

MARK SCHEME

MAY I RECOMMEND THE FOLLOWING 2023 SAMPLE PAPER (V1)

Total 30 marks

1: (a) Outline two benefits to NextStar's clients of NextStar using a recommendation system [2 marks]

[1] Mark for point

[1] mark for a brief account or summary of the point.

Personalized recommendations:

Discover new artists:

Improved user experience:

Increased engagement:

Greater satisfaction:

(b) Identify two drawbacks of NextStar using a Cloud Computing Model to host its applications [2 marks]

[1] Mark for each possible answer, examples include

Dependence on internet connection:

Security concerns:

Limited control:

Cost:

Data privacy:

2: (a) Describe two benefits of using supervised learning opposed to unsupervised learning methods [4 marks]

[1] Mark for each point

[1] Mark for giving a detailed account as an expansion on each point.

Example points could include;

Greater accuracy:

Clear evaluation metrics:

Faster training:

Better feature selection:

Easier interpretation:

(b) Describe how the cold start problem could impact NextStar using the collaborative based filtering method to suggest recommendations [4 marks]

[1] Mark for each point

[1] Mark for giving a detailed account as an expansion on each point.

Limited recommendations for new users:

Limited recommendations for new artists:

Unpredictable recommendations:

Data sparsity:

Over-reliance on popular items:

NextStