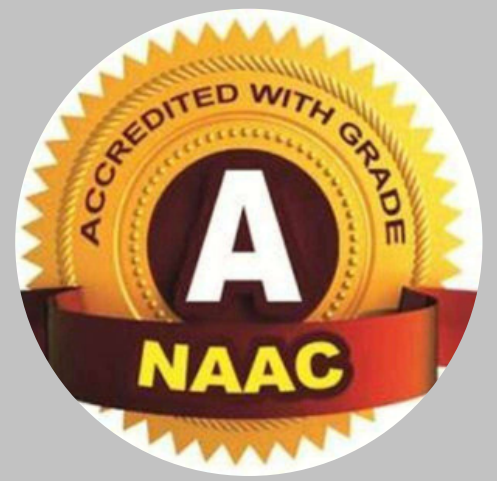




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Department Of Computer Science & Engineering
(Artificial Intelligence & Machine Learning)

A Mini Project
on
**Crop Yield Prediction Using Machine
Learning Techniques**

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Assistant Professor

CSE-AIML

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Abstract

- In India, we all know that Agriculture is the **Backbone of the Country**.
- This paper predicts the yield of almost all kinds of crops that are planted in India.
- The paper uses advanced regression techniques like **Kernel Ridge, Lasso,** and **ENet algorithms** for enhancing the algorithms to give a better prediction.



Existing System

- **Ananthara**, M. G. et al. (2013, February) proposed a prediction model for datasets pertaining to agriculture which is called as CRY algorithm for crop yield using beehive clustering techniques.
- Their proposed algorithm was then compared with C&R tree algorithm and it outperformed well with an accuracy of 90 percent.
- **Chaudhari**, A. N. et al. (2018, August) used three algorithms namely clustering k means , Apriori and Bayes algorithm, then they hybridized the algorithm for better efficiency of yield prediction.

Disadvantages

- In the existing work, the system is **less effective** for large number of data sets.
- This system is **less performance** in error calculation for crop yield detection.



Proposed System

Pre-processing

For the given data set, there are quite a few 'NA' values which are filtered in python. Furthermore, as the data set consists of numeric data, the proposed system used robust scaling, which is quite similar to normalization, but it instead uses the inter quartile range whereas normalization is something which normalization shrinks the data in terms of 0 to 1.

Stacked Regression

- In this, we add a meta model and use the out of fold predictions of the other models used to train the main meta model.

Step-1: the total training set is again divided into two different sets. (train and holdout)

Step-2: train the selected base models with first part (train).

Step-3: Test them with the second part. (holdout)

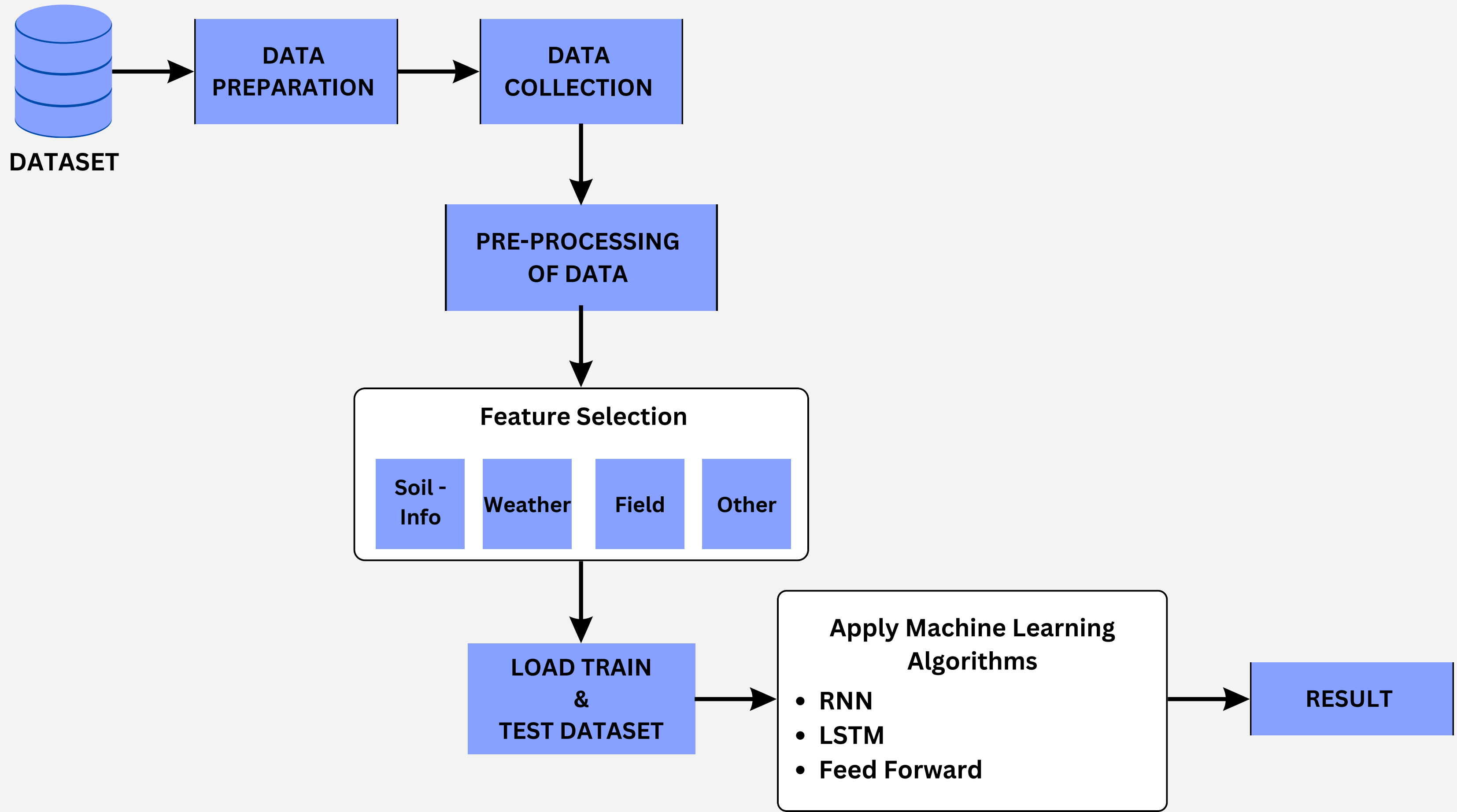
Step-4: Now, the predictions obtained from test part are inputs to the train higher level learner called meta-model.

