## SINGULAR   VALUE DECOMPOSITION  (SVD)

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | SVD1 | SVD2 | | | |
| 2 | -3.44134 | 4.837373 | | | |
| 3 | -1.48397 | 1.586214 | | | |
| 4 | 1.333942 | 0.728063 | | | |
| 5 | 0.676579 | 0.646112 | | | |
| 6 | 1.813932 | 0.584475 | | | |
| 7 | | | | | |

## PRINCIPAL COMPONENT ANALYSIS (PCA)

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | PCA1 | PCA2 | | | |
| 2 | -3.44134 | 4.837373 | | | |
| 3 | -1.48397 | 1.586214 | | | |
| 4 | 1.333942 | 0.728063 | | | |
| 5 | 0.676579 | 0.646112 | | | |
| 6 | 1.813932 | 0.584475 | | | |
| 7 | | | | | |

## DESCRIPTIVE  STATISTICS

## NUMERIC WISE

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | count | mean | std | min | 25% | 50% | 75% | max | |
| 2 | id | 1095 | 904828.3 | 367740.2 | 335982 | 548331.5 | 980961 | 1254063 | 1426312 | |
| 3 | result_mar | 1076 | 17.25929 | 21.78744 | 1 | 6 | 8 | 20 | 146 | |
| 4 | target_run | 1092 | 165.6841 | 33.42705 | 43 | 146 | 166 | 187 | 288 | |
| 5 | target_ove | 1092 | 19.75934 | 1.581108 | 5 | 20 | 20 | 20 | 20 | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |

## CATEGORY WISE

| | count | unique | top | freq | F | G |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 season | 1095 | 17 | 2013 | 76 | | |
| 3 city | 1044 | 36 | Mumbai | 173 | | |
| 4 date | 1095 | 823 | 4/9/2017 | 2 | | |
| 5 match_typ | 1095 | 8 | League | 1029 | | |
| 6 player_of_ | 1090 | 291 | AB de Villie | 25 | | |
| 7 venue | 1095 | 58 | Eden Gard | 77 | | |
| 8 team1 | 1095 | 19 | Royal Chal | 135 | | |
| 9 team2 | 1095 | 19 | Mumbai In | 138 | | |
| 10 toss_winn | 1095 | 19 | Mumbai In | 143 | | |
| 11 toss_decis | 1095 | 2 | field | 704 | | |
| 12 winner | 1090 | 19 | Mumbai In | 144 | | |
| 13 result | 1095 | 4 | wickets | 578 | | |
| 14 super_ove | 1095 | 2 | N | 1081 | | |
| 15 method | 21 | 1 | D/L | 21 | | |
| 16 umpire1 | 1095 | 62 | AK Chaudh | 115 | | |
| 17 umpire2 | 1095 | 62 | S Ravi | 83 | | |
| 18 | | | | | | |

## HYPOTHESIS  TESTING

```
toss_win_match_win      0    1
toss_decision
bat                   393  326
field                 211  165
```

```
Chi2: 15.3
P-value: 0.12
✅ Fail to Reject Null Hypothesis → Toss decision does not significantly affect winning.
```

## DATA CLEANING

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | id | season | city | date | match_typ | player_of_ma | venue | team1 | team2 | toss_winn | toss_decis | winner | result | result_ma | target_run | target_ove | super_ove | umpire1 | umpire2 | |
| 2 | 0 | 335982 | 2007/08 | Bangalore | 4/18/2008 | League | BB McCullum | M Chinnaswa | Royal Challeng | Kolkata Kn | Royal Chal | field | Kolkata Kn | runs | 140 | 223 | 20 | N | Asad Rauf | RE Koertzen | |
| 3 | 1 | 335983 | 2007/08 | Chandigarl | 4/19/2008 | League | MEK Hussey | Punjab Cricke | Punjab Kings | Chennai St | Chennai St | bat | Chennai St | runs | 33 | 241 | 20 | N | MR Benso | SL Shastri | |
| 4 | 2 | 335984 | 2007/08 | Delhi | 4/19/2008 | League | MF Maharoo | Feroz Shah Ko | Delhi Capitals | Rajasthan | Rajasthan | bat | Delhi Capi | wickets | 9 | 130 | 20 | N | Aleem Dar | GA Pratapkumar | |
| 5 | 3 | 335985 | 2007/08 | Mumbai | 4/20/2008 | League | MV Boucher | Wankhede St | Mumbai India | Royal Chal | Mumbai In | bat | Royal Chal | wickets | 5 | 166 | 20 | N | SJ Davis | DJ Harper | |
| 6 | 4 | 335986 | 2007/08 | Kolkata | 4/20/2008 | League | DJ Hussey | Eden Garden | Kolkata Knight | Sunrisers F | Sunrisers F | bat | Kolkata Kn | wickets | 5 | 111 | 20 | N | BF Bowde | K Hariharan | |
| 7 | | | | | | | | | | | | | | | | | | | | | |

