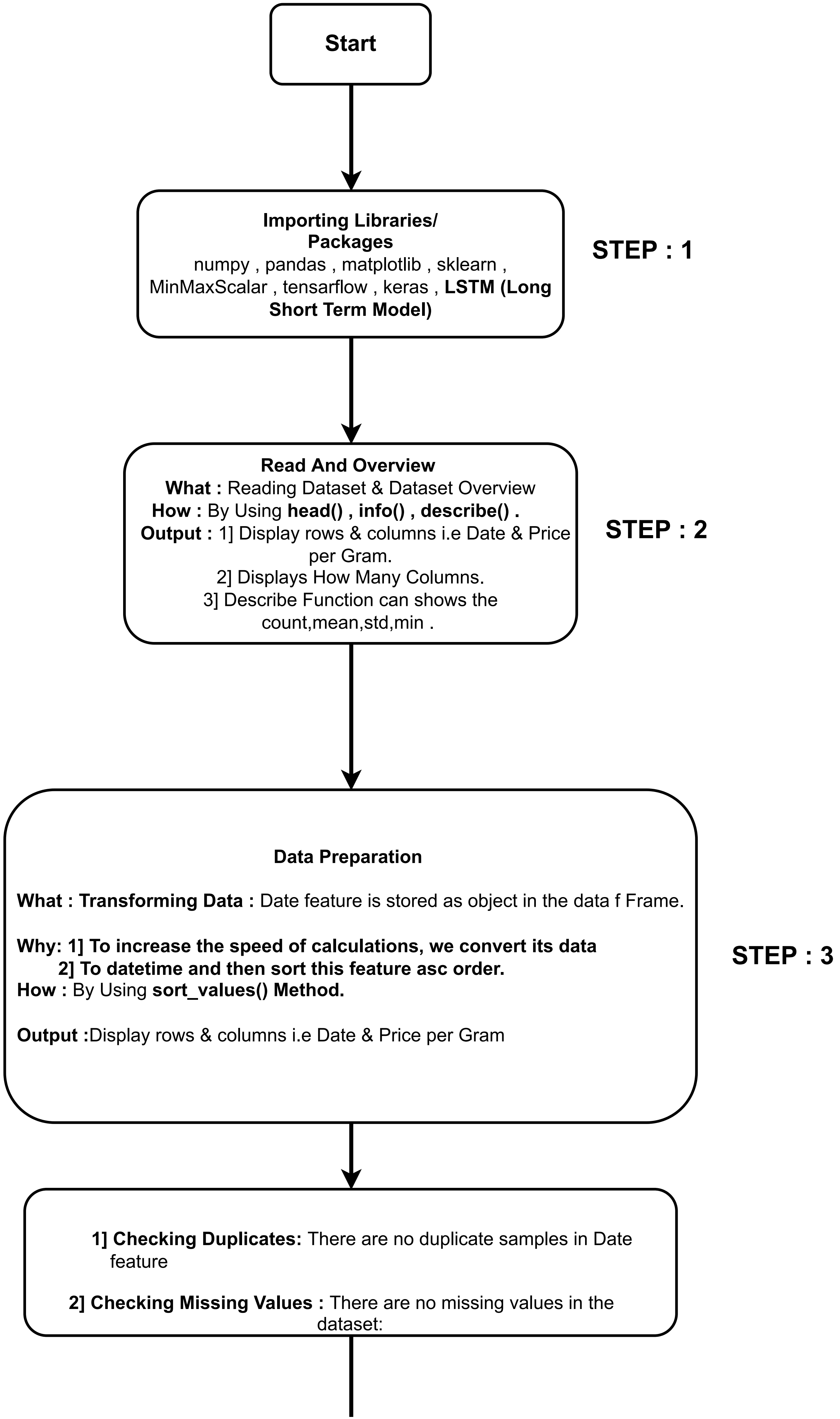


Start

Importing Libraries/
Packages
numpy , pandas , matplotlib , sklearn , MinMaxScalar , tensarflow , keras , **LSTM (Long Short Term Model)**

STEP : 1

Read And Overview
What : Reading Dataset & Dataset Overview
How : By Using **head() , info() , describe() .**
Output : 1] Display rows & columns i.e Date & Price per Gram.
2] Displays How Many Columns.
3] Describe Function can shows the count,mean,std,min .

