Goal:

The objective of this project is to "Predict the Winner of IPL 2020".

Approach:

Given the player statistics to a machine learning model, the model outputs the rating points for that player based on his statistics.

Once the model has generated ratings for all the IPL players, we choose the best playing X1 of a team by using an algorithm and add all the points of the best X1 to get the total ratings of the team

This algorithm then outputs the winner of two teams using the team rating points that the machine learning algorithm had provided.

We call this algorithm for all the matches in the league stage. Thus, after the league stage, the algorithm outputs the top four teams which goes into qualifiers.

In the qualifier stage, again the same algorithm is run between two teams and the top two teams will be selected for finals.

In the final stage, we are left with top two teams. We call the algorithm for one last time and it outputs the Final Winner.

Dataset:

We have scraped the data from ICC's T20 top 100 players and Cricbuzz websites using Beautiful Soup module and obtained the data for Batsmen, Bowler and All-Rounder separately.

Features used for Batsmen:

- Innings
- Runs Scored
- Batting Average
- Batting Strike Rate
- Fifties
- Fours
- Sixes

Features used for Bowlers:

- Innings
- Wickets
- Economy
- Bowling Average
- Bowling Strike Rate

Features used for All-Rounders:

- Innings as Batsmen
- Runs Scored
- Batting Average
- Batting Strike Rate
- Fifties

- Fours
- Sixes
- Innings as Bowler
- Wickets
- Economy
- Bowling Average
- Bowling Strike Rate

Data Pre-Processing:

We have observed that the there are some unnecessary features like Double Centuries, Centuries. So we have dropped them from the dataset. We deleted some records which have 0 values for some of the features.

We observed that the data is highly right skewed. So, we have applied log transformation to the data to make the distribution like a normal distribution of data.

Histrogram of the Original Data:
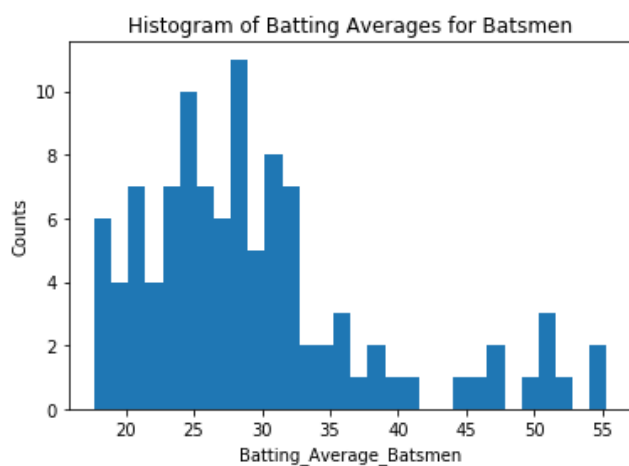
**Histogram of the data after log transformation:**
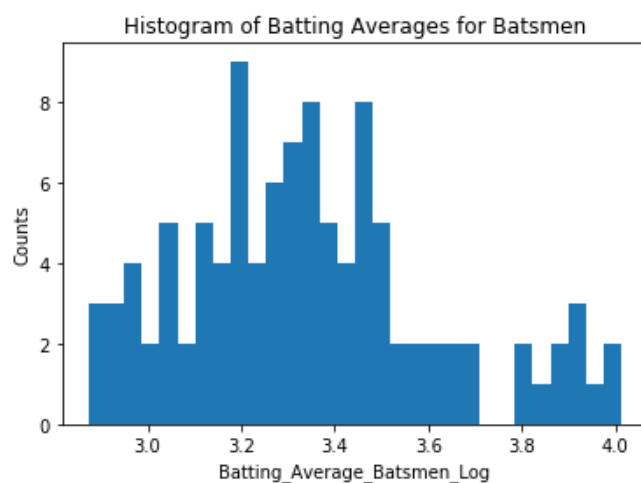
Models Used:

We have implemented the below models and have compared our results with Scikit-learn's implementation.