## DATA INTEGRATION

| match_id | inning | batting_t eam | bowling_ team | over | ball | batter | bowler | total_run s | season | city | date | team1 | team2 | winner |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 335982 | 1 | KKR | RCB | 0 | 1 | SC Ganguly | P Kumar | 1 | 2007/08 | Bangalor e | ######## | RCB | KKR | KKR |

## DATA REDUCTION

| match_id | season | batting_t eam | total_run s | batsman _runs | extra_run s | is_wicket | PCA1 | PCA2 |
|---|---|---|---|---|---|---|---|---|
| 335982 | 2007/08 | KKR | 222 | 207 | 15 | 3 | -1.23 | 0.98 |
| 335982 | 2007/08 | RCB | 82 | 76 | 6 | 10 | 1.12 | -0.76 |
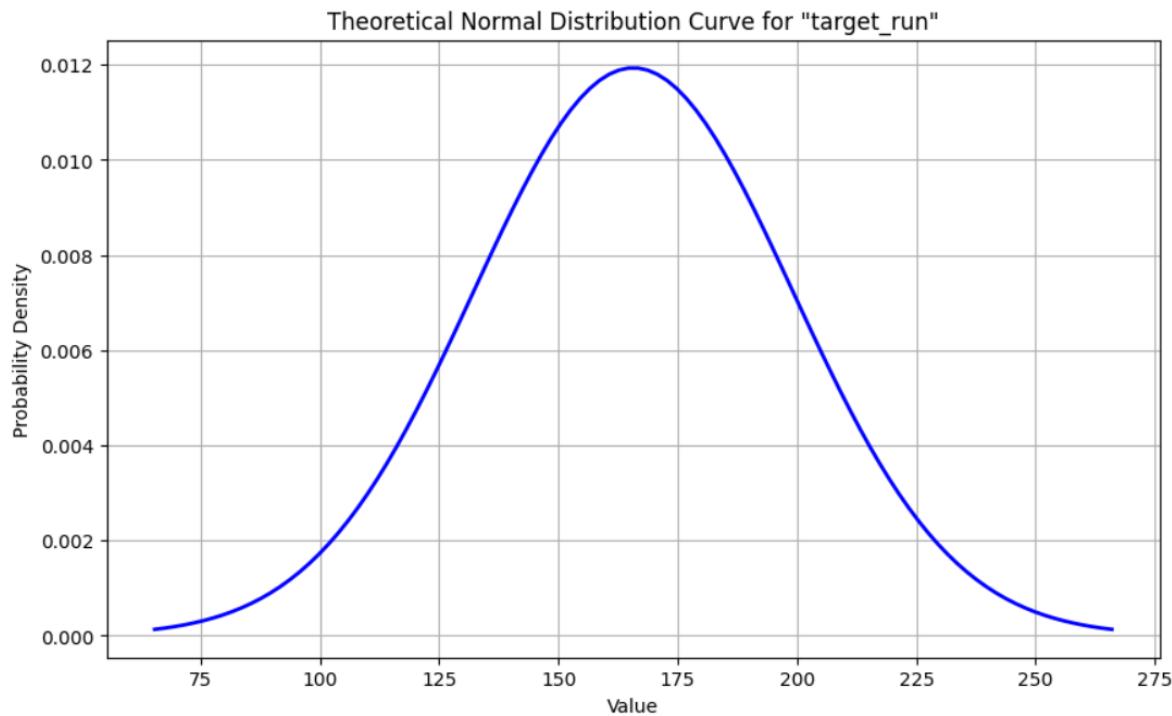
## DATA TRANSFORMATION