STEP : 2

Data Preparation

What : Transforming Data : Date feature is stored as object in the data f Frame.

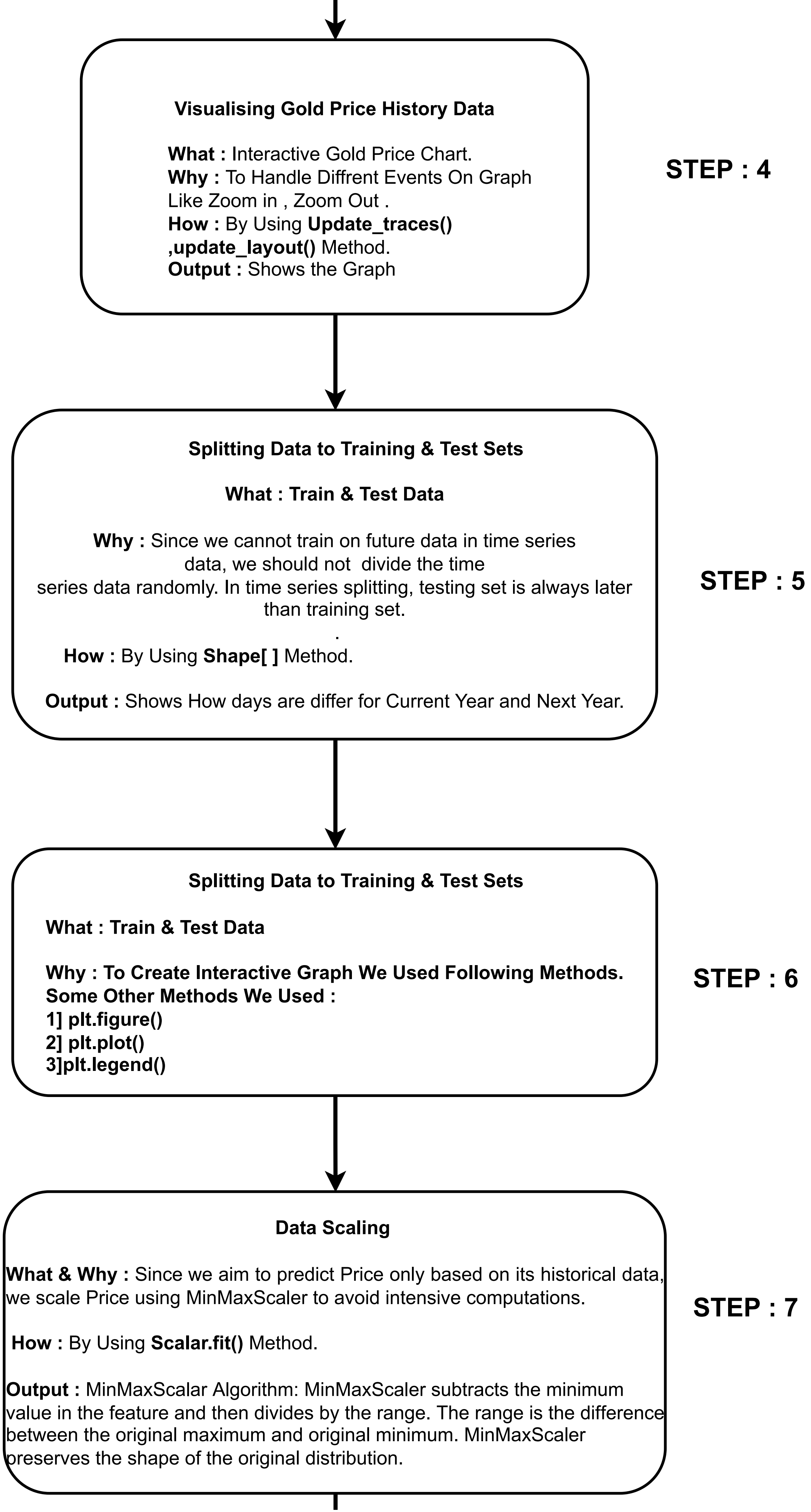
Why: 1] To increase the speed of calculations, we convert its data
2] To datetime and then sort this feature asc order.
How : By Using **sort_values() Method.**