Advantages

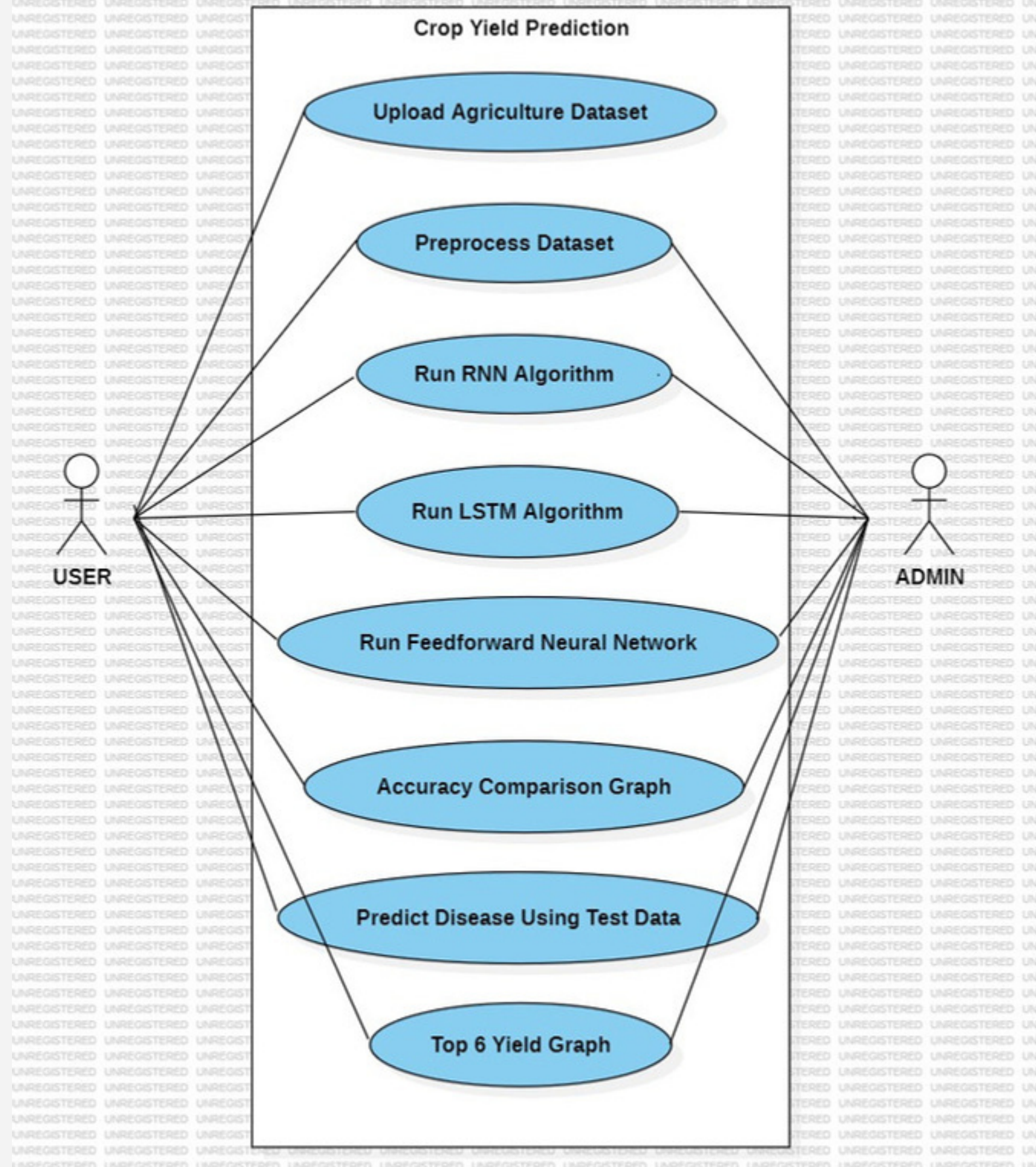
- In the proposed system, the **advanced regression techniques** used – **Lasso**, **ENet** and **Kernel Ridge** and further.
- To The system is more effective due to presence of Data Sets **Classification Techniques**.



