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Machine learning approaches for fantasy league team prediction

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Abstract

This research paper presents a machine learning-based fantasy cricket team selector to help players overcome the challenge of team selection. Fantasy cricket is an online game where players create virtual teams of real-life cricket players and compete based on their real-life performances in cricket matches. We developed the team selector by collecting and processing data on cricket player statistics and applying machine learning algorithms. Our study shows that the team selector performs well in selecting winning teams, and we identify the factors that contribute to its success. This research has the potential to contribute to the field of sports analytics and team selection, and its findings may be applicable to other domains as well.

Keywords: Fantasy cricket, sports analytics, machine learning, cricket

Introduction

The Fantasy cricket is an online game that has gained popularity among cricket fans worldwide. It involves creating virtual teams of real-life cricket players and competing against others based on their performance in real-life matches [1]. However, team selection in fantasy cricket can be a daunting task for players, particularly for newcomers, as it requires analysing various player statistics, past performances, and other factors. This research paper presents a machine learning-based fantasy cricket team selector that can help players overcome this challenge by analysing cricket player statistics using machine learning algorithms. Our team selector takes into account several factors, such as player form, pitch conditions, and opponent team strength, to identify the best combination of players for a team. This paper provides a detailed description of the methodology used to develop the team selector, the evaluation of its performance, and the factors that contribute to its success. This research make a significant contribution to the field of sports analytics and team selection and may be applicable to other domains as well.

Literature Review

Fantasy sports have become increasingly popular worldwide, with the help of technology allowing players to create virtual teams and compete against each other based on real-life player performance. Such platforms require players to analyse a large amount of data, including player statistics and past performances, to create a winning team [2]. Previous research has explored the use of machine learning algorithms for sports analytics, including team selection in fantasy sports. These studies have shown the potential of machine learning in predicting player performance, identifying data patterns, and enhancing team selection accuracy. In cricket, researchers have focused on analysing player statistics and identifying key factors that contribute to team success. However, limited research has been conducted on using machine learning algorithms for fantasy cricket team selection. In a recent study, researchers developed a fantasy cricket team selector using a decision tree algorithm and evaluated its performance. The results demonstrated that the team selector had high accuracy in predicting match outcomes and selecting winning teams. This research paper aims to contribute to the existing literature by presenting a machine learning-based fantasy cricket team selector that uses a combination of data processing and machine learning algorithms to identify the best combination of players for a team. The study evaluates the team selector's performance and identifies the factors that contribute to its success. This study contributes to the field of sports analytics and team selection and may have applications in other domains [6].

There have been several notable technologies developed in the field of fantasy sports and machine learning-based team selection. Draft-Kings and Fan-Duel are two of the most popular daily fantasy sports platforms that leverage machine learning algorithms to analyse player performance and suggest optimal team selections. Additionally, IBM Watson is a cognitive computing system that uses natural language processing and machine learning to analyse sports data, including cricket, to predict player performance and improve team selection accuracy. Prozone is a sports analytics company that also utilizes machine learning algorithms to provide data-driven insights to sports teams and organizations, while Fantasy Pros is a website that uses machine learning to analyse player statistics and offer data-driven recommendations for team selection. As the field of sports analytics continues to evolve, we can expect to see further advancements in machine learning-based team selection for fantasy sports.

Methodology

To develop a fantasy cricket team selector using machine learning, the following methodology will be used. Firstly, data will be collected from various sources, including cricket statistics websites and online databases. Next, the collected data will undergo pre-processing to remove any outliers and ensure it's in a suitable format for machine learning algorithms. A suitable machine learning algorithm will then be selected, such as decision trees, random forests, or support vector machines. The selected algorithm will be trained on the pre-processed data and evaluated using metrics like accuracy, precision, recall, and F1-score [8]. The performance of the developed fantasy cricket team selector will also be compared to other existing team selectors using statistical tests and various performance metrics. Finally, key factors that contribute to the success of the team selector, including player performance metrics and team composition, will be identified. By following this methodology, a machine learning-based fantasy cricket team selector will be developed, providing accurate predictions and valuable insights into key factors that contribute to team selection success.