Output : Display rows & columns i.e Date & Price per Gram

STEP : 3

1] Checking Duplicates: There are no duplicate samples in Date feature

2] Checking Missing Values : There are no missing values in the dataset:



Visualising Gold Price History Data

What : Interactive Gold Price Chart.
Why : To Handle Diffrent Events On Graph Like Zoom in , Zoom Out .
How : By Using **Update_traces() ,update_layout()** Method.
Output : Shows the Graph

STEP : 4

Splitting Data to Training & Test Sets

What : Train & Test Data

Why : Since we cannot train on future data in time series data, we should not divide the time series data randomly. In time series splitting, testing set is always later than training set.
.

How : By Using **Shape[ ]** Method.

Output : Shows How days are differ for Current Year and Next Year.

STEP : 5

Splitting Data to Training & Test Sets

What : Train & Test Data

Why : To Create Interactive Graph We Used Following Methods.
Some Other Methods We Used :
1] plt.figure()
2] plt.plot()
3]plt.legend()

STEP : 6

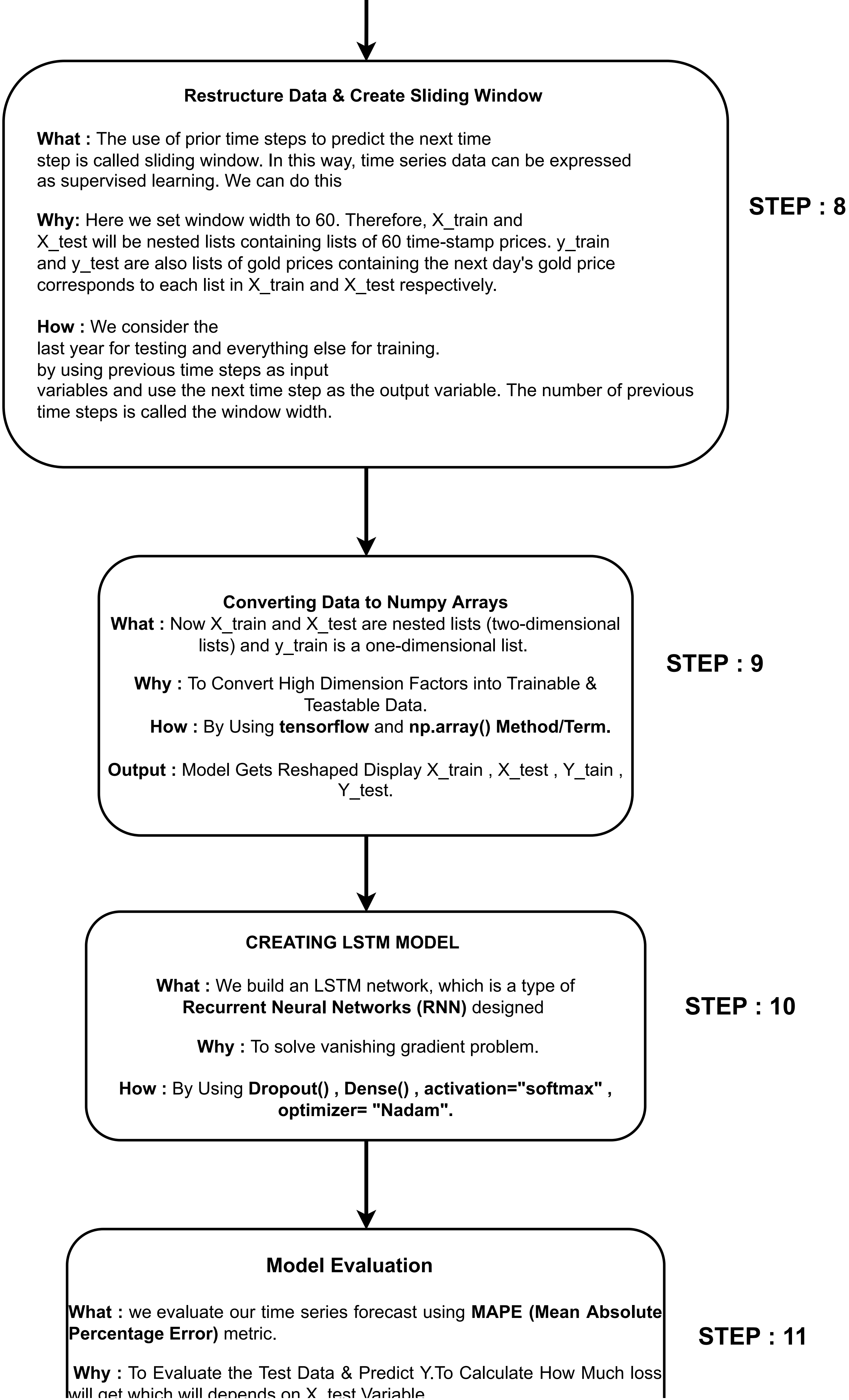
Data Scaling

What & Why : Since we aim to predict Price only based on its historical data, we scale Price using MinMaxScaler to avoid intensive computations.

How : By Using **Scalar.fit()** Method.

Output : MinMaxScalar Algorithm: MinMaxScaler subtracts the minimum value in the feature and then divides by the range. The range is the difference between the original maximum and original minimum. MinMaxScaler preserves the shape of the original distribution.

STEP : 7



Restructure Data & Create Sliding Window

What : The use of prior time steps to predict the next time step is called sliding window. In this way, time series data can be expressed as supervised learning. We can do this

Why: Here we set window width to 60. Therefore, X_train and X_test will be nested lists containing lists of 60 time-stamp prices. y_train and y_test are also lists of gold prices containing the next day's gold price corresponds to each list in X_train and X_test respectively.

How : We consider the last year for testing and everything else for training. by using previous time steps as input variables and use the next time step as the output variable. The number of previous time steps is called the window width.

STEP : 8

Converting Data to Numpy Arrays

What : Now X_train and X_test are nested lists (two-dimensional lists) and y_train is a one-dimensional list.

Why : To Convert High Dimension Factors into Trainable & Teastable Data.

How : By Using **tensorflow** and **np.array() Method/Term.**

Output : Model Gets Reshaped Display X_train , X_test , Y_tain , Y_test.

STEP : 9

CREATING LSTM MODEL

What : We build an LSTM network, which is a type of **Recurrent Neural Networks (RNN)** designed

Why : To solve vanishing gradient problem.

How : By Using **Dropout() , Dense() , activation="softmax" , optimizer= "Nadam".**

