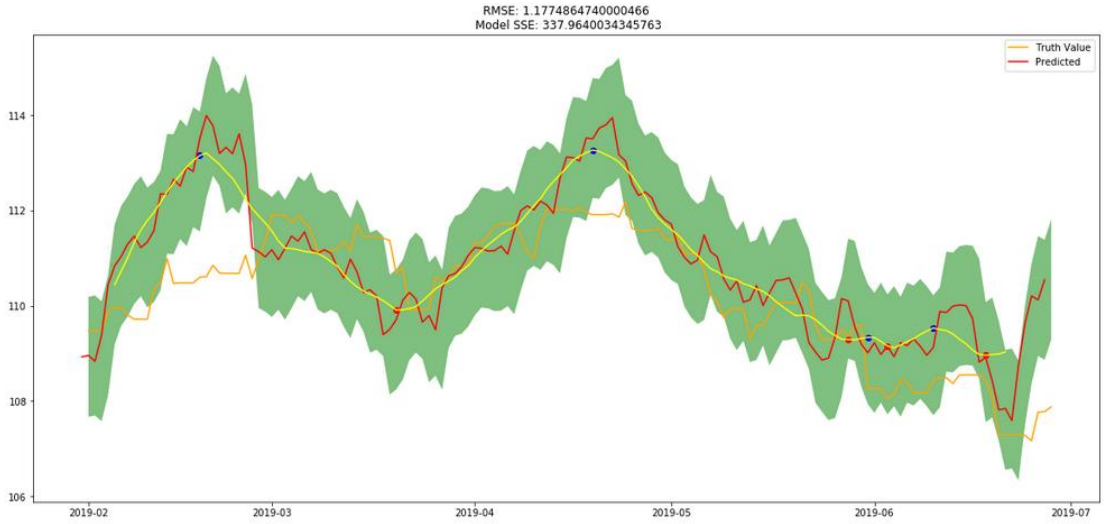

Fig. 2) a predicted line (red) and a smoothened line (yellow) from 2019 Feb to Jun.

A part of the dataset (Feb to Jun) were used to evaluate our model, and we acquired a model that can nicely fit the testing set, the Root Mean Squared Error from the Real Value is just 1.18.

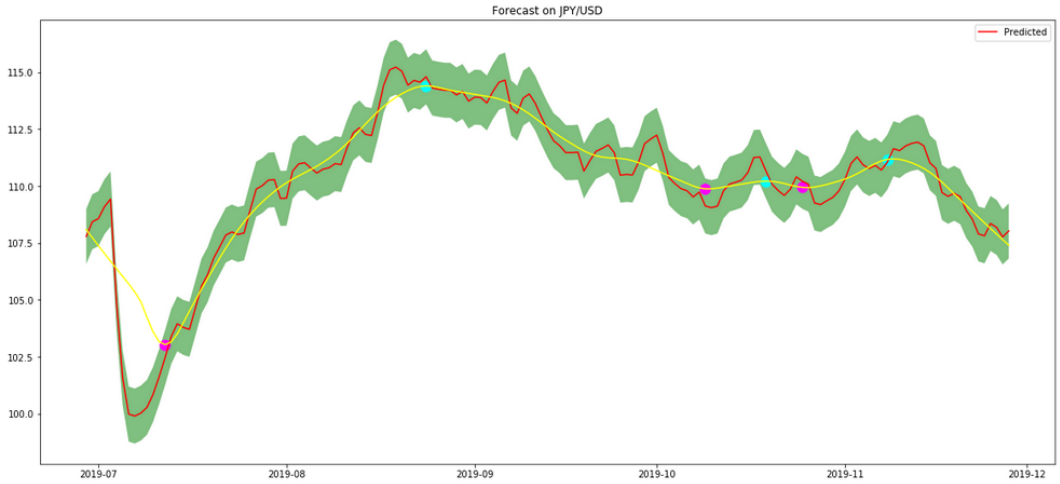

Fig. 2) a predicted line (red) and a smoothened line (orange) from 2019 July to Nov.

Then we used the model to know exactly at which point (blue and pink dot) to sell or buy FX forward/option. As being a seller, a forward contract may suffer unlimited loss, we decided to use FX option to do a sell option when It reaches the blue dot. For example, an option is placed on selling USD for JPY on the highest blue dot on fig.2.

Although we cannot model the trend perfectly due to constraints in the amount the data, but the model can predict trends relatively well. So, we will choose to place an option when we have at least 95% confidence that it will go down. Although a premium fee is needed in order to place an option, it is always better to protect ourselves from a chance of unlimited loss if an unfortunate event ever happened, therefore durations are also calculated to prevent exactly that from happening.

When we are confident that the FX will go up, we will put a forward as no extra fee is charged when an order is placed. Also, we will predict how long is the upward/downward trend and we will last. If the trend lasts for less 7 days, we will do nothing as it is just a short-term fluctuation. And if it is longer than 90 days (3 months) we will just buy for 3 months to maximize profit. And here is the result of when we should buy or sell forward/option. Suggested points on placing the order is also predicted, so the model can be automated easily if needed.

	DATE_TRADE	TYPE_TRADE	ESTM_TURNPT	ESTM_ENDPT	ESTM_EARNING	DURATION(DAYS)
0	2019-07-12	FX_FOWARD	102.4664231	114.8046861	12.33826298	43
1	2019-08-24	FX_OPTION	114.8046861	109.1246956	5.679990469	46
2	2019-10-09	FX_FOWARD	109.1246956	110.6618175	1.537121942	10
3	2019-10-25	FX_FOWARD	110.2085815	111.0519687	0.843387126	14

Fig. 3) Predicted trade actions using the model as shown in Fig. 2)