

SCSE20047- Evolving Deep Fuzzy Ensemble Network (EDFE) with application in ETF index Trading

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Objectives

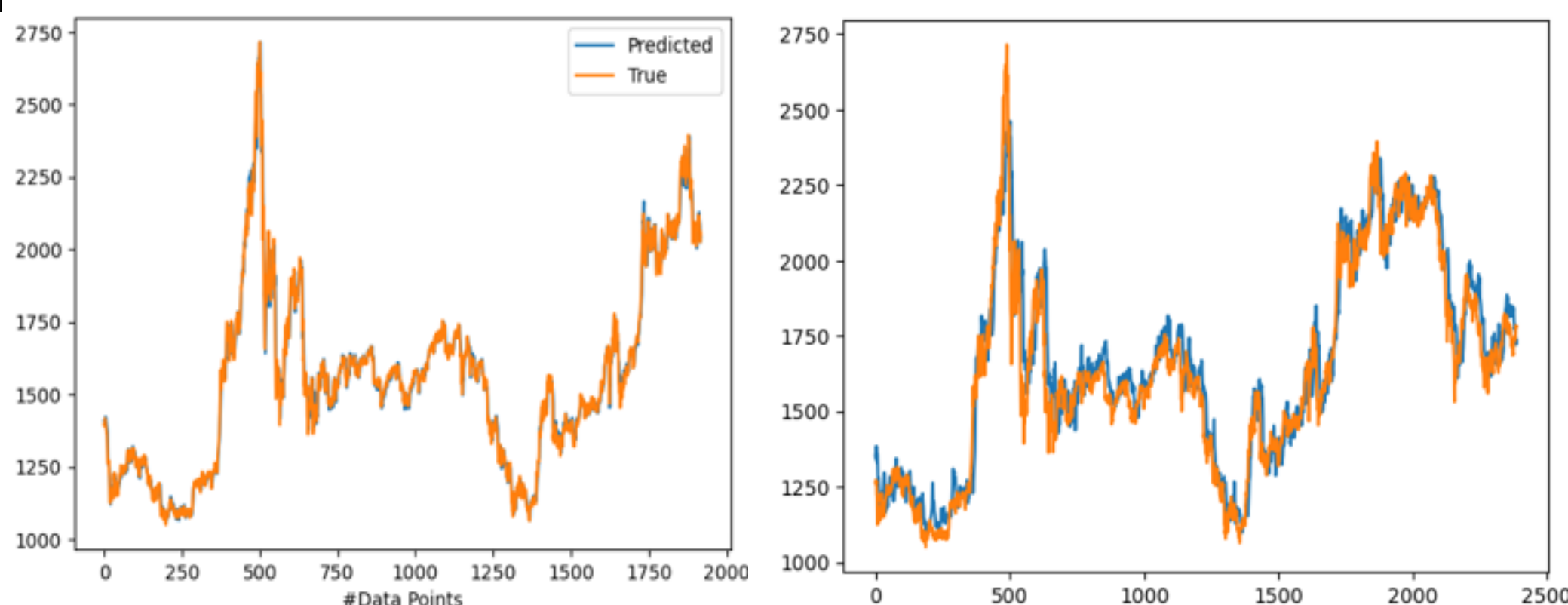
This project proposes an Evolving Deep Fuzzy Ensemble Network (EDFE) that uses ensemble learning to incorporate the strengths of a Fuzzy Inference System and Deep Neural Network to provide highly accurate predictions. By using stacking, a meta-model is able to take the outputs of the two base models as inputs to increase the accuracy of either models prediction. These predictions will then be used to calculate financial indicators to reduce the impact of inaccuracy in prediction and to generate trading signals for a trading algorithm.

Model and Model Flow

The base models for the ensemble network are the Dynamic Evolving neural-fuzzy inference system (DENFIS) and deep LSTM model. The ensemble network uses a feed forward neural network as a final meta-model for predicting output.

1. Data is retrieved and undergoes feature engineering
2. Data will be fed to each model
3. Outputs of the model will be merged and fed to a meta-model
4. Meta-model makes final prediction and produces the output for the ensemble network

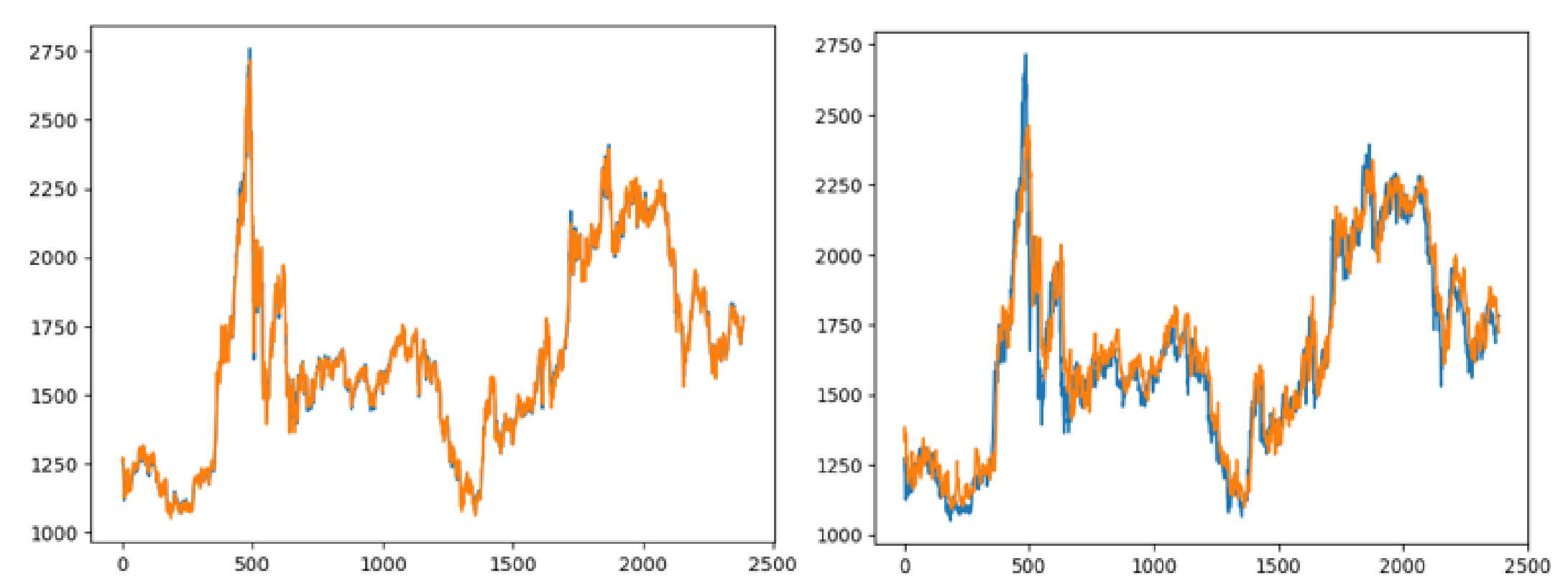
Base Model Prediction Result



DENFIS Model Prediction

LSTM Model Prediction

Ensemble Network Prediction Result



T+1 Prediction

T+3 Prediction

Prediction result

	DENFIS	LSTM	EDFE
RMSE	32.61	100.41	16.42
R^2	0.987	0.910	0.997

Trading

Strategy	Return (10 year)
Buy and Hold	32.5%
Vanilla MACD	59.0%
Predicted MACD	99.6%
Predicted EMA MACD Crossover	125.4%