SGD Regressor:

We have provided the training data as the input to the models and found the best number of epoch using Cross Validation Data. AS we can see in the plots, the training error decreases as the epochs increases which means we are going towards convergence. We can increase the number of epochs to reduce the error furthermore, but we have stopped at 2000 epochs as the error fall rate is almost steady at this point.

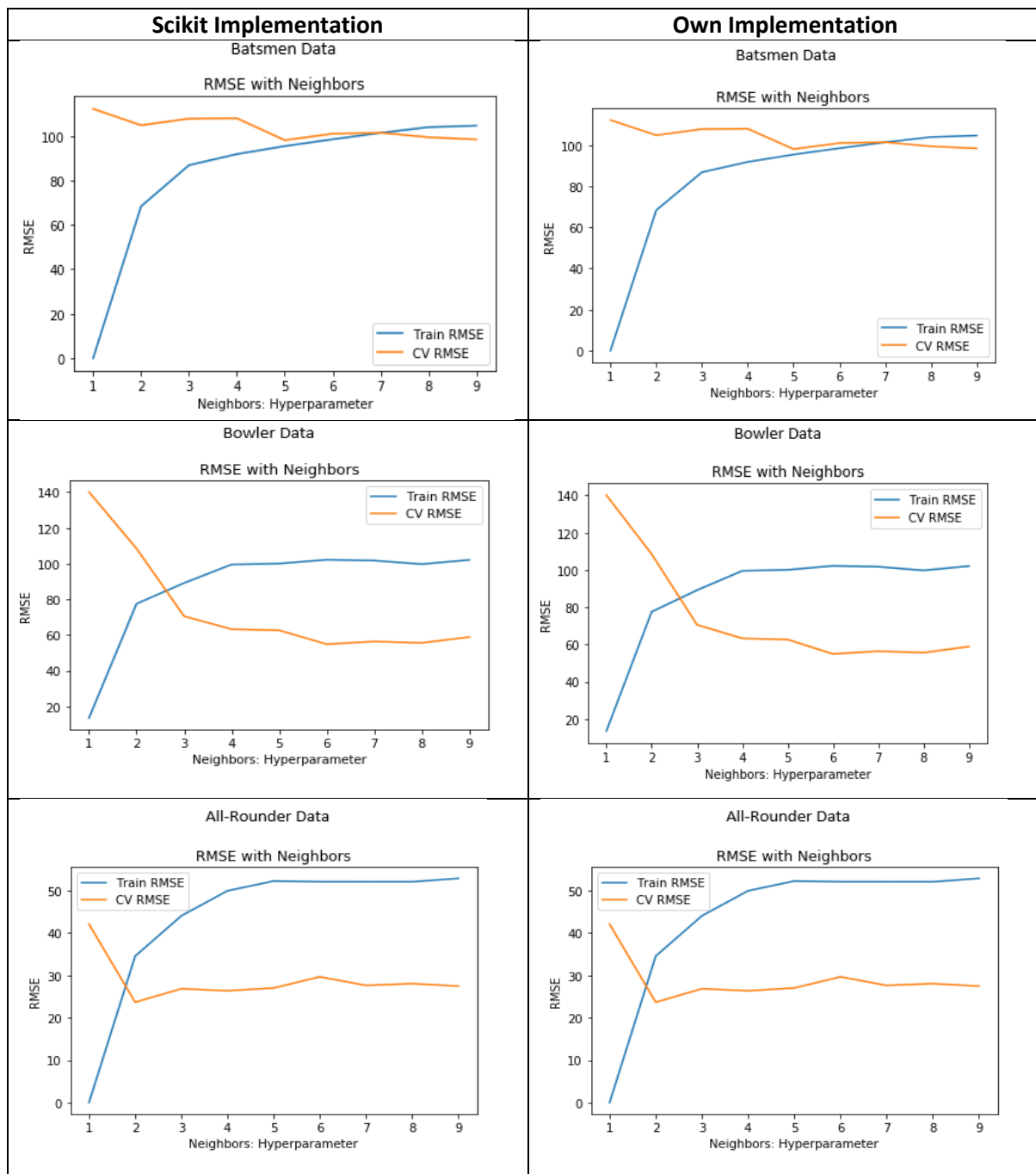| Scikit Implementation	Own Implementation
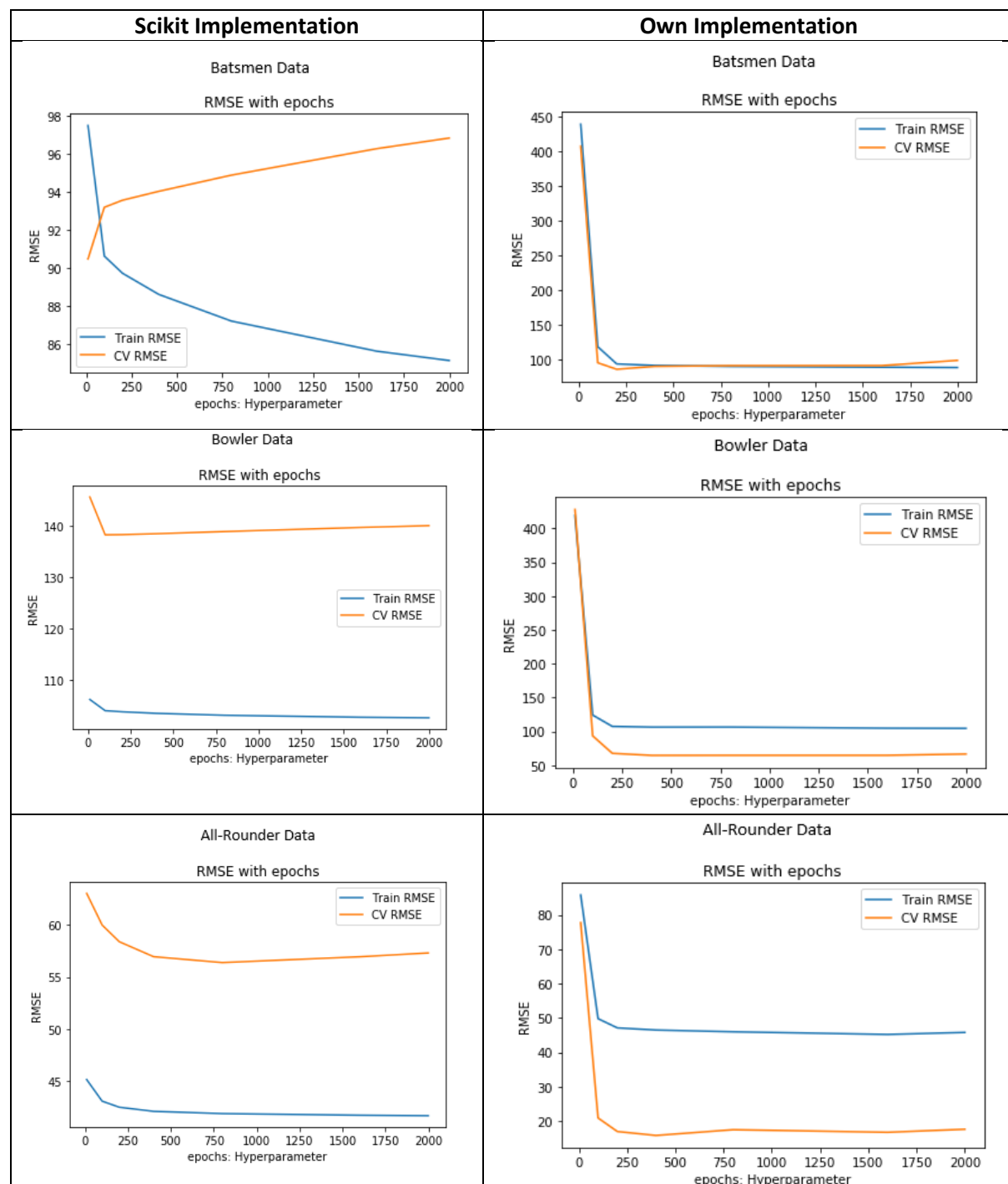
KNNRegressor:

We have provided the training data as the input to the models and found the best number of neighbours using Cross Validation Data. As we can see from the plots, the training error increases as the value of K increases, which means that smaller values of K leads to overfitting and larger values of K leads to underfitting.

