SRI RAMAKRISHNA ENGINEERING COLLEGE

WELLS FARGO QUANTITATIVE AI HACKATHON

GEOMAPS

[ED02179]

MEMBERS:

MENTOR:

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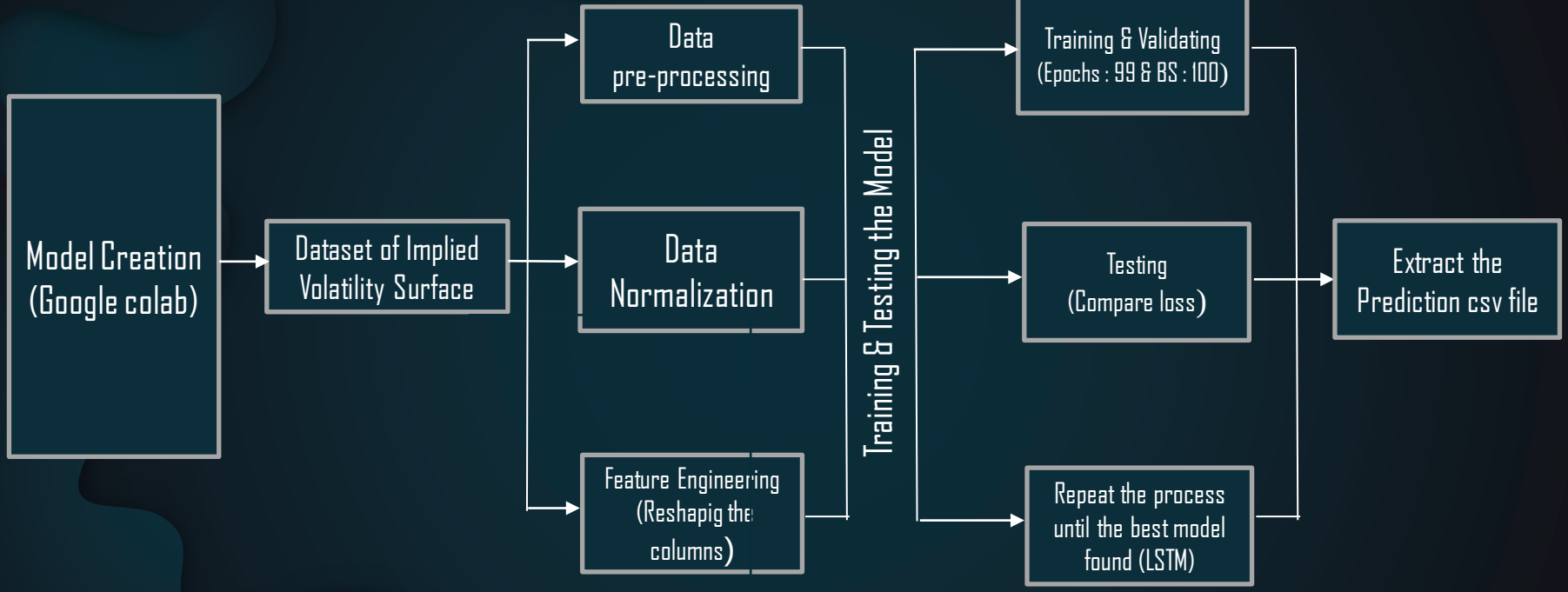
Model Implied Volatility Surface Dynamics using AI/ML techniques

PROPOSED MEDIUM

- Using of AI & Deep learning to predict the IV's.
- Segregated the csv file into a trainable format
- Reshaped the Strike columns in the dataframe (Dimensionality Reduction).
- Model : [Conv1D + LSTM + Dropout Dense +].
- Dataframe plot & Loss plot are visualized.