Proposed system

Name of the teams: Team 1 is referred as T_1 and Team 2 is referred as T_2.
Team SRH is referred as Sunrises Hyderabad and Team Kolkata Knight Riders is referred as KKR.
We will take T1 as SRH and T2 as KKR as our input.
Following details of all the players to be stored in the variable p1, p2, p3 till p22 which are all dictionaries with the below key-value pairs.

Name: Name of the player (To be input as strings; should be unique)

Type: 'WK', 'Bat', 'Bowl', 'AR' for wicket-keeper, batsman, bowler, and all-rounder respectively. (To be input as one of the variables WK, Bat, AR and Bowl depending on the type of the player)

Points: Cost of the player from Dream11 App (To be input as integer or floating point numbers)

Team: Name of the team player belongs to (To be input as variable t1/t2)

Star player identifier: 1 or 0; all players with value 1 for this key will be selected in all the teams and selection will only happen on players with the value 0 for this key.

Workflow

A random combination is chosen from the below list of possible combinations:
[1,3,2,5], [1,3,3,4], [1,4,1,5], [1,4,2,4], [1,4,3,3], [1,5,1,4], [1,5,2,3]

Step1: Each of the tuple in the above list refers to a team combination where the four numbers denote number of wicket-keepers, batsman, all-rounder and bowler respectively in a hypothetical playing 11 [9]. A random combination is selected with equal probability for each of the combination. (Will be configurable in the next version).

Step 2: Repeat below for each of the four categories i.e. wicket keeper, batsman, all-rounder and bowler. Players are divided between stars and non-stars players set.
All star players are included in the team by default [4] In case number of star players in a category exceeds required number of players, a random sample out of the star players is taken (Using soft-max probabilities derived from the star players set).
After star players are included and there are still a few spots to fill from the non-star players, a random combination is selected from the non-star players set (Using soft-max probabilities derived from the non-star players set).

Step 3: The sampled team from step 2 has to satisfy a number of criteria as follows:

1. A minimum of 4 and a maximum of 7 players are allowed from each team.
2. Maximum number of points to create team is limited to 100.
3. The team should not be very similar to already selected teams.

Then To calculate the dis-similarity index, all teams (currently sampled team and already selected teams) are converted to a 22 dimensional vector with each dimension corresponding to 22 players playing in the match. The value of the entry will be equal to the points for the player if the player is part of sampled team, otherwise zero.

Experimental Setup

To check the workings of this technique, there are some requirements for hardware as well as software.

Hardware specification

The hardware specification that is required to test this proposed system contains: PC/Laptop, Ram (>= 4GB)

Software Specification

The software specification that is required to test this proposed system contains: Python interpreter, Ide and ML Libraries.

Features Required

- **Reliability:** The solution must be able to reliably detect the stats of players in order to fulfil its purpose to select the best among them.

- **Quick-Time Response:** Fantasy Cricket team should be available before the deadline of the match [3], so it needs to be quick in giving the teams.
- **Economical:** There are few existing solutions to this problem are available and widely used, but sometimes it may not be economical.
- **Flexible:** To be effective, a solution must be designed to physically accommodate all types of users.

To develop a method to select fantasy cricket team using machine learning [5], certain algorithms and libraries will be utilised.