Scikit Implementation	Own Implementation

By executing the above models on test data, we have generated the plots which shows the Predicted Rating Points and the Actual Rating Points

SGD Scikit Implementation	SGD Own Implementation
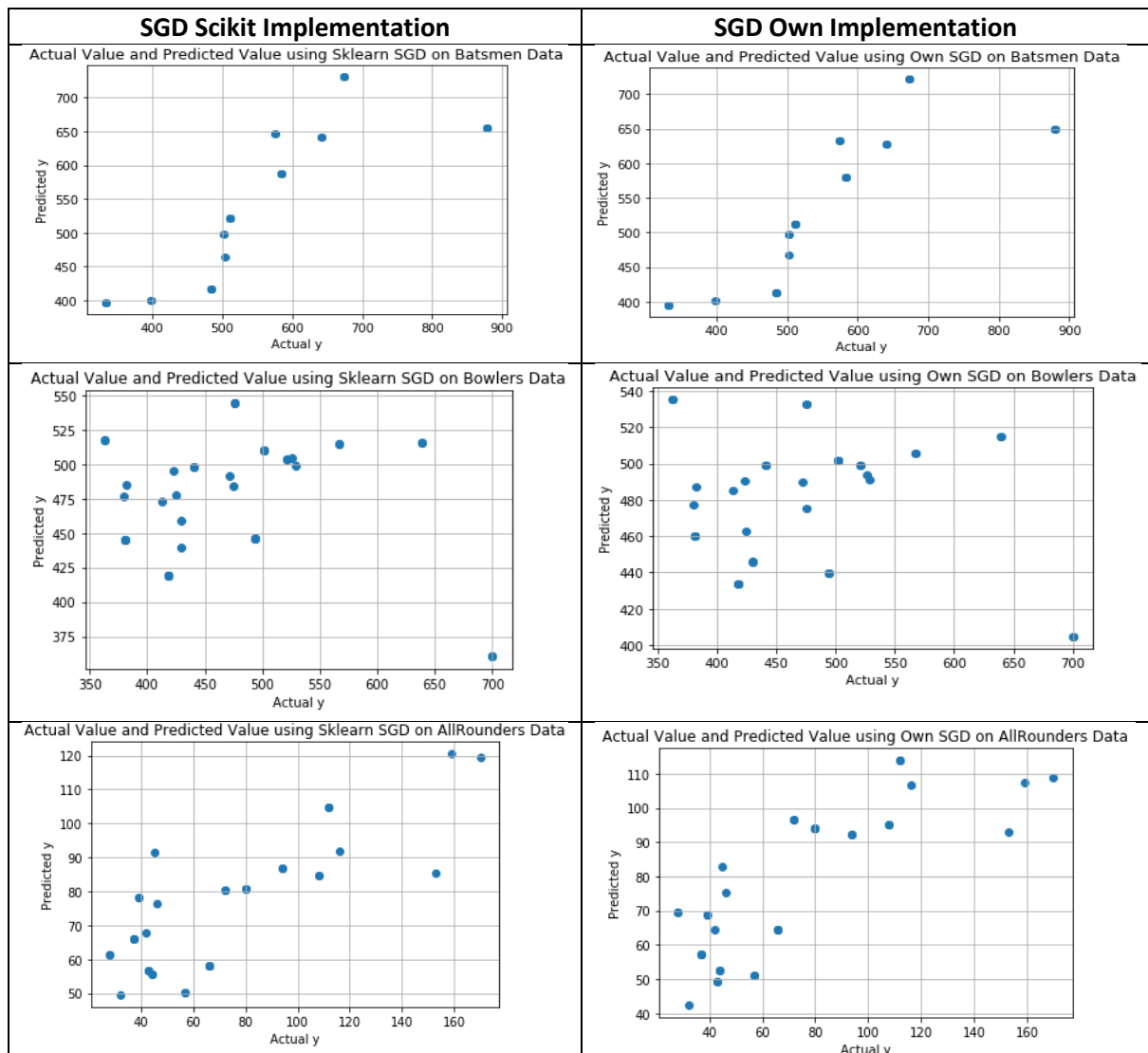
KNN Regression Scikit Implementation	KNN Regression Own Implementation
Actual Value and Predicted Value using Sklearn KNN on Batsmen Data	Actual Value and Predicted Value using Own KNN on Batsmen Data
Actual Value and Predicted Value using Sklearn KNN on Bowlers Data	Actual Value and Predicted Value using Own KNN on Bowlers Data
Actual Value and Predicted Value using sklearn KNN on AllRounders Data	Actual Value and Predicted Value using Own KNN on AllRounders Data
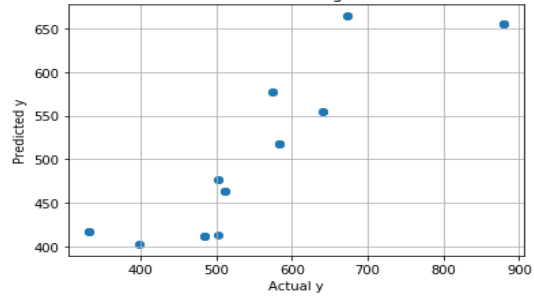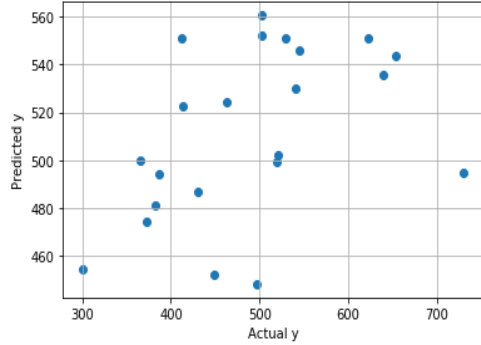
In addition to the above mentioned models, we have also implemented Weighted KNN Regressor and Linear Regression using Least Square Estimates method.