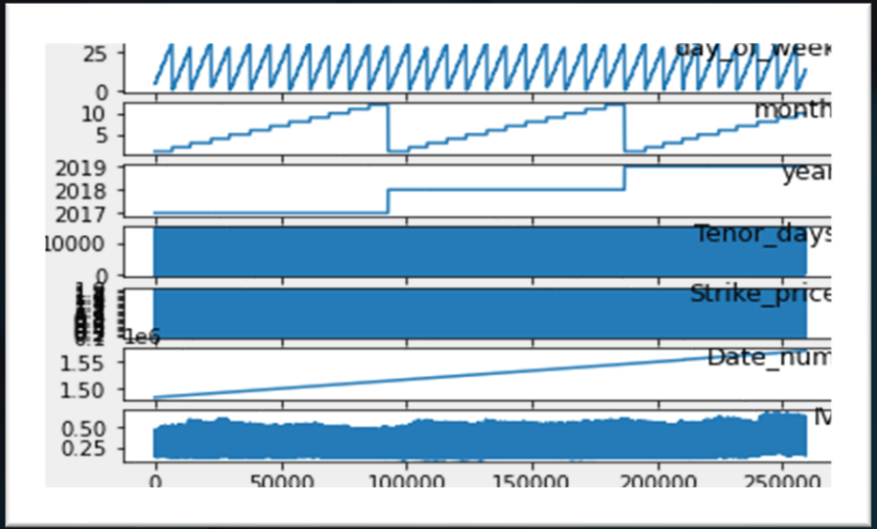
BLOCK DIAGRAM – MACHINE LEARNING MODEL




```
rmse = sqrt(mean_squared_error(inv_y, inv_yhat))
print('Test RMSE: %.3f' % rmse)
```

RMSE VALUE ===➔ :

```
Test RMSE: 0.086
```



<<< DATAFRAME PLOT

TRAINING DATASET >>>

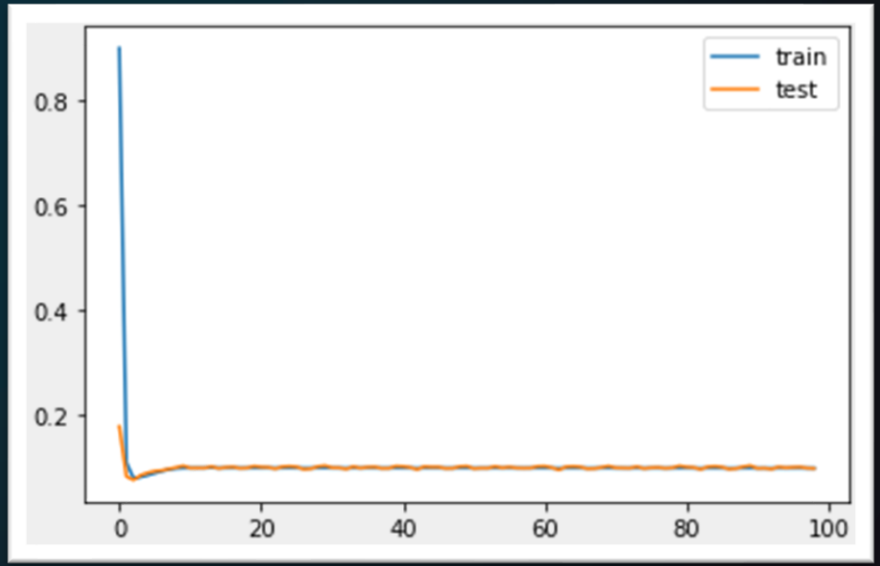
	day_of_week	month	year	Tenor_days	Strike_price	Date_num	IV
0	5	1	2017	59	0.1	1483574.4	0.5
1	5	1	2017	59	0.2	1483574.4	0.4
2	5	1	2017	59	0.3	1483574.4	0.4
3	5	1	2017	59	0.4	1483574.4	0.3
4	5	1	2017	59	0.5	1483574.4	0.3
...	...	...	...	...	...	...	...
259193	14	10	2019	14610	1.5	1571011.2	0.2
259194	14	10	2019	14610	1.6	1571011.2	0.2
259195	14	10	2019	14610	1.7	1571011.2	0.2
259196	14	10	2019	14610	1.8	1571011.2	0.2
259197	14	10	2019	14610	1.9	1571011.2	0.2

Layer (type)	Output Shape	Param #
conv1d_22 (Conv1D)	(None, 1, 32)	608
lstm_44 (LSTM)	(None, 1, 256)	295936
dense_110 (Dense)	(None, 1, 128)	32896
lstm_45 (LSTM)	(None, 124)	125488
dense_111 (Dense)	(None, 64)	8000
dropout_65 (Dropout)	(None, 64)	0
dense_112 (Dense)	(None, 128)	8320
dense_113 (Dense)	(None, 64)	8256
dropout_66 (Dropout)	(None, 64)	0
dense_114 (Dense)	(None, 1)	65

Total params: 479,569
Trainable params: 479,569
Non-trainable params: 0

<<< MODEL SUMMARY

LOSS PLOT >>>



THANK YOU