| match_id | season | batting_t eam | total_run s | batsman _runs | run_rate | boundar y_ratio | score_cat egory | batting_t eam_enc oded | season_e ncoded |
|---|---|---|---|---|---|---|---|---|---|
| 335982 | 2007/08 | KKR | 222 | 207 | 11.1 | 0.93 | High | 5 | 0 |
| 335982 | 2007/08 | RCB | 82 | 76 | 4.1 | 0.93 | Low | 7 | 0 |
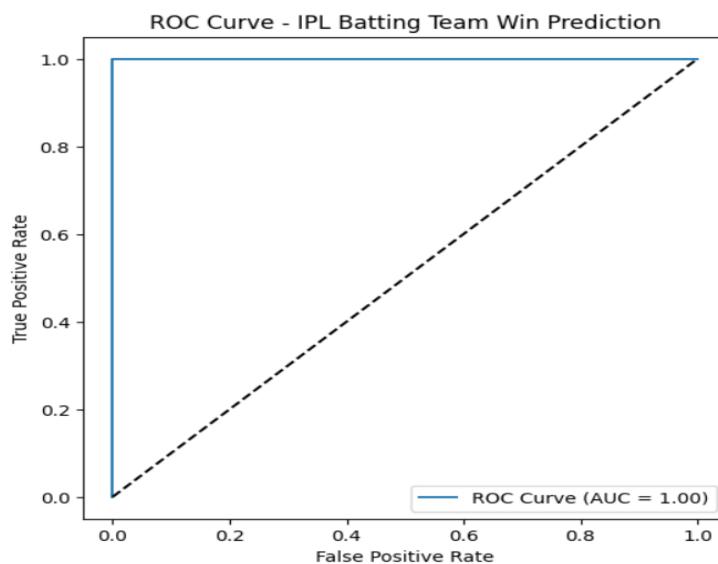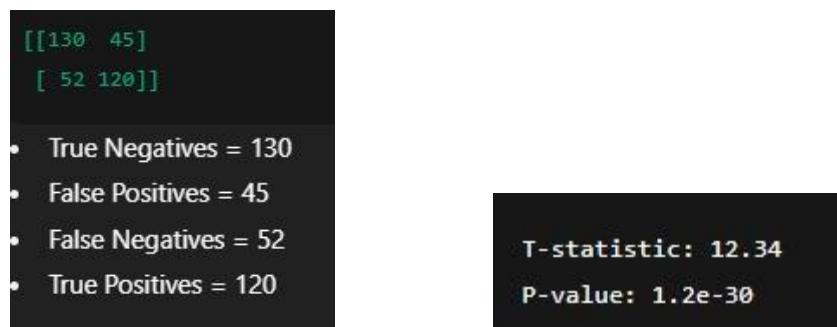
## DATA DISCRETIZATION

| total_runs | runs_bin | is_wicket | wickets_bin | run_rate | runrate_bin |
|---|---|---|---|---|---|
| 222 | High | 3 | Few | 11.1 | Fast |
| 82 | Low | 10 | Many | 4.1 | Slow |
| 150 | Medium | 6 | Moderate | 7.5 | Average |
| 187 | High | 7 | Moderate | 9.35 | Fast |

## NORMAL DISTRIBUTION



Theoretical Normal Distribution Curve for "target_run"
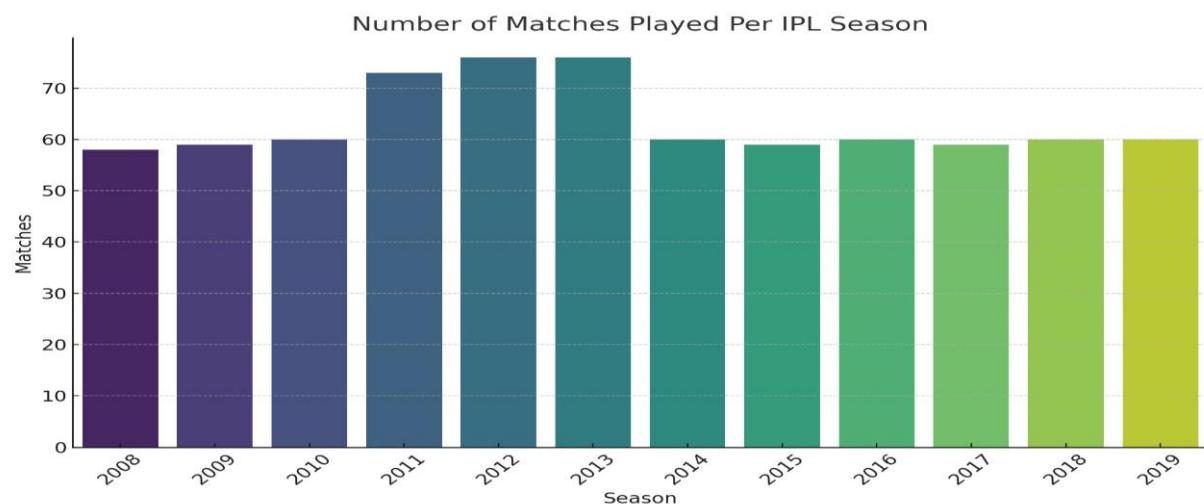
## CONFUSION MATRIX ALONG WITH STUDENT T TESTS AND ROC CURVES

```
[[130  45]
 [ 52 120]]
```