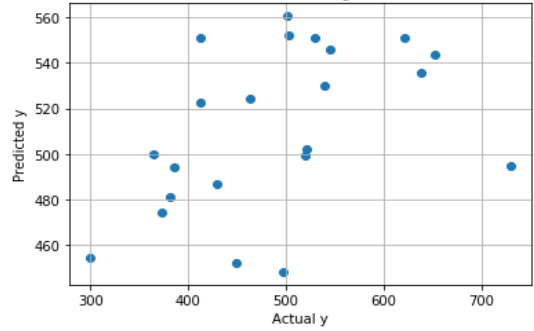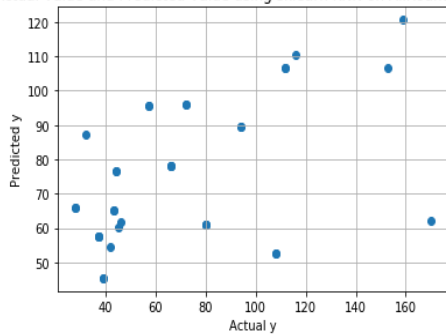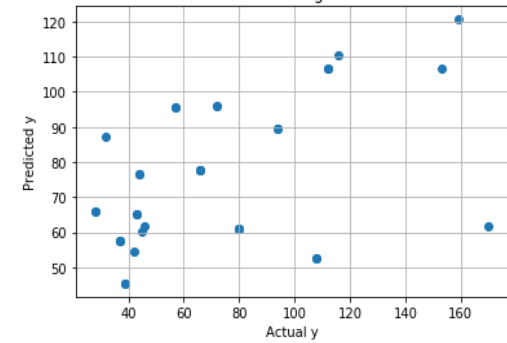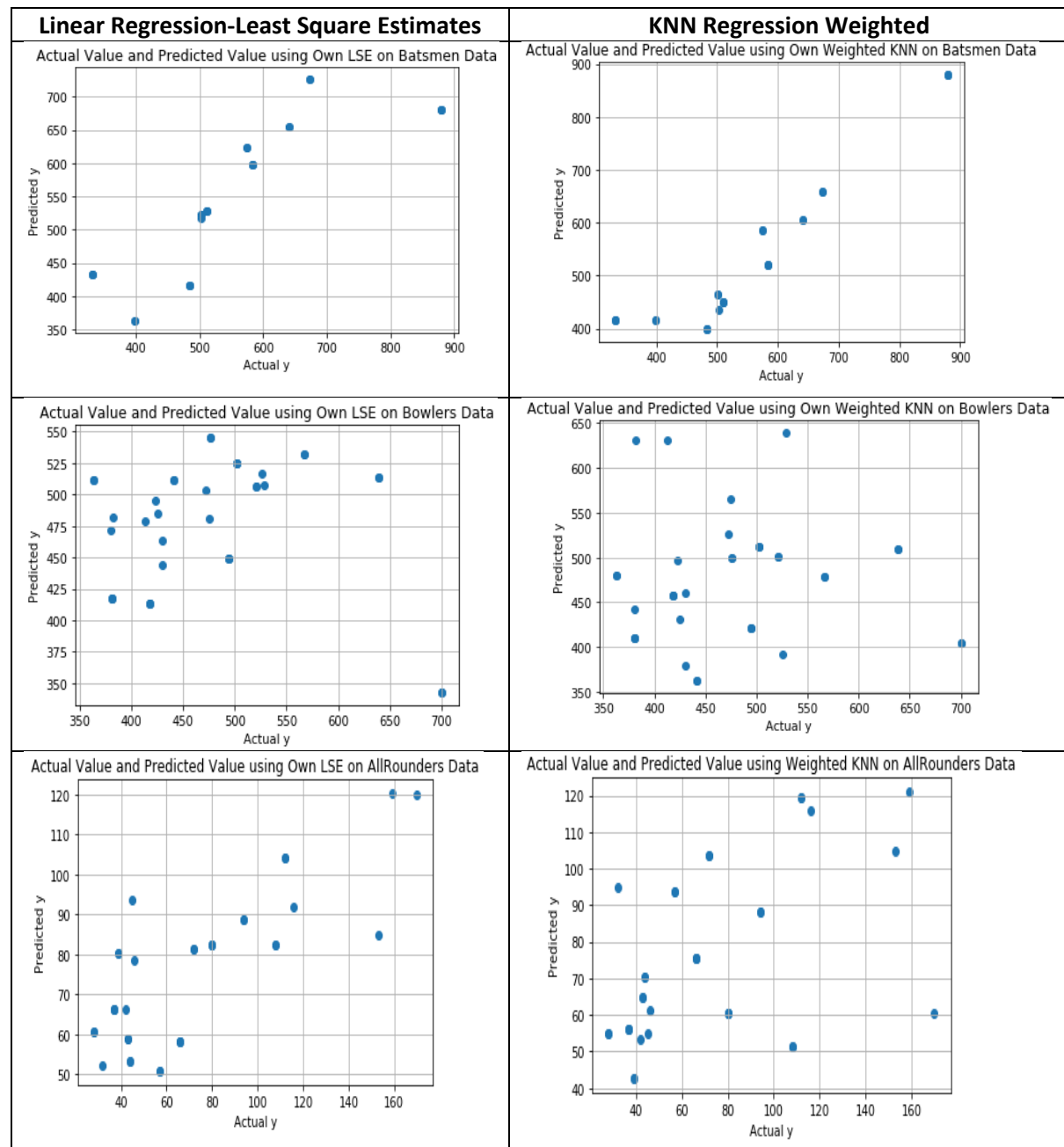| Linear Regression-Least Square Estimates	KNN Regression Weighted
Actual Value and Predicted Value using Own LSE on Batsmen Data	Actual Value and Predicted Value using Own Weighted KNN on Batsmen Data
Actual Value and Predicted Value using Own LSE on Bowlers Data	Actual Value and Predicted Value using Own Weighted KNN on Bowlers Data
Actual Value and Predicted Value using Own LSE on AllRounders Data	Actual Value and Predicted Value using Weighted KNN on AllRounders Data

