Forecasting Currency Exchange Rate

Team 3:
Sri Mourya Dommeti
Vishaka Balasubramanian Sekar
Nithin Vasudevan
Mose Yoloye

Agenda

- Background
- Goals
- Data & Set-up
- Results
- Conclusions & Future Recommendations
- Demo

Background

- Forecasting forex values can help in making :
    - hedging decisions,
    - Short-term & long term financing decisions,
    - investment decisions,
    - capital budgeting decisions
- There are several economic and machine learning approaches
    - Purchasing Power Parity
    - Econometric Models
    - Time Series Model

- We thought a hybrid model would be a better approach
- Consider possible models : RNN, EMD+RNN and ARIMA

Goal

- Hybrid approach - EMD + RNN
- This model is compared with
  - Raw RNN
  - ARIMA
- Evaluate suitability for long term and short term .

The Data & Set up

- USD/INR Exchange rate data from Quandl.com
- Data from April 2010 - March 2017, as excel sheets , imported to R Studio

Inputs

- RNN & EMD + RNN: 1500 days of historical USD/INR exchange rates
- ARIMA: 100 days of data historical USD/INR exchange rates
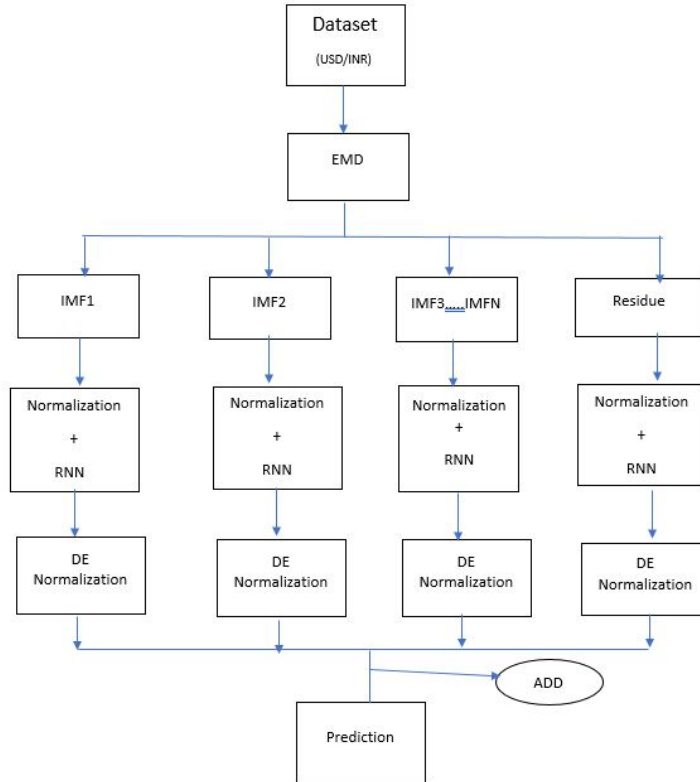
Outputs