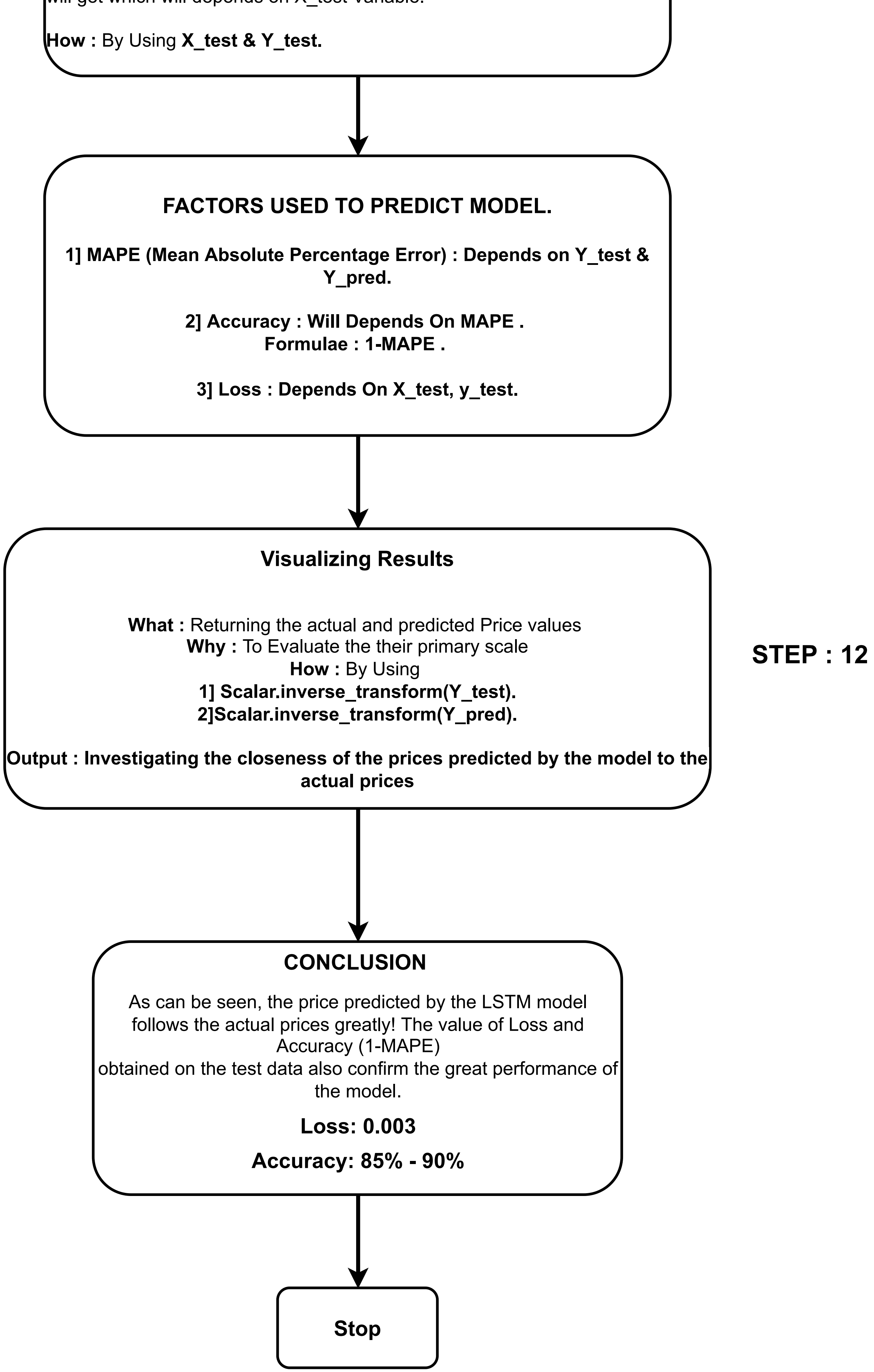
STEP : 10

Model Evaluation

What : we evaluate our time series forecast using **MAPE (Mean Absolute Percentage Error)** metric.

Why : To Evaluate the Test Data & Predict Y.To Calculate How Much loss will get which will depends on X_test Variable

STEP : 11



will get which will depends on X_test variable.

How : By Using **X_test & Y_test.**

FACTORS USED TO PREDICT MODEL.

1] MAPE (Mean Absolute Percentage Error) : Depends on Y_test & Y_pred.

2] Accuracy : Will Depends On MAPE .
Formulae : 1-MAPE .

3] Loss : Depends On X_test, y_test.

Visualizing Results

What : Returning the actual and predicted Price values
Why : To Evaluate the their primary scale
How : By Using
1] Scalar.inverse_transform(Y_test).
2]Scalar.inverse_transform(Y_pred).

Output : Investigating the closeness of the prices predicted by the model to the actual prices

STEP : 12

CONCLUSION

As can be seen, the price predicted by the LSTM model follows the actual prices greatly! The value of Loss and Accuracy (1-MAPE)
obtained on the test data also confirm the great performance of the model.

Loss: 0.003

Accuracy: 85% - 90%

Stop

LSTM MODEL

IMPLEMENTATION