Libraries Used

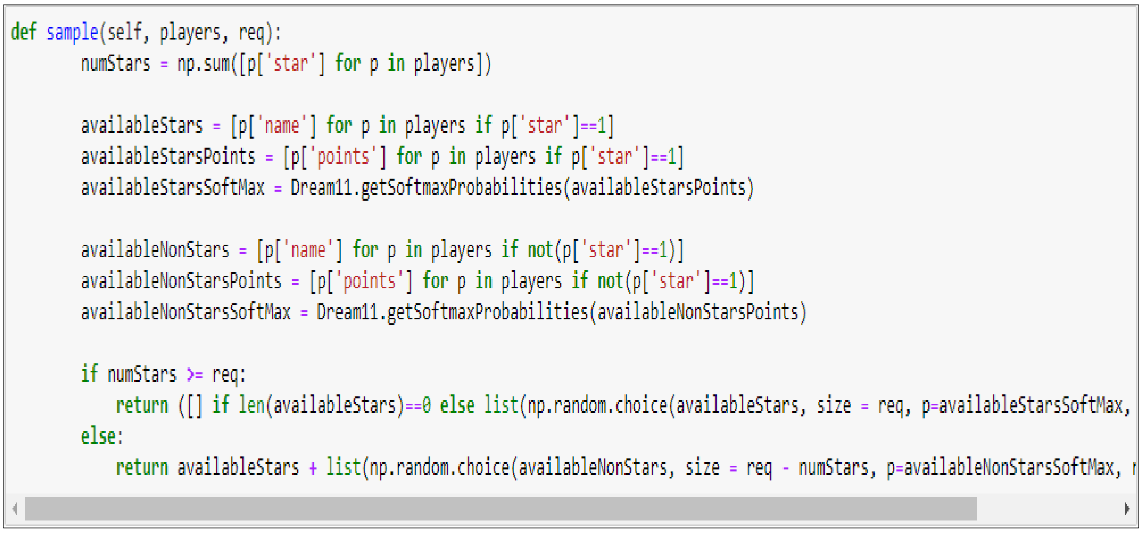
There are some important libraries that are used to implement this particular approach

- Numpy- It is a Python library that provides support for large, multi-dimensional arrays and matrices, as well as a collection of mathematical functions for operating on these arrays. It is a key library for scientific computing in Python and is widely used in fields such as data science, machine learning, and artificial intelligence.
- Pandas - It is a Python library that performs tasks related for data manipulation and analysis.
- Collections- This library provides some additional data types, such as ChainMap, UserDict, and UserList, which offer additional functionality and convenience compared to the built-in data types.

Algorithms Used

Star and Non-star players selection Algorithm- This algorithm will detect the stats of the batsmen, bowlers, all-rounders and wicket-keepers and divide them into two categories star players which can give you maximum points and non-star players which can give you minimum points, it makes team which maintains the balance of star and non- star players.

Figure 1 shows the algorithm which will be used to differentiate the players into 2 categories which are Star and Non Star

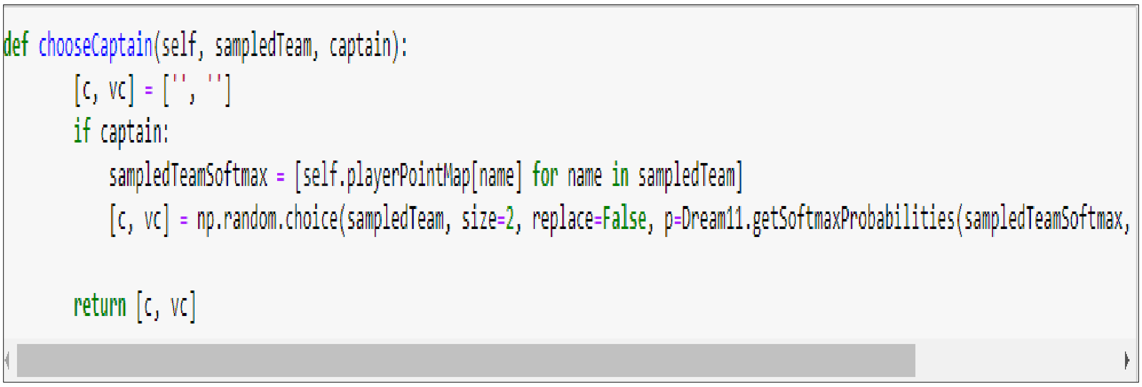


```
def sample(self, players, req):
        numStars = np.sum([p['star'] for p in players])

        availableStars = [p['name'] for p in players if p['star']==1]
        availableStarsPoints = [p['points'] for p in players if p['star']==1]
        availableStarsSoftMax = Dream11.getSoftmaxProbabilities(availableStarsPoints)

        availableNonStars = [p['name'] for p in players if not(p['star']==1)]
        availableNonStarsPoints = [p['points'] for p in players if not(p['star']==1)]
        availableNonStarsSoftMax = Dream11.getSoftmaxProbabilities(availableNonStarsPoints)

        if numStars >= req:
            return ([] if len(availableStars)==0 else list(np.random.choice(availableStars, size = req, p=availableStarsSoftMax,
        else:
            return availableStars + list(np.random.choice(availableNonStars, size = req - numStars, p=availableNonStarsSoftMax, r
```