- **For each of RNN , EMD + RNN and ARIMA model :**
- Predicted future values in window sizes = 1 day, 10 , 15, 50 and 75 days
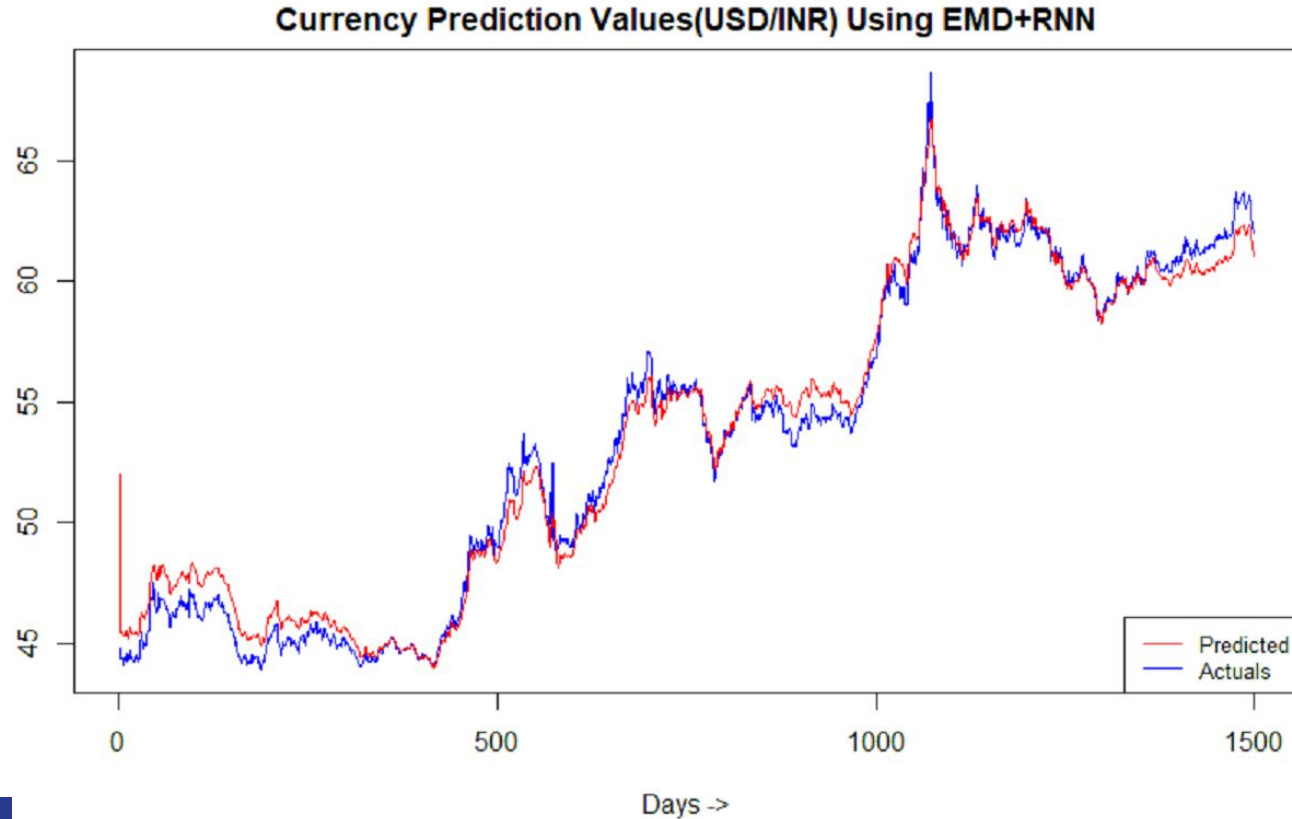- Plotted graphs, calculated root mean square error