Output:

We have provided the player statistics to the above two machine learning models and applied the algorithm to predict the Winner of IPL 2020.

Using Own SGD Regressor	Using Own KNN Regressor
SRH vs KKR || venue at SRH Winner is SRH	CSK vs KX1P || venue at CSK Winner is CSK
KX1P vs DC || venue at KX1P Winner is DC	RR vs MI || venue at RR Winner is RR
KX1P vs RR || venue at KX1P Winner is KX1P	CSK vs KKR || venue at CSK Winner is CSK
SRH vs KX1P || venue at SRH Winner is SRH	RCB vs KKR || venue at RCB Winner is RCB
DC vs MI || venue at DC Winner is DC	RCB vs KX1P || venue at RCB Winner is RCB
RR vs MI || venue at RR Winner is MI	KX1P vs SRH || venue at KX1P Winner is KX1P
KX1P vs MI || venue at KX1P Winner is MI	RR vs RCB || venue at RR Winner is RR
MI vs DC || venue at MI Winner is MI	MI vs RR || venue at MI Winner is MI
MI vs CSK || venue at MI Winner is MI	KX1P vs CSK || venue at KX1P Winner is CSK
CSK vs RCB || venue at CSK Winner is CSK	DC vs SRH || venue at DC Winner is DC
RCB vs CSK || venue at RCB Winner is RCB	DC vs RCB || venue at DC Winner is DC
RR vs DC || venue at RR Winner is RR	RR vs CSK || venue at RR Winner is CSK
KX1P vs SRH || venue at KX1P Winner is SRH	CSK vs DC || venue at CSK Winner is CSK
MI vs KX1P || venue at MI Winner is MI	DC vs CSK || venue at DC Winner is DC

CSK vs RR || venue at CSK Winner is CSK	RCB vs DC || venue at RCB Winner is RCB
RCB vs SRH || venue at RCB Winner is RCB	SRH vs MI || venue at SRH Winner is SRH
RR vs SRH || venue at RR Winner is SRH	KX1P vs MI || venue at KX1P Winner is MI
CSK vs KX1P || venue at CSK Winner is CSK	RCB vs RR || venue at RCB Winner is RCB
RCB vs KKR || venue at RCB Winner is RCB	MI vs KX1P || venue at MI Winner is MI
CSK vs KKR || venue at CSK Winner is CSK	MI vs DC || venue at MI Winner is MI
SRH vs DC || venue at SRH Winner is SRH	KX1P vs DC || venue at KX1P Winner is DC
DC vs KKR || venue at DC Winner is DC	MI vs SRH || venue at MI Winner is MI
DC vs KX1P || venue at DC Winner is DC	SRH vs KKR || venue at SRH Winner is SRH
CSK vs DC || venue at CSK Winner is CSK	KKR vs CSK || venue at KKR Winner is CSK
RCB vs RR || venue at RCB Winner is RCB	KX1P vs KKR || venue at KX1P Winner is KX1P
SRH vs MI || venue at SRH Winner is SRH	KKR vs MI || venue at KKR Winner is MI
CSK vs SRH || venue at CSK Winner is CSK	DC vs MI || venue at DC Winner is DC
RR vs CSK || venue at RR Winner is CSK	RCB vs CSK || venue at RCB Winner is CSK
MI vs SRH || venue at MI Winner is MI	CSK vs SRH || venue at CSK Winner is CSK
RR vs KKR || venue at RR Winner is RR	KKR vs DC || venue at KKR Winner is DC