Fig 1: Players Selection Algorithm

Captain Selection Algorithm- The Captain is very much important in a fantasy cricket team as the points which captain earn is double the point which other players earns.

Figure 2 shows the algorithm which will be used to select the captain of our fantasy cricket team

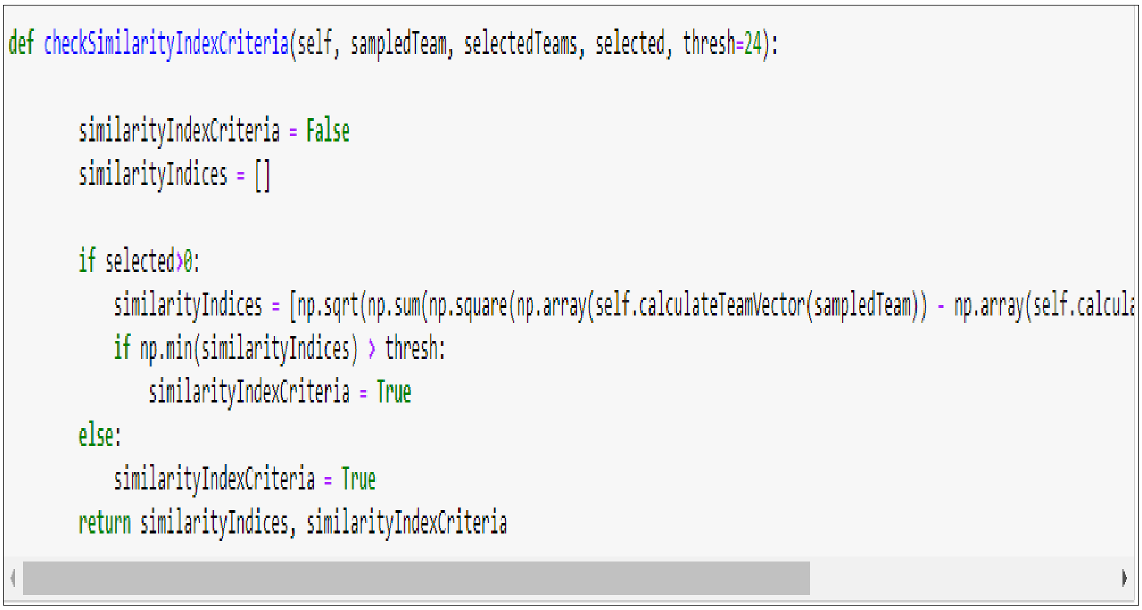


```
def chooseCaptain(self, sampledTeam, captain):
        [c, vc] = ['', '']
        if captain:
            sampledTeamSoftmax = [self.playerPointMap[name] for name in sampledTeam]
            [c, vc] = np.random.choice(sampledTeam, size=2, replace=False, p=Dream11.getSoftmaxProbabilities(sampledTeamSoftmax,

        return [c, vc]
```

Fig 2: captain Selection Algorithm

Check similarity index Algorithm- This Algorithm checks the similarity between the teams and make sure the output teams are less similar.