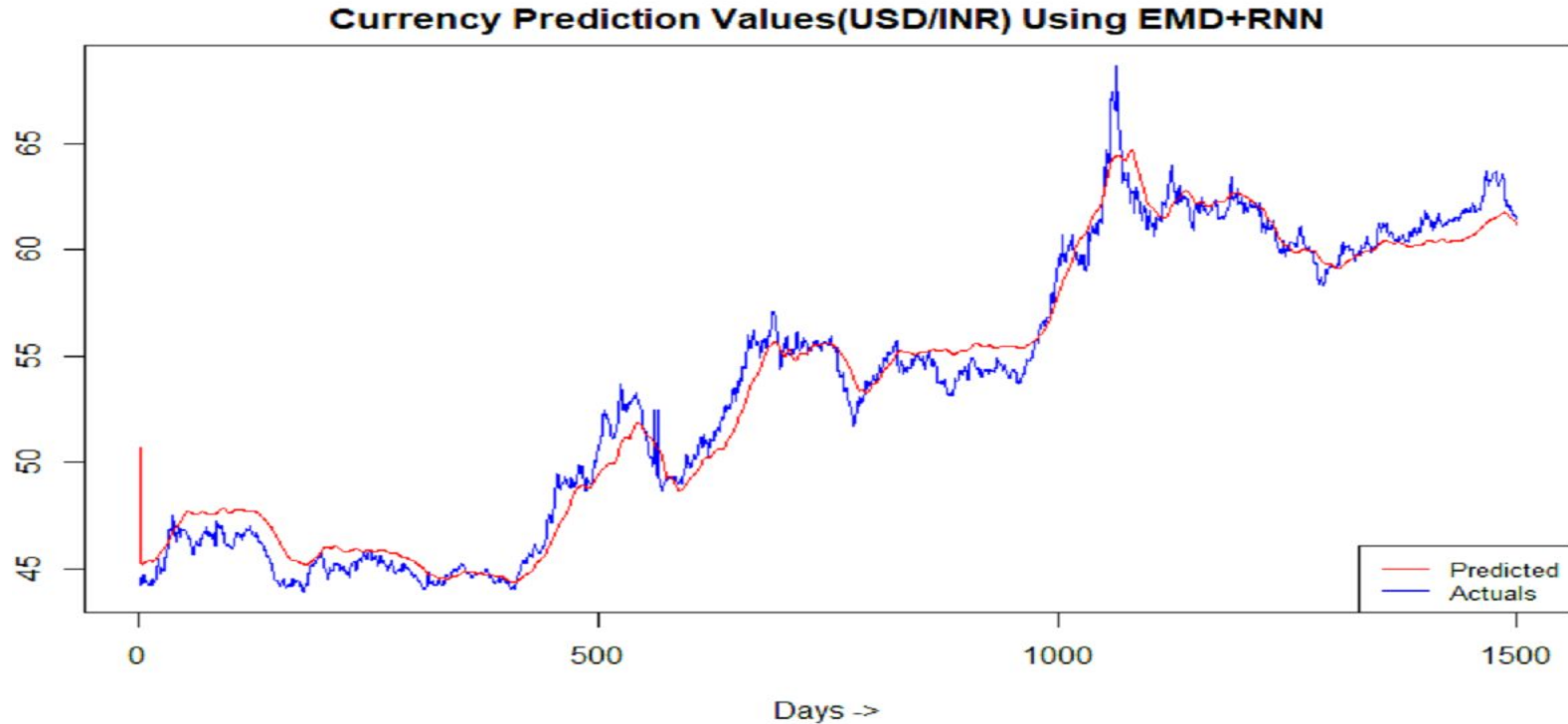
Methodology RNN
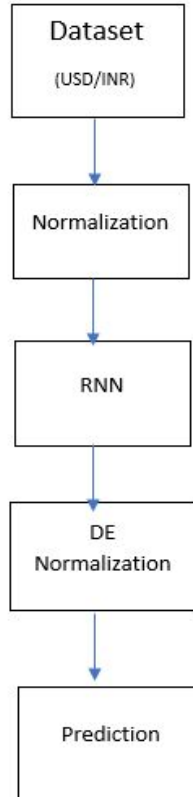
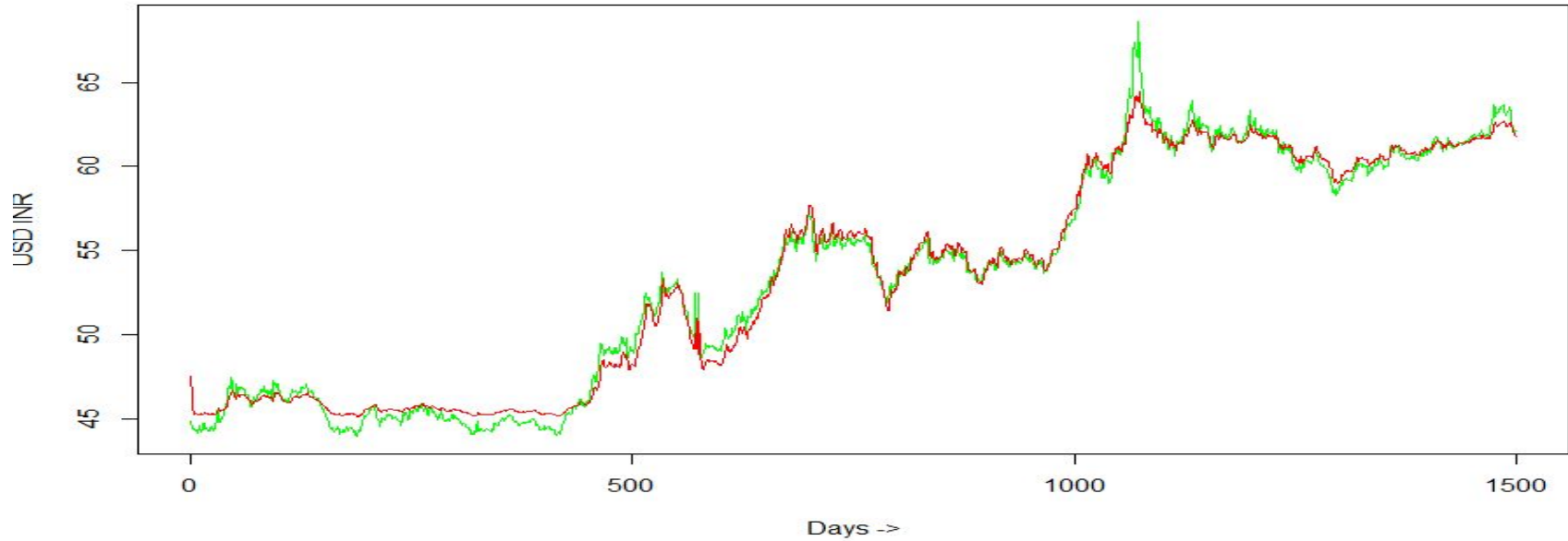# Methodology : EMD +RNN