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KKR  vs  DC   ||    venue at KKR          SRH  vs  KX1P  ||    venue at SRH
         Winner is DC                              Winner is SRH

 KKR  vs  SRH  ||    venue at KKR          SRH  vs  DC   ||    venue at SRH
         Winner is SRH                             Winner is SRH

 SRH  vs  CSK  ||    venue at SRH         KKR  vs  KX1P  ||    venue at KKR
         Winner is SRH                             Winner is KKR

 RCB  vs  DC   ||    venue at RCB          MI  vs  RCB   ||    venue at MI
         Winner is RCB                              Winner is MI

 SRH  vs  RR   ||    venue at SRH          RR  vs  KKR   ||    venue at RR
         Winner is SRH                              Winner is RR

  MI  vs  RCB   ||    venue at MI          CSK  vs  RCB   ||    venue at CSK
         Winner is MI                              Winner is CSK

KX1P  vs  RCB   ||    venue at KX1P        DC  vs  KKR   ||    venue at DC
         Winner is RCB                              Winner is DC

  MI  vs  KKR   ||    venue at MI          RR  vs  SRH   ||    venue at RR
         Winner is MI                              Winner is RR

  MI  vs  RR   ||    venue at MI          RCB  vs  SRH   ||    venue at RCB
         Winner is MI                              Winner is RCB

 KKR  vs  RR   ||    venue at KKR         SRH  vs  CSK   ||    venue at SRH
         Winner is RR                              Winner is SRH

  DC  vs  SRH   ||    venue at DC          MI  vs  CSK   ||    venue at MI
         Winner is DC                              Winner is MI

  DC  vs  RCB   ||    venue at DC         SRH  vs  RCB   ||    venue at SRH
         Winner is DC                              Winner is SRH

 RCB  vs  KX1P  ||    venue at RCB         MI  vs  KKR   ||    venue at MI
         Winner is RCB                              Winner is MI

  RR  vs  KX1P  ||    venue at RR          SRH  vs  RR   ||    venue at SRH
         Winner is RR                              Winner is SRH

 KKR  vs  CSK   ||    venue at KKR         RR  vs  KX1P  ||    venue at RR
         Winner is CSK                              Winner is RR

 RCB  vs  MI   ||    venue at RCB         CSK  vs  MI   ||    venue at CSK
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Winner is RCB	Winner is CSK
KKR vs RCB || venue at KKR Winner is RCB	KKR vs RCB || venue at KKR Winner is RCB
KKR vs KX1P || venue at KKR Winner is KX1P	KX1P vs RR || venue at KX1P Winner is KX1P
DC vs RR || venue at DC Winner is DC	DC vs KX1P || venue at DC Winner is DC
DC vs CSK || venue at DC Winner is DC	RCB vs MI || venue at RCB Winner is RCB
RR vs RCB || venue at RR Winner is RCB	KX1P vs RCB || venue at KX1P Winner is KX1P
KX1P vs CSK || venue at KX1P Winner is CSK	KKR vs RR || venue at KKR Winner is KKR
CSK vs MI || venue at CSK Winner is CSK	KKR vs SRH || venue at KKR Winner is SRH
KX1P vs KKR || venue at KX1P Winner is KX1P	CSK vs RR || venue at CSK Winner is CSK
SRH vs RCB || venue at SRH Winner is SRH	DC vs RR || venue at DC Winner is DC
KKR vs MI || venue at KKR Winner is MI	RR vs DC || venue at RR Winner is DC

Qualifier1: RCB vs MI Winner is MI	Qualifier1: CSK vs DC Winner is CSK
Eliminator: SRH vs CSK Winner is CSK	Eliminator: MI vs SRH Winner is MI
Qualifier2: RCB vs CSK Winner is CSK	Qualifier2: DC vs MI Winner is DC
******FINAL****** MI vs CSK	******FINAL****** CSK vs DC

Winner is CSK	**Winner is CSK**