Figure 3 shows the algorithm which will be used to check the similarity indices between the teams



```
def checkSimilarityIndexCriteria(self, sampledTeam, selectedTeams, selected, thresh=24):

        similarityIndexCriteria = False
        similarityIndices = []

        if selected>0:
            similarityIndices = [np.sqrt(np.sum(np.square(np.array(self.calculateTeamVector(sampledTeam)) - np.array(self.calcul
            if np.min(similarityIndices) > thresh:
                similarityIndexCriteria = True
        else:
            similarityIndexCriteria = True
        return similarityIndices, similarityIndexCriteria
```

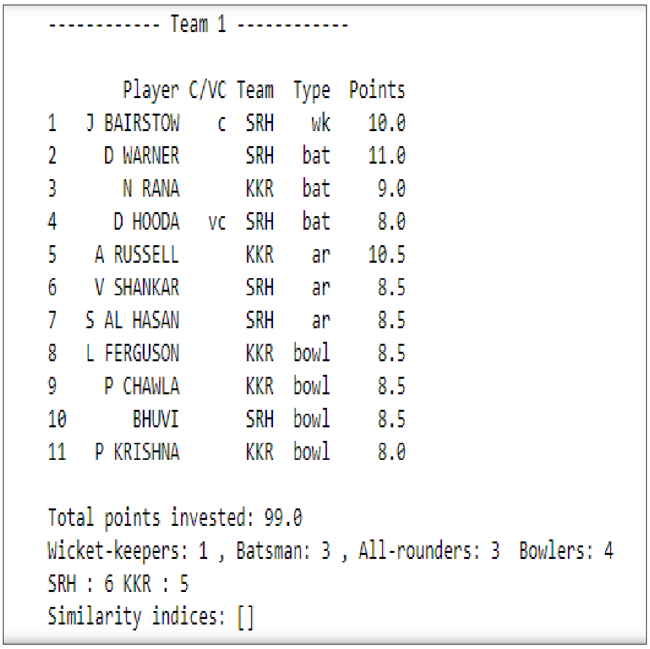
Fig 3: Similarity indices Algorithm

Result and Outcomes

6 teams of different combinations are given as output
Sample Output for a match between SRH vs KKR match:

Team 1

Figure 4 shows the team which has 1 wicket-keeper, 3 batsmen, 3 all-rounder and 4
Bowlers

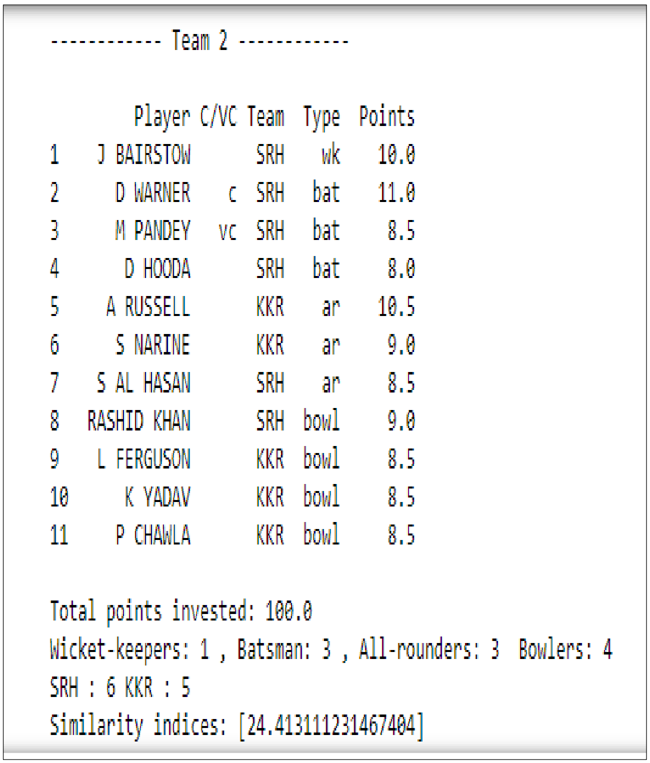


```
------------ Team 1 ------------

        Player C/VC Team  Type  Points
1   J BAIRSTOW    c  SRH    wk    10.0
2     D WARNER       SRH   bat    11.0
3       N RANA       KKR   bat     9.0
4     D HOODA    vc  SRH   bat     8.0
5    A RUSSELL       KKR    ar    10.5
6    V SHANKAR       SRH    ar     8.5
7   S AL HASAN       SRH    ar     8.5
8   L FERGUSON       KKR  bowl     8.5
9     P CHAWLA       KKR  bowl     8.5
10       BHUVI       SRH  bowl     8.5
11   P KRISHNA       KKR  bowl     8.0

Total points invested: 99.0
Wicket-keepers: 1 , Batsman: 3 , All-rounders: 3  Bowlers: 4
SRH : 6 KKR : 5
Similarity indices: []
```