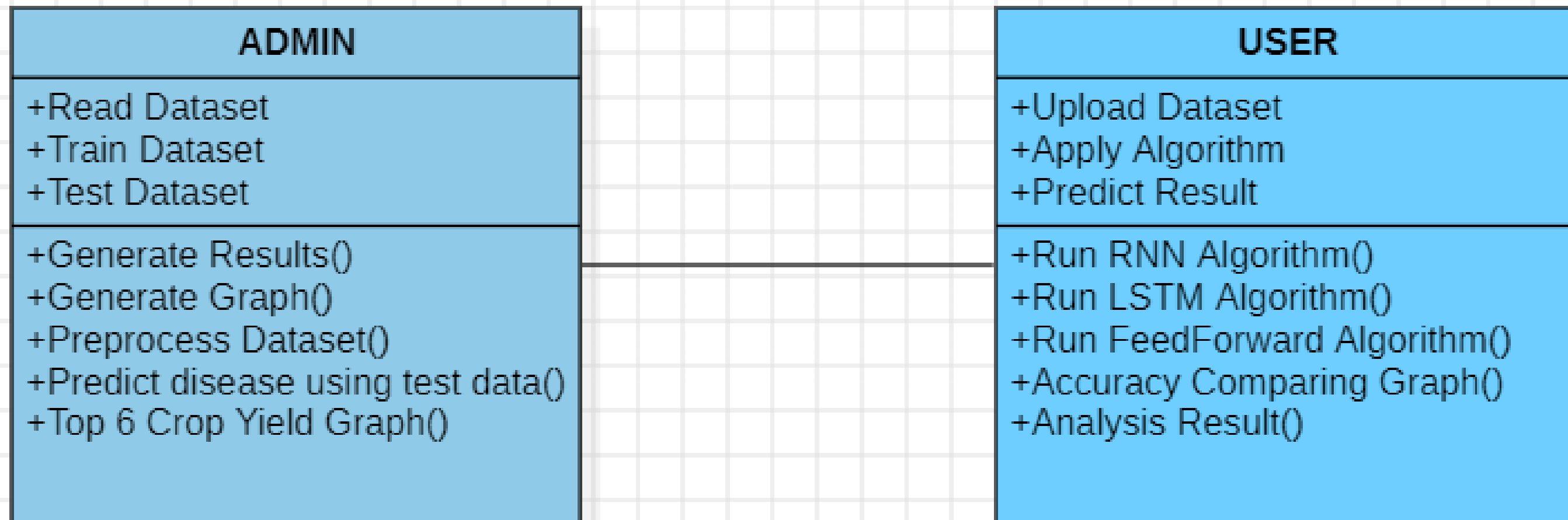
System Architecture



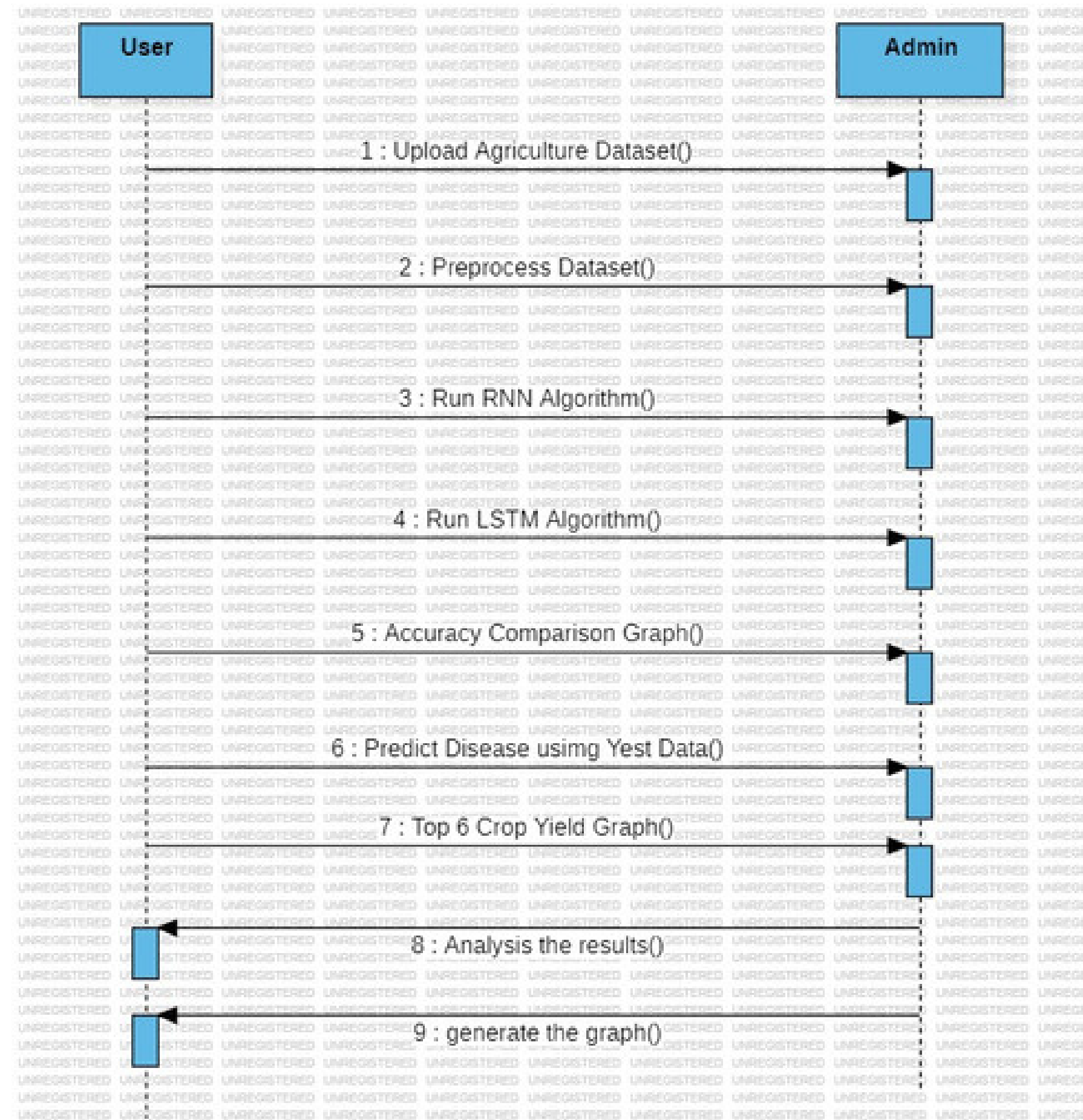
Use Case Diagram



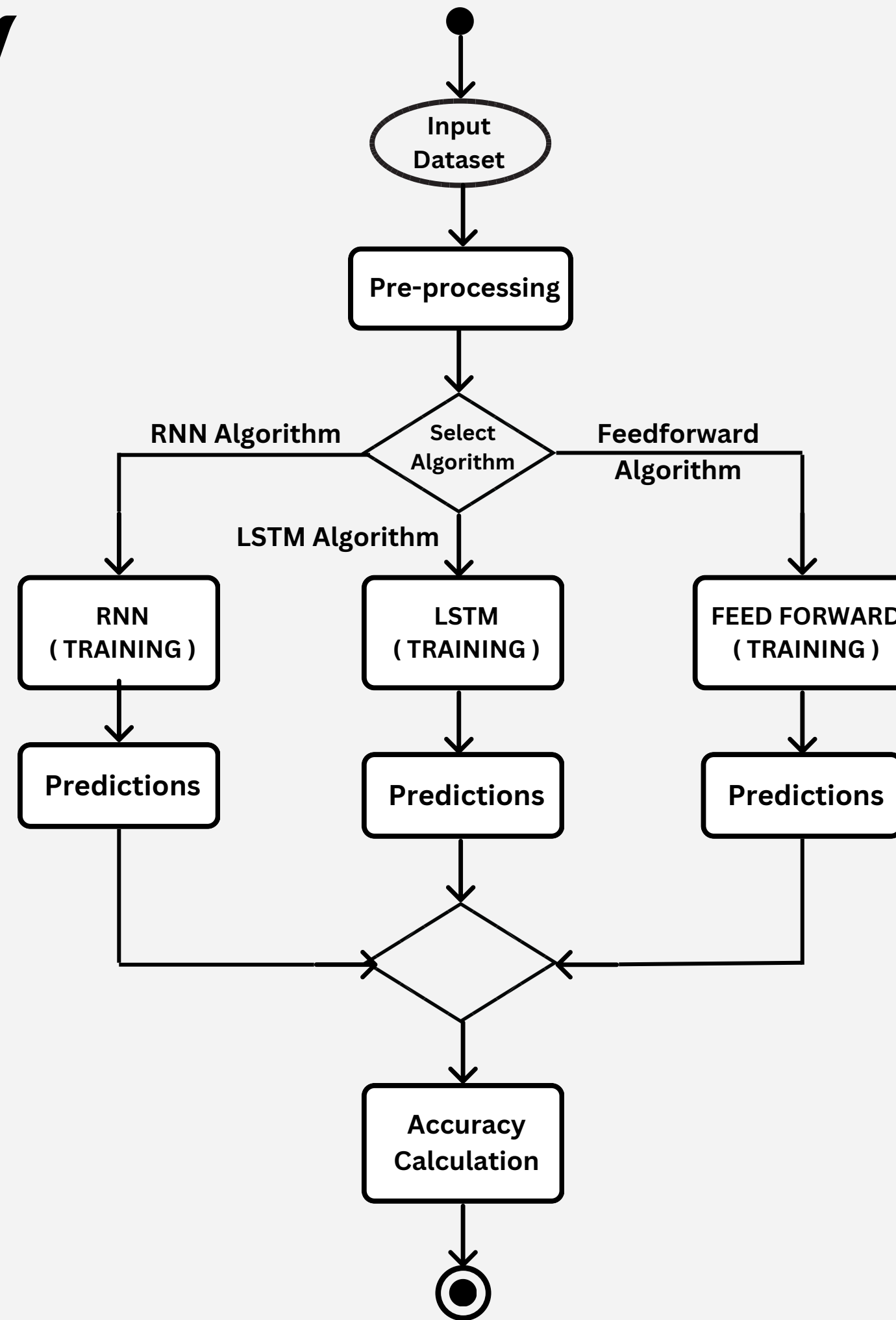
Class Diagram



Sequence Diagram



Methodology / Algorithm



Dataset

State_Name	District_Name	Crop_Year	Season	Crop	Area
Andaman & Nicobar Islands	NICOBARS	2000	Kharif	Arecanut	1254
Andaman & Nicobar Islands	NICOBARS	2000	Kharif	Other Kharif	2
Andaman & Nicobar Islands	NICOBARS	2000	Kharif	Rice	102
Chhattisgarh	NARAYANIPUR	2012	Kharif	Other Kharif	13
Chhattisgarh	NARAYANIPUR	2012	Kharif	Ragi	346
Chhattisgarh	NARAYANIPUR	2012	Kharif	Rice	24207
Andaman & Nicobar Islands	NICOBARS	2000	Whole Year	Coconut	18168
Andaman & Nicobar Islands	NICOBARS	2001	Whole Year	Coconut	18190
Andaman & Nicobar Islands	NICOBARS	2001	Whole Year	Dry ginger	46
Andaman & Nicobar Islands	NICOBARS	2001	Whole Year	Sugarcane	1
Bihar	SIWAN	2001	Whole Year	Sugarcane	5537
Bihar	SIWAN	2001	Kharif	Moong(Green)	4