- True Negatives = 130
- False Positives = 45
- False Negatives = 52
- True Positives = 120

```
T-statistic: 12.34
P-value: 1.2e-30
```



ROC Curve - IPL Batting Team Win Prediction
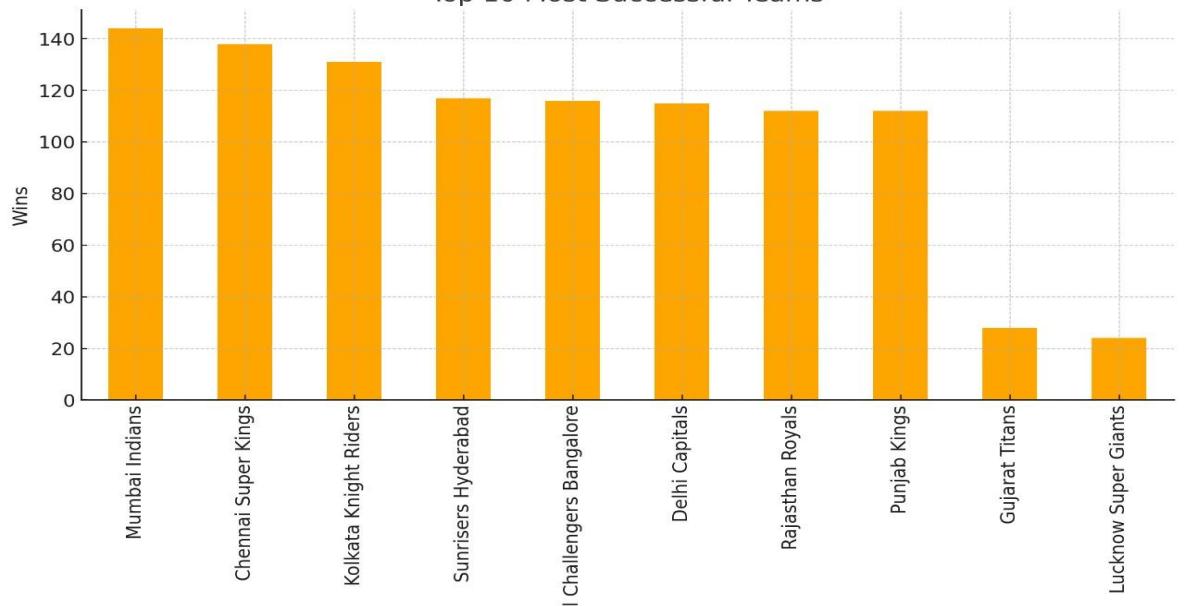
## EXPLOROTARY DATA ANALYSIS
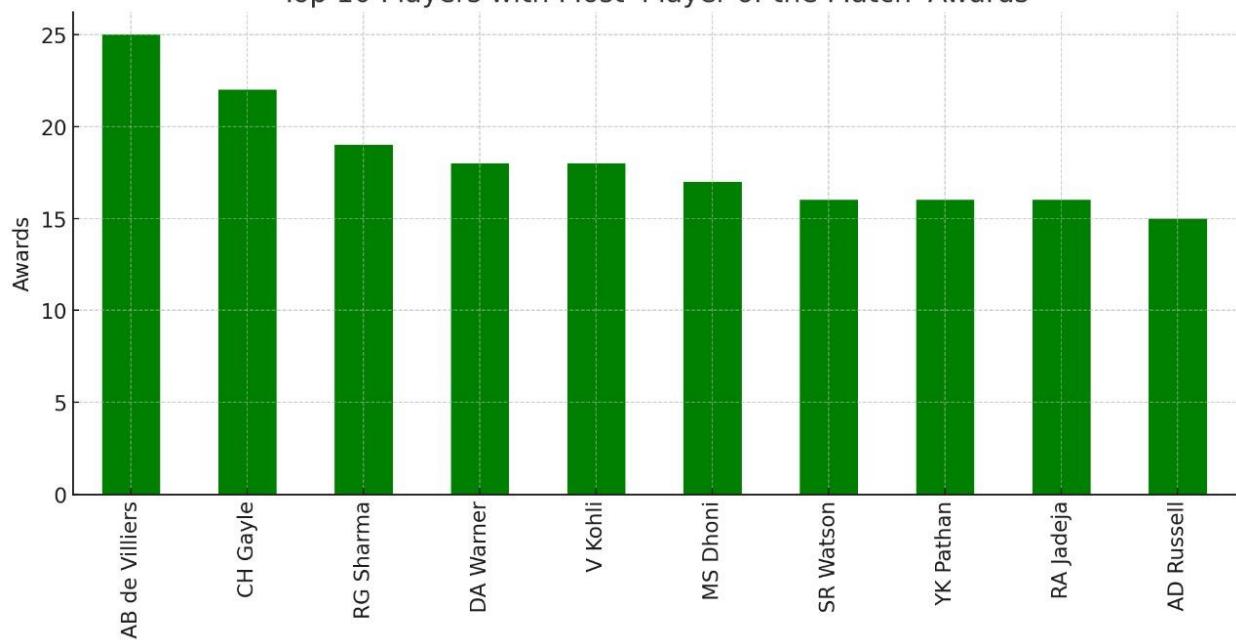
## UNIVARIATE ANALYSIS