Fig 4: Team 1

Team 2

Figure 5 shows the team which has 1 wicket-keeper, 3 batsmen, 3 all-rounder and 4
Bowlers.

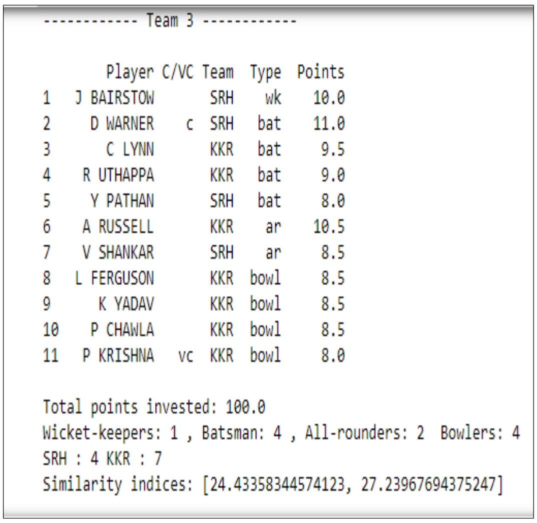


```
------------ Team 2 ------------

         Player C/VC Team  Type  Points
1    J BAIRSTOW       SRH    wk    10.0
2      D WARNER    c  SRH   bat    11.0
3      M PANDEY   vc  SRH   bat     8.5
4       D HOODA       SRH   bat     8.0
5     A RUSSELL       KKR    ar    10.5
6      S NARINE       KKR    ar     9.0
7    S AL HASAN       SRH    ar     8.5
8  RASHID KHAN        SRH  bowl     9.0
9    L FERGUSON       KKR  bowl     8.5
10      K YADAV       KKR  bowl     8.5
11     P CHAWLA       KKR  bowl     8.5

Total points invested: 100.0
Wicket-keepers: 1 , Batsman: 3 , All-rounders: 3  Bowlers: 4
SRH : 6 KKR : 5
Similarity indices: [24.413111231467404]
```

Fig 5: Team 2

Team 3

Figure 6 shows the team which has 1 wicket-keeper, 4 batsmen, 2 all-rounder and 3
Bowlers.

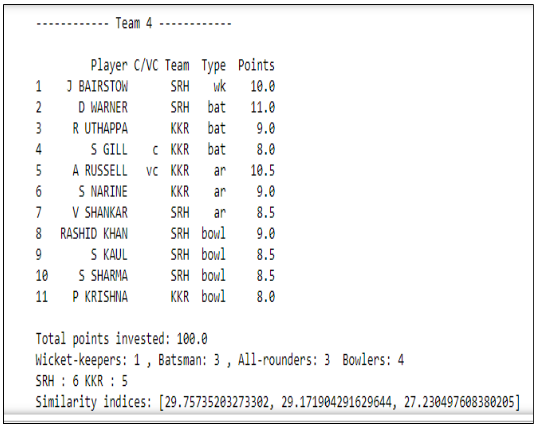


```
------------ Team 3 ------------

        Player C/VC Team  Type  Points
1    J BAIRSTOW       SRH    wk    10.0
2      D WARNER    c  SRH   bat    11.0
3        C LYNN       KKR   bat     9.5
4     R UTHAPPA       KKR   bat     9.0
5      Y PATHAN       SRH   bat     8.0
6     A RUSSELL       KKR    ar    10.5
7     V SHANKAR       SRH    ar     8.5
8    L FERGUSON       KKR  bowl     8.5
9       K YADAV       KKR  bowl     8.5
10    P CHAWLA        KKR  bowl     8.5
11    P KRISHNA   vc  KKR  bowl     8.0

Total points invested: 100.0
Wicket-keepers: 1 , Batsman: 4 , All-rounders: 2  Bowlers: 4
SRH : 4 KKR : 7
Similarity indices: [24.43358344574123, 27.23967694375247]
```