Screenshots

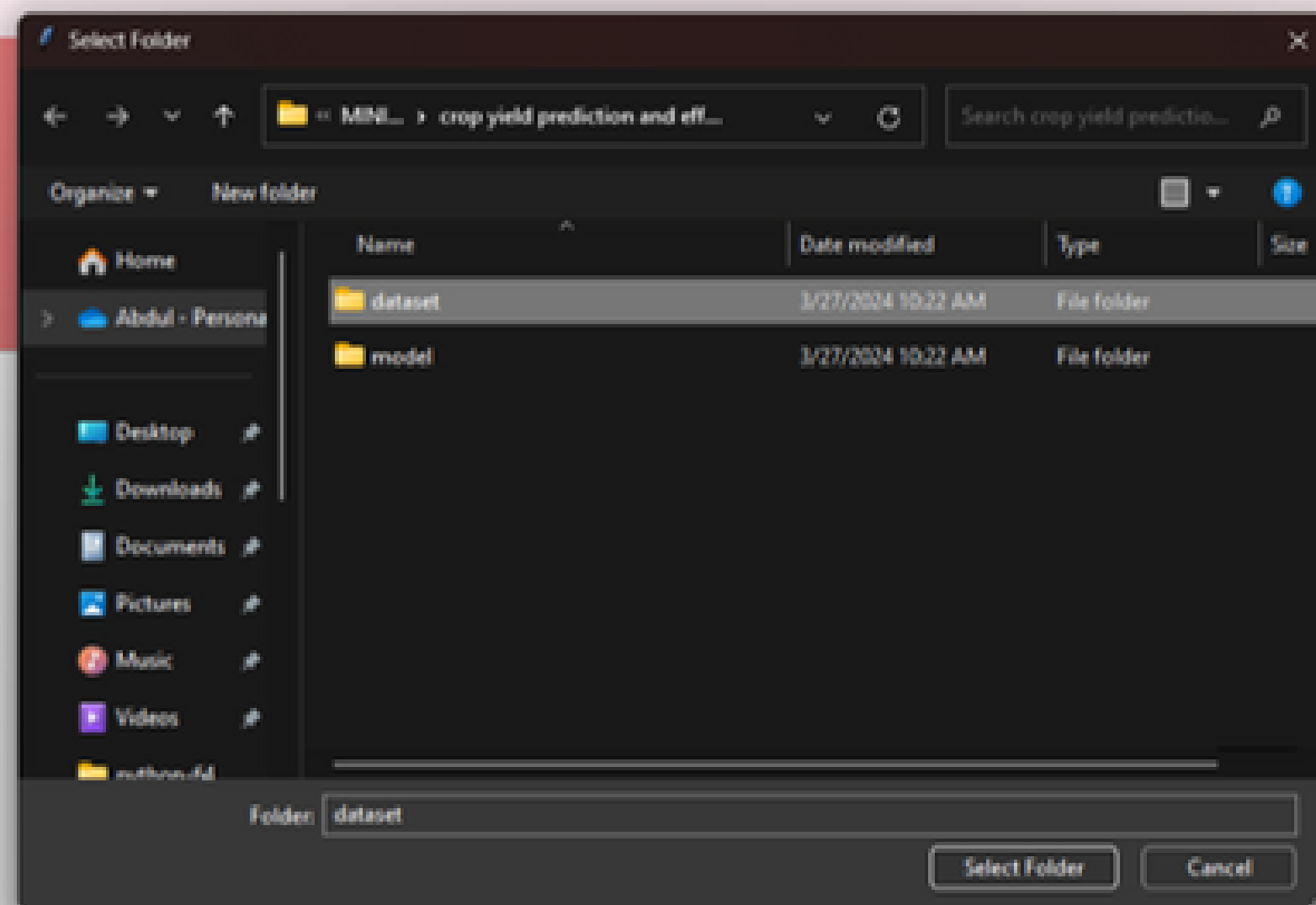


Crop Yield Prediction using RNN, Feedforward and LSTM Neural Network

Upload Agriculture Dataset

Run Feedforward Neural Network

Predict Disease using Test Data



Download Dataset

Crop Yield Prediction using RNN, Feedforward and LSTM Neural Network

Crop Yield Prediction using RNN, Feedforward and LSTM Neural Network

Upload Agriculture Dataset

Preprocess Dataset

Run RNN Algorithm

Run LSTM Algorithm

Run Feedforward Neural Network

Accuracy Comparison Graph

Predict Disease using Test Data

Top 6 Crop Yield Graph

D:/MINI PROJECT/crop yield prediction and efficient use of fertilizers using machine learning/dataset Loaded

```
<bound method NDFrame.head of
      State_Name District_Name Crop_Year Season Crop Area Production
0  Andaman and Nicobar Islands NICOBARS 2000 Kharif  Arecanut 1254.0 2000
1  Andaman and Nicobar Islands NICOBARS 2000 Kharif Other Kharif pulses 2.0 1
2  Andaman and Nicobar Islands NICOBARS 2000 Kharif Rice 102.0 321
3  Andaman and Nicobar Islands NICOBARS 2000 Whole Year Banana 176.0 641
4  Andaman and Nicobar Islands NICOBARS 2000 Whole Year Cashewnut 720.0 165
...
246086 West Bengal PURULLA 2014 Summer Rice 306.0 801
246087 West Bengal PURULLA 2014 Summer Sesamum 627.0 463
246088 West Bengal PURULLA 2014 Whole Year Sugarcane 324.0 16250
246089 West Bengal PURULLA 2014 Winter Rice 279151.0 597899
246090 West Bengal PURULLA 2014 Winter Sesamum 175.0 88
```

[246091 rows x 7 columns]>

Preprocess Dataset

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Top 6 Crop Yield Graph

```
[[[-1.75173486  0.61694526 -1.13950787 -0.90932635 -1.95000112 -0.21274977]
 [-1.75173486  0.61694526 -1.13950787 -0.90932635  0.16342367 -0.23753042]
 [-1.75173486  0.61694526 -1.13950787 -0.90932635  0.77983923 -0.23555113]
 ...
 [ 1.47874838  0.85197704  1.68754488  1.42276135  1.10272358 -0.23115712]
 [ 1.47874838  0.85197704  1.68754488  2.20012392  0.77983923  5.28762317]
 [ 1.47874838  0.85197704  1.68754488  2.20012392  0.98531109 -0.23410625]]
```