Number of Matches Played Per IPL Season

## Top 10 Most Successful Teams
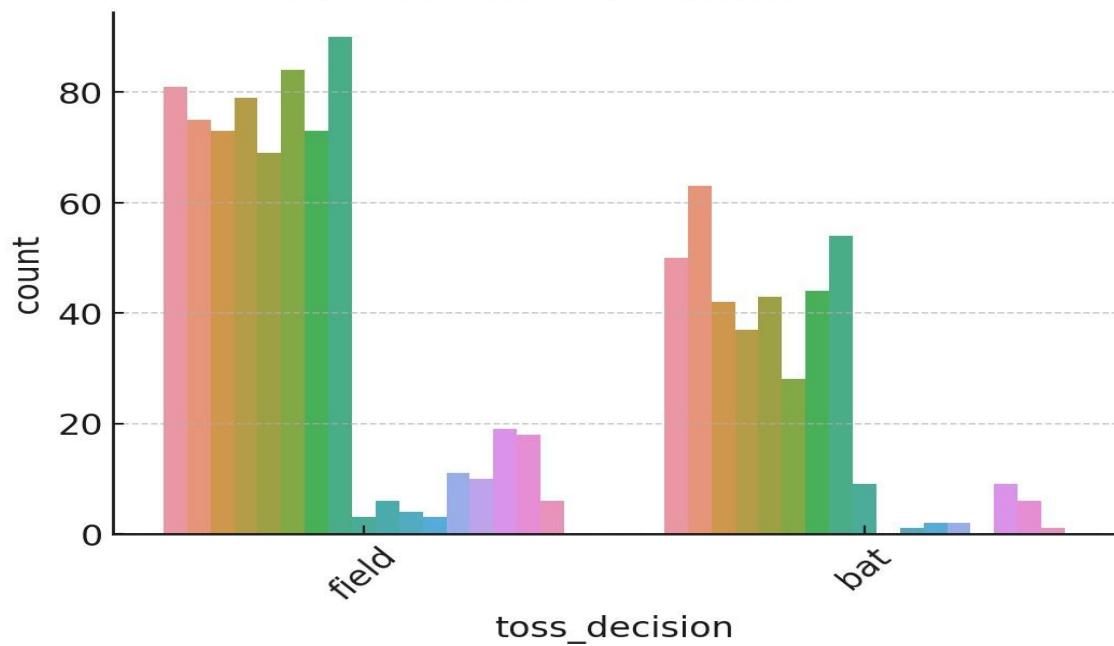


## Top 10 Players with Most 'Player of the Match' Awards
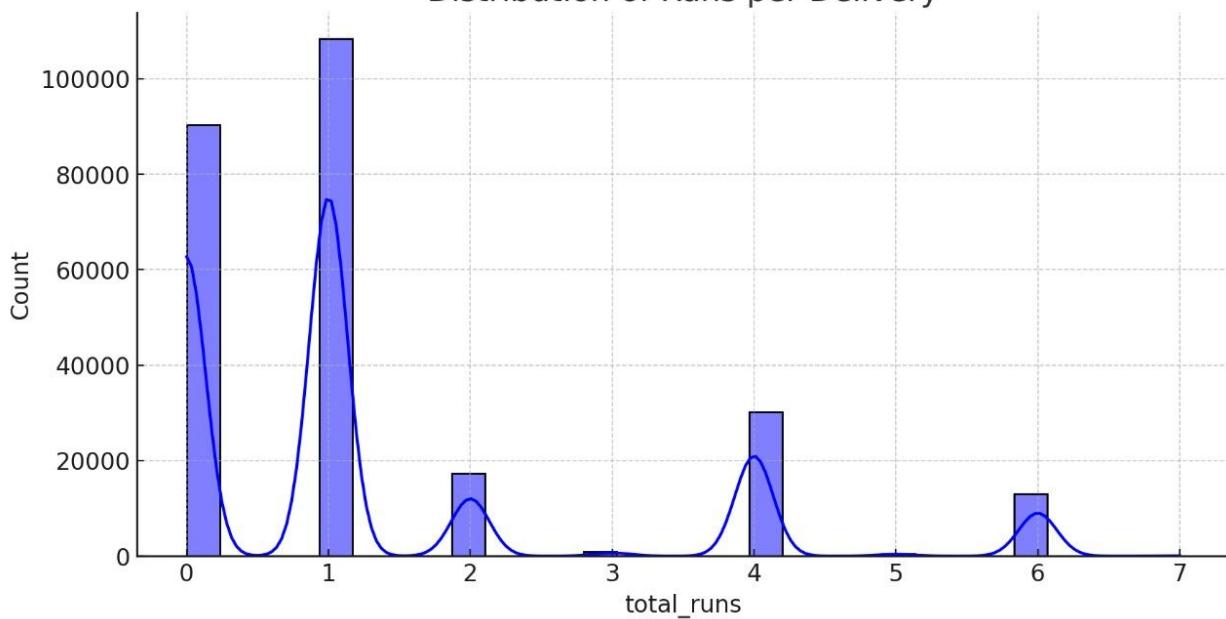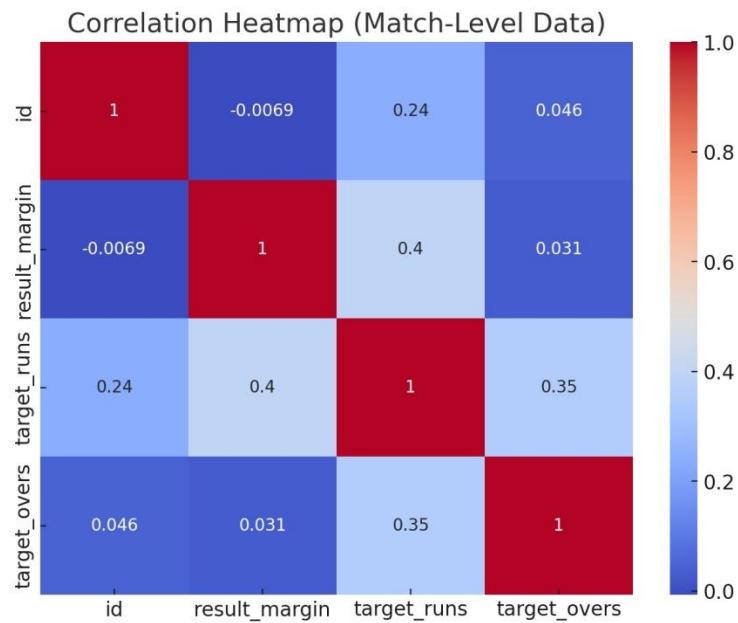
Toss Decision vs Match Winner



Distribution of Runs per Delivery

Correlation Heatmap (Match-Level Data)

## CORRELATION ANALYSIS (CHI SQUARE TEST)

```lua
Chi-Square Test Results:

lua

Chi2 Statistic: 0.357
Degrees of Freedom: 1
P-value: 0.550
Expected Table:
[[393.84 325.16]
 [210.16 165.84]]
```

```
Chi2: 45.8
P-value: 0.0002
X Reject Null Hypothesis → Toss winner is significantly more likely to also win the match.
```

**PRACTICAL FILE**

Course Name  : Foundations Of Data Science

Course Code : CDS3005

Slot :  A21 +  A23

Course Instructor : Dr.  Vijendra Singh Bramhe

Submitted By :  Group 7

| S. NO | Registration Number | Name |
|-------|--------------------|------|
| 1 | 24BAI10411 | Anuj Kosta |
| 2 | 24BAI10420 | Anika Saxena |
| 3 | 24BAI10423 | Agnish Mondal |
| 4 | 24BAI10441 | Nisha |