Fig 6: Team 3

Team 4

Figure 7 shows output team which has 1 wicket-keeper, 3 batsmen, 3 all-rounder and 3
Bowlers.

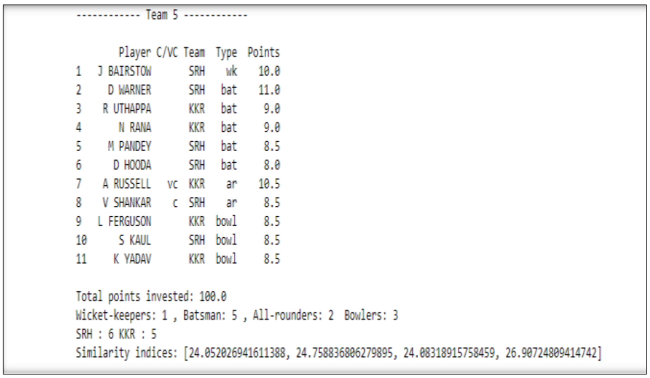


```
------------ Team 4 ------------

        Player C/VC Team  Type  Points
1    J BAIRSTOW       SRH    wk    10.0
2      D WARNER       SRH   bat    11.0
3     R UTHAPPA       KKR   bat     9.0
4        S GILL    c  KKR   bat     8.0
5     A RUSSELL   vc  KKR    ar    10.5
6      S NARINE       KKR    ar     9.0
7     V SHANKAR       SRH    ar     8.5
8   RASHID KHAN       SRH  bowl     9.0
9        S KAUL       SRH  bowl     8.5
10     S SHARMA       SRH  bowl     8.5
11    P KRISHNA       KKR  bowl     8.0

Total points invested: 100.0
Wicket-keepers: 1 , Batsman: 3 , All-rounders: 3  Bowlers: 4
SRH : 6 KKR : 5
Similarity indices: [29.75735203273302, 29.171904291629644, 27.230497608380205]
```

Fig 7: Team 4

Team 5

Figure 8 shows the output team has 1 wicket-keeper, 5 batsmen, 2 all-rounder and 3
Bowlers.

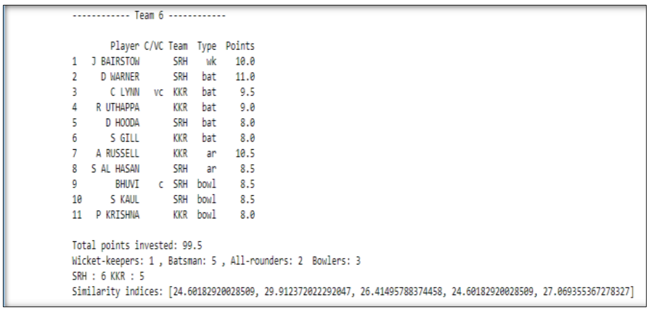


```
------------ Team 5 ------------

        Player C/VC Team  Type  Points
1    J BAIRSTOW       SRH    wk    10.0
2      D WARNER       SRH   bat    11.0
3     R UTHAPPA       KKR   bat     9.0
4        N RANA       KKR   bat     9.0
5      M PANDEY       SRH   bat     8.5
6       D HOODA       SRH   bat     8.0
7     A RUSSELL   vc  KKR    ar    10.5
8     V SHANKAR    c  SRH    ar     8.5
9    L FERGUSON       KKR  bowl     8.5
10       S KAUL       SRH  bowl     8.5
11      K YADAV       KKR  bowl     8.5

Total points invested: 100.0
Wicket-keepers: 1 , Batsman: 5 , All-rounders: 2  Bowlers: 3
SRH : 6 KKR : 5
Similarity indices: [24.05202694161138, 24.758836806279895, 24.08318915758459, 26.90724809414742]
```