RNN Algorithm

Crop Yield Prediction using RNN, Feedforward and LSTM Neural Network

Crop Yield Prediction using RNN, Feedforward and LSTM Neural Network

Upload Agriculture Dataset

Preprocess Dataset

Run RNN Algorithm

Run LSTM Algorithm

Run Feedforward Neural Network

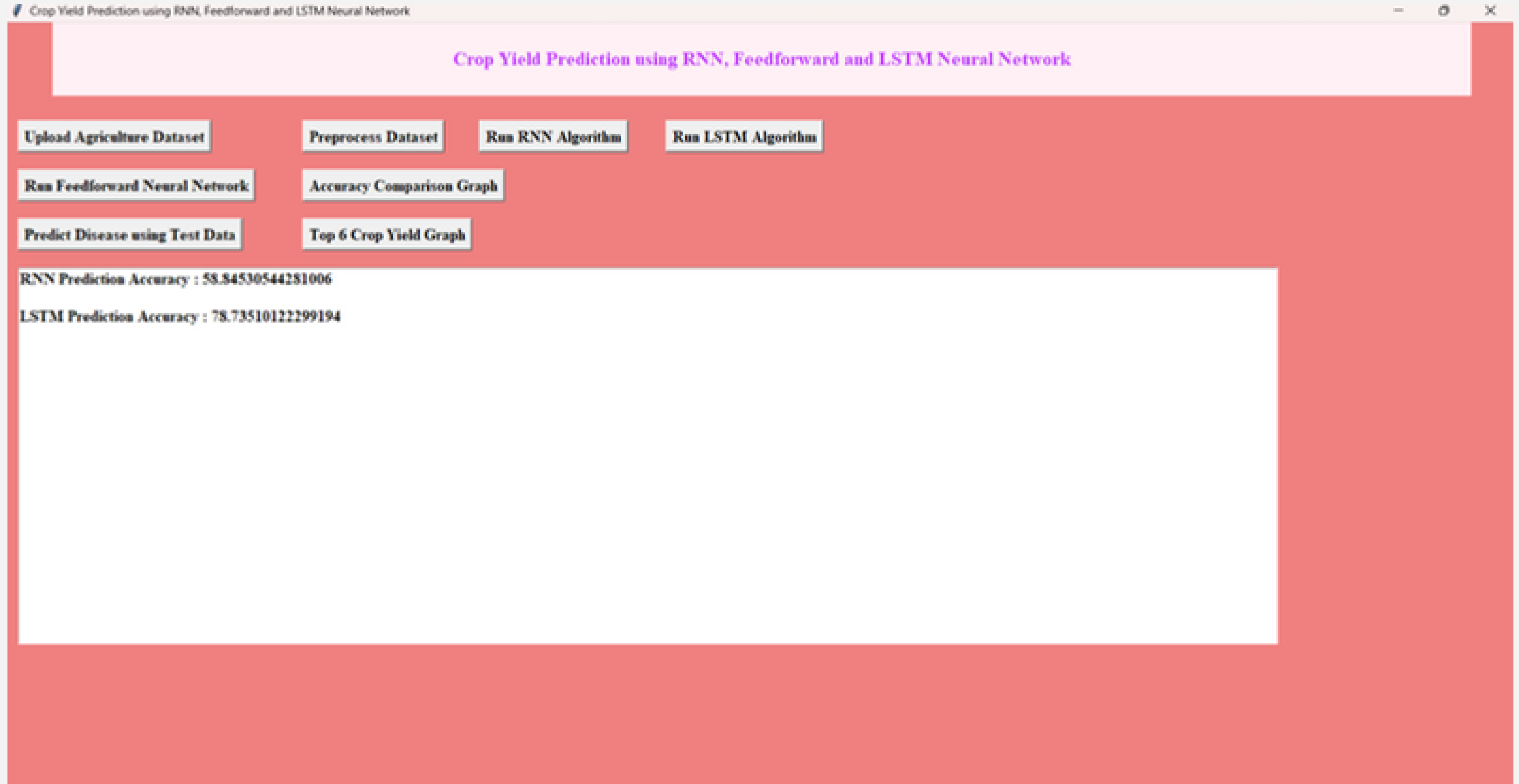
Accuracy Comparison Graph

Predict Disease using Test Data

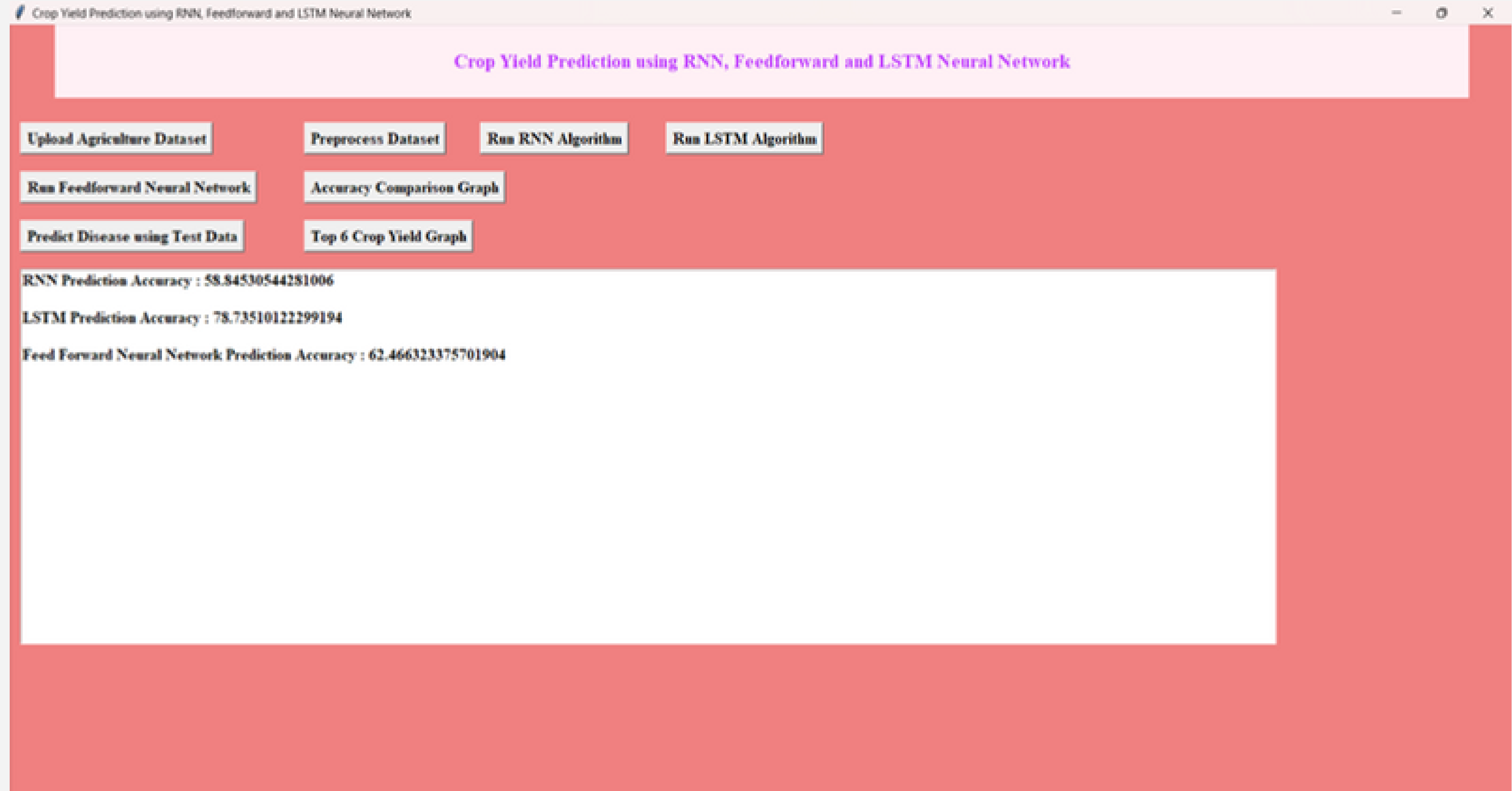
Top 6 Crop Yield Graph