Results: RNN + EMD (Window size = 1 day)

Currency Prediction Values(USD/INR) Using EMD+RNN

Results : RNN + EMD (Window size = 100 days)

Currency Prediction Values(USD/INR) Using EMD+RNN

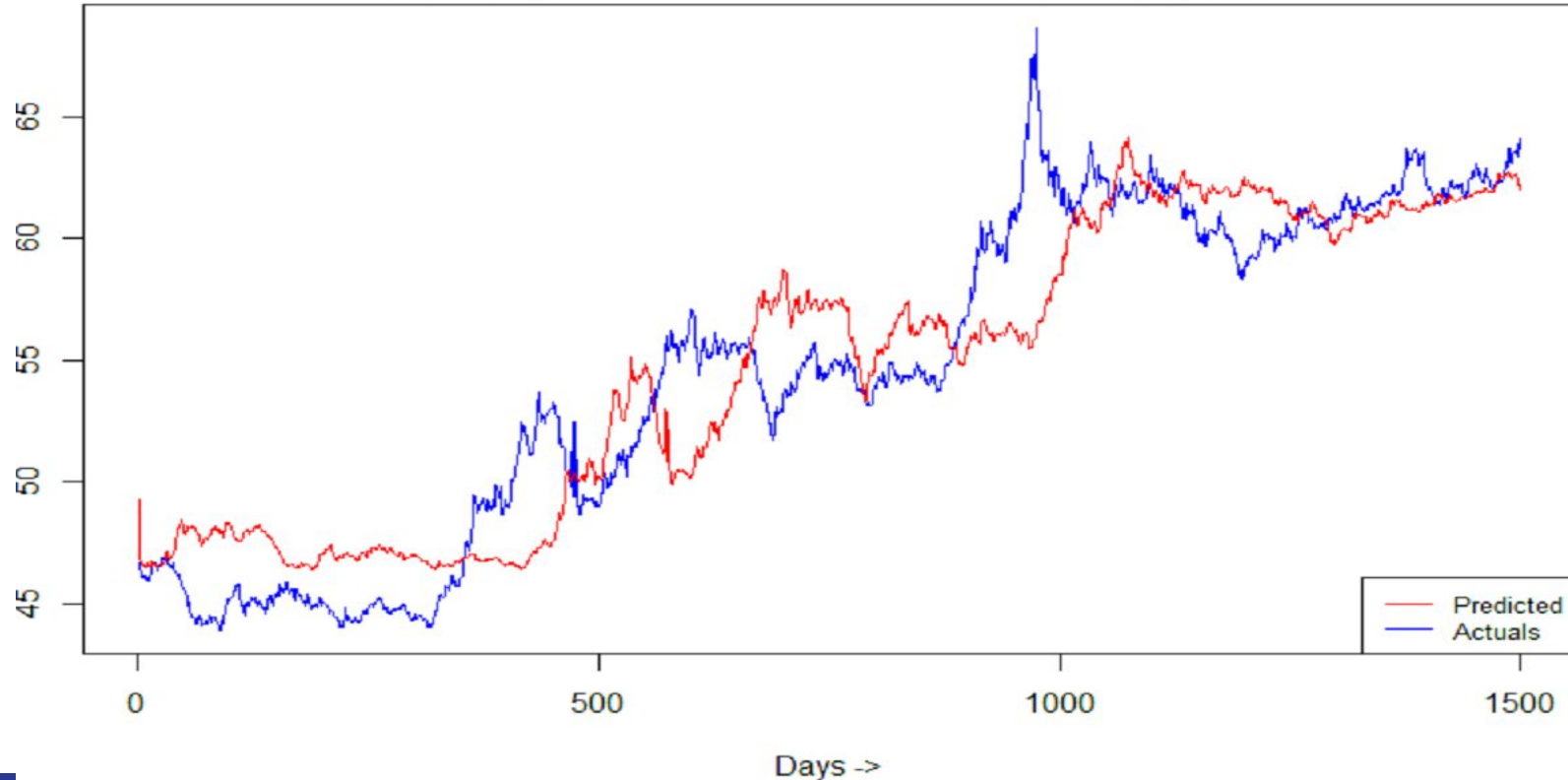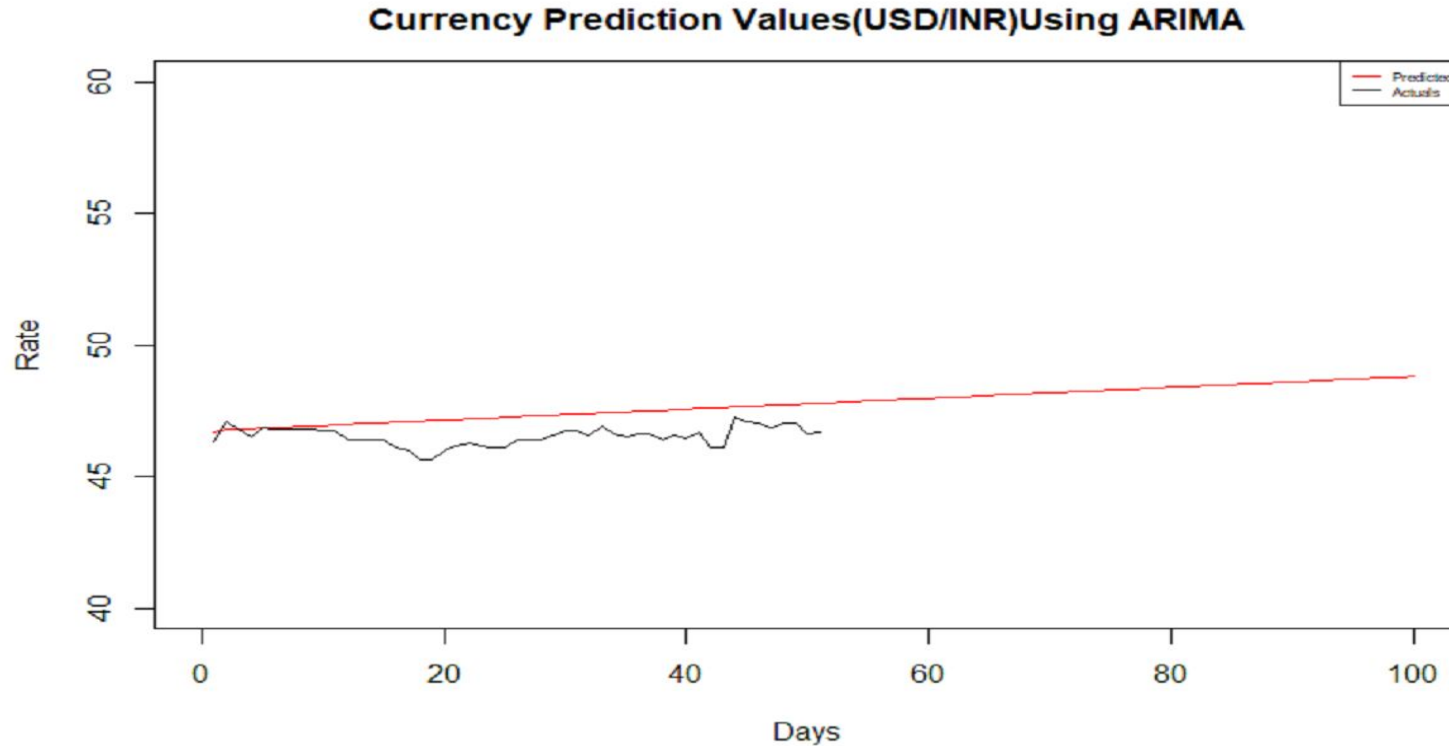# Results : RNN (Window size = 1 day)

Results: RNN (Window Size = 100 day)

Currency Prediction Values(USD/INR) Using RNN

Results : ARIMA (Window size = 100 days)

Currency Prediction Values(USD/INR)Using ARIMA

Analysis : RMSE (Root Mean Square Error)

Model Name	Dataset Size	Root mean Square Error (RMSE) for Prediction window of					
		1 day	10days	15days	50days	75days	100days
EMD+RNN	1500 days Historical Currency Rates	0.7	0.9	1.1188	1.708996	1.73	1.825113
RNN	1500 days Historical Currency Rates	0.6586	0.9947	1.261028	1.99738	2.3752	2.727316
ARIMA	100 days Historical Currency Rates	1.47	1.47	1.47	1.47	1.47	1.47

Conclusion & Future Recommendations

- EMD + RNN model was the best among the other chosen models which are Raw RNN and ARIMA for long term prediction

- **Performance : RNN + EMD > RNN > ARIMA**

Possible Future Work :

- Training the RNN model for a short term prediction
- Training ARIMA for large datasets

Demo

Questions?

Thank You!