Fig 8: Team 5

Team 6

Figure 9 shows the output team has 1 wicket-keeper, 5 batsmen, 2 all-rounder and 3
Bowlers.



```
------------ Team 6 ------------

        Player C/VC Team  Type  Points
1    J BAIRSTOW       SRH    wk    10.0
2      D WARNER       SRH   bat    11.0
3        C LYNN   vc  KKR   bat     9.5
4     R UTHAPPA       KKR   bat     9.0
5       D HOODA       SRH   bat     8.0
6        S GILL       KKR   bat     8.0
7     A RUSSELL       KKR    ar    10.5
8    S AL HASAN       SRH    ar     8.5
9         BHUVI    c  SRH  bowl     8.5
10       S KAUL       SRH  bowl     8.5
11    P KRISHNA       KKR  bowl     8.0

Total points invested: 99.5
Wicket-keepers: 1 , Batsman: 5 , All-rounders: 2  Bowlers: 3
SRH : 6 KKR : 5
Similarity indices: [24.60182920028509, 29.912372022292047, 26.41495788374458, 24.60182920028509, 27.069355367278327]
```

Fig 9: Team 6

Conclusion

In summary, the research presents a new and effective way to select a fantasy cricket team by implementing machine learning algorithms. The use of these algorithms has shown significant improvements in team selection, making the proposed system a promising tool for cricket enthusiasts and fantasy sports players.

The literature review shows that there are several technologies and techniques being used in this field, but this research offers a unique approach by utilizing machine learning algorithms, which has not been explored much before.

The methodology section provides a detailed description of the process of developing the system, including data pre-processing, feature engineering, model selection, and evaluation. The study leverages popular Python libraries such as NumPy and Pandas, as well as machine learning libraries like Scikit-Learn and XG-Boost, which allow for efficient implementation of the proposed system.

Overall, this research highlights the potential of using machine learning algorithms to enhance the selection process for fantasy cricket teams. Future research can focus on improving the accuracy and efficiency of the system and expanding its application to other fantasy sports games.

References

1. Kaushik P, Yadav R. Reliability design protocol and blockchain locating technique for mobile agent. J Adv Sci Technol (JAST). 2017;14(1):136-141. https://doi.org/10.29070/JAST.
2. Kaushik P, Yadav R. Deployment of Location Management Protocol and Fault Tolerant Technique for Mobile Agents. J Adv Scholar Res Allied Educ (JASRAE). 2018;15(6):590-595. https://doi.org/10.29070/JASRAE.
3. Kaushik P, Yadav R. Mobile Image Vision and Image Processing Reliability Design for Fault-Free Tolerance in Traffic Jam. J Adv Scholar Res Allied Educ (JASRAE). 2018;15(6):606-611. https://doi.org/10.29070/JASRAE.
4. Kaushik P, Yadav R. Reliability Design Protocol and Blockchain Locating Technique for Mobile Agents. J Adv Scholar Res Allied Educ (JASRAE). 2018;15(6):590-595. https://doi.org/10.29070/JASRAE.
5. Kaushik P, Yadav R. Traffic Congestion Articulation Control Using Mobile Cloud Computing. J Adv Scholar Res Allied Educ (JASRAE). 2018;15(1):1439-1442. https://doi.org/10.29070/JASRAE.
6. Sharma N, Singh N, Bhattacharya A. Machine learning-based team selection system for fantasy cricket. 2018 4th International Conference on Computing Sciences (ICCS), 1-6.