RNN Prediction Accuracy : 58.84530544281006

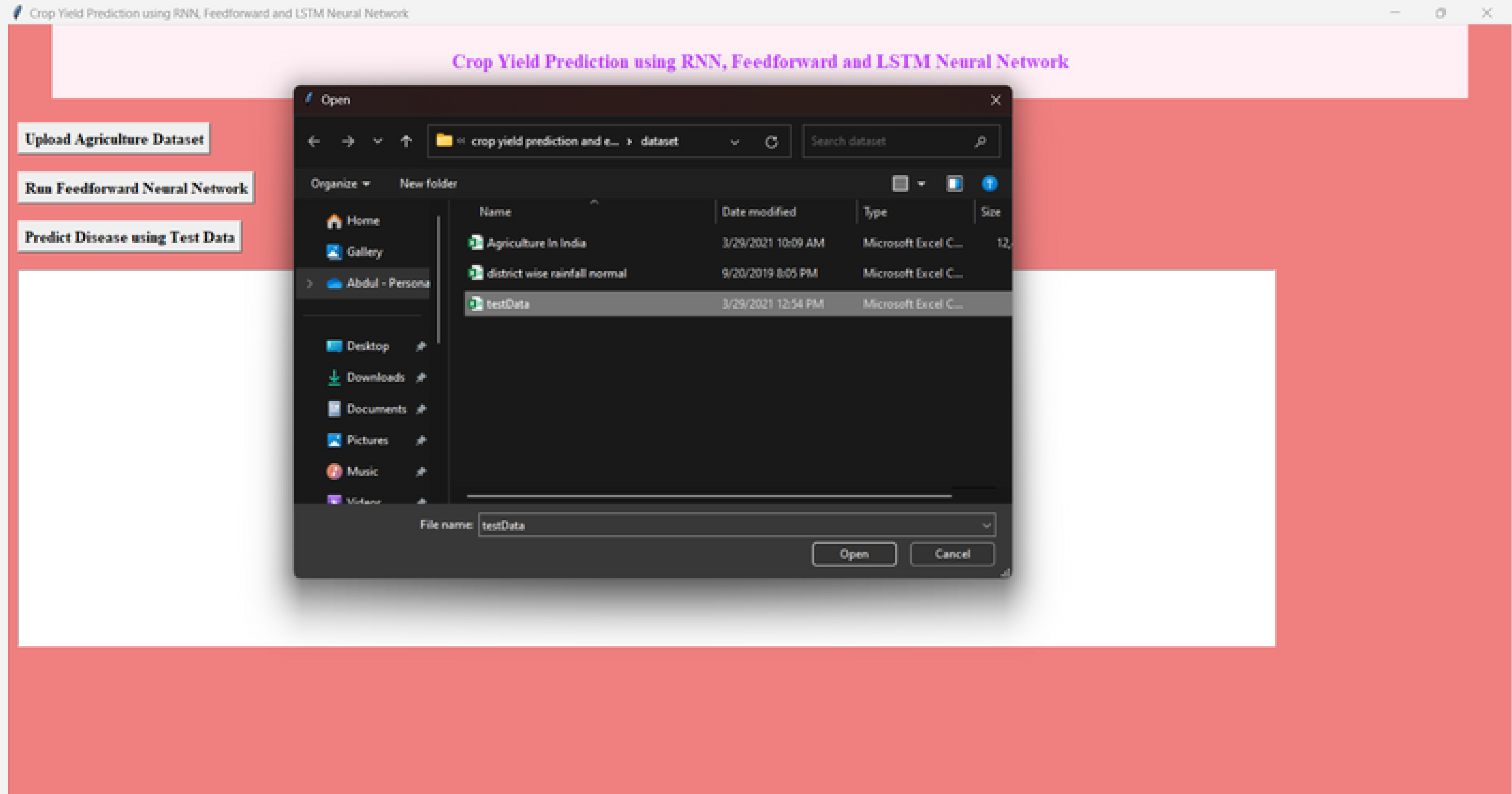
LSTM Algorithm



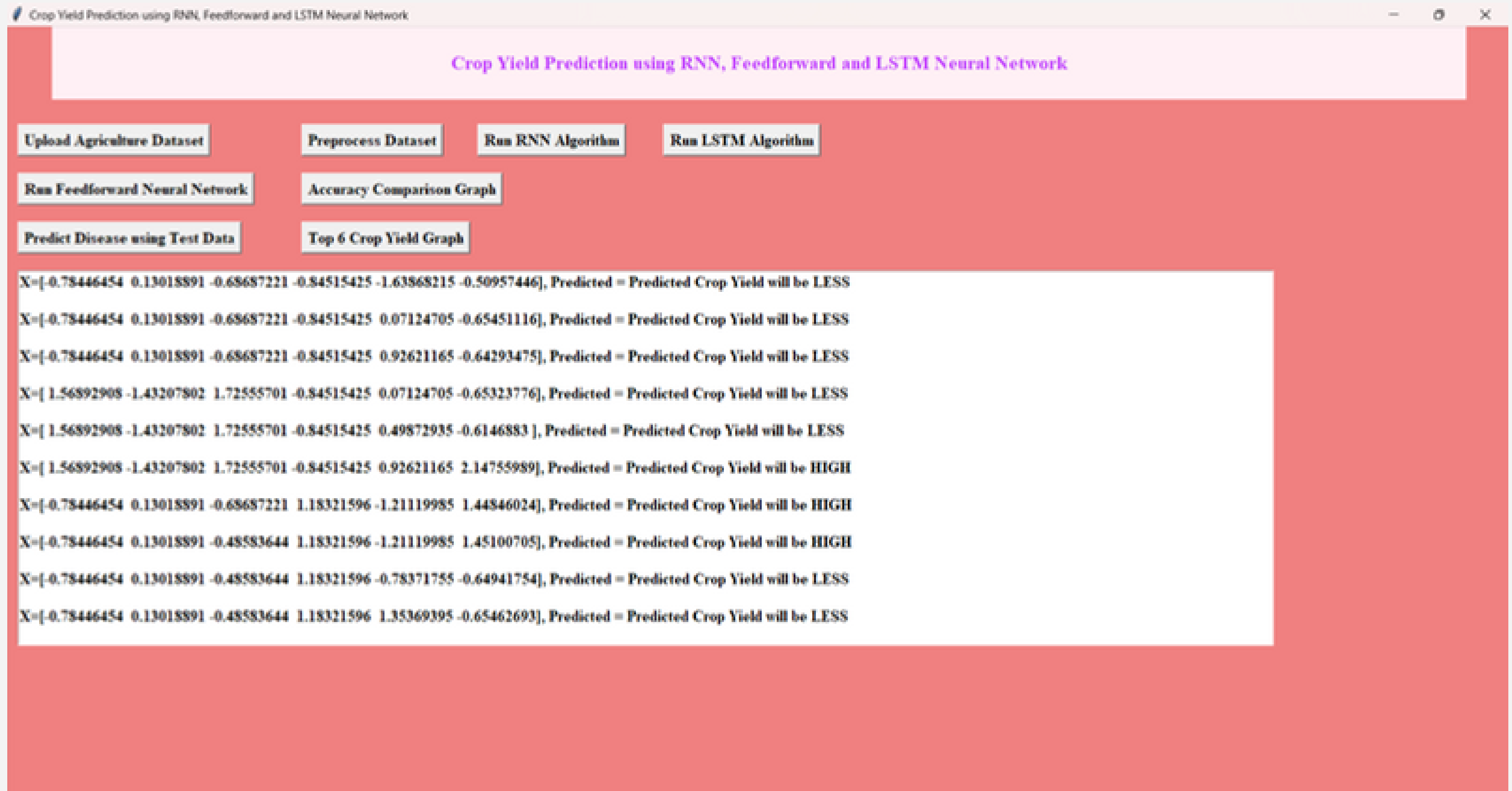
Feedforward Algorithm



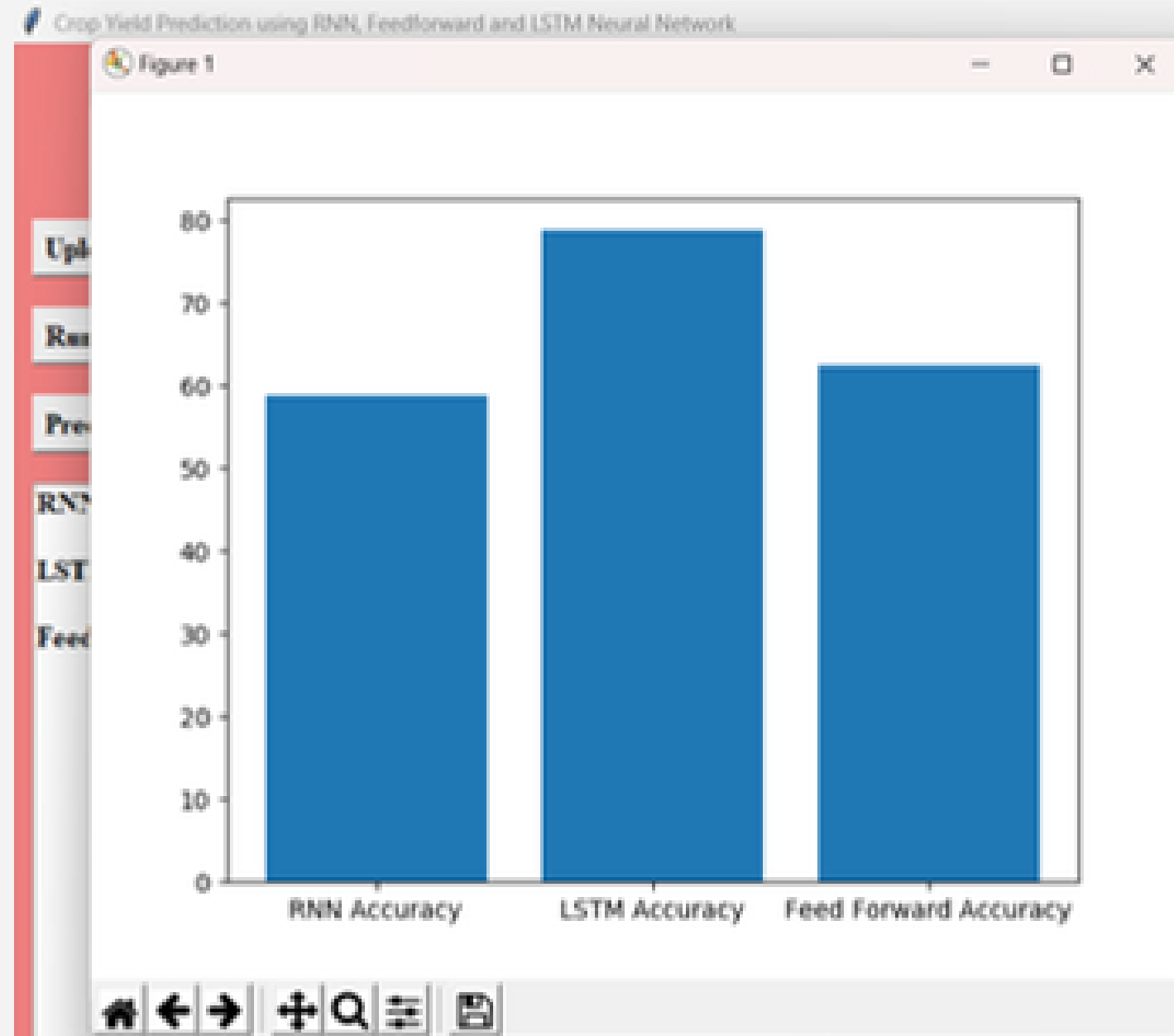
Test Data Upload



Test Data Results



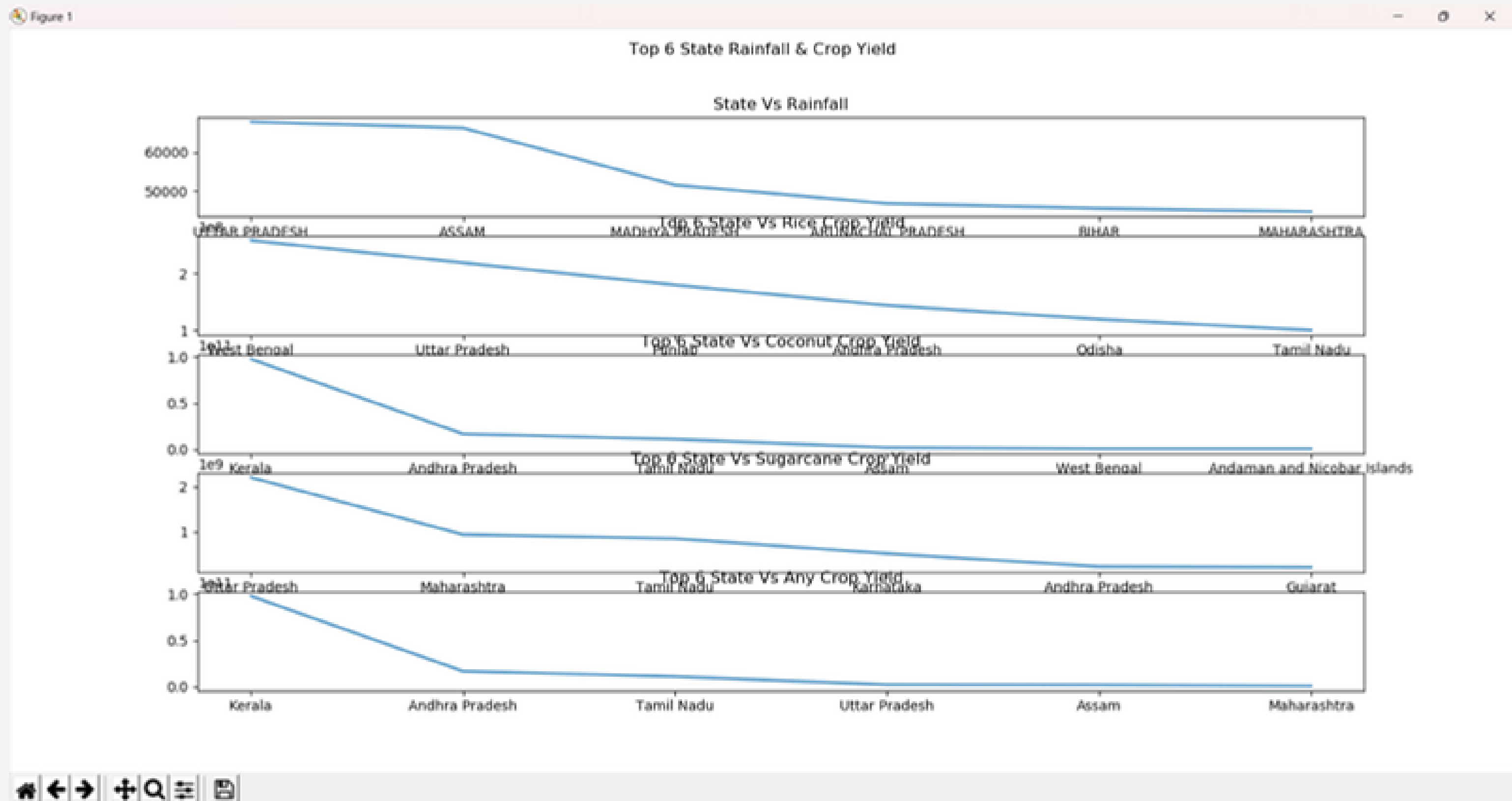
Performance Metrics



ing RNN, Feedforward and LSTM Neural Network

Run LSTM Algorithm

Result Analysis



Conclusion and Future scope

- The analytical process started from data cleaning and processing, missing value, exploratory analysis and finally model building and evaluation.
- Finally we predict the crop using machine learning algorithm with different results. This brings some of the following insights about crop prediction.
- As maximum types of crops will be covered under this system, farmer may get to know about the crop which may never have been cultivated and lists out all possible crops.

**ANY
QUERIES ?**



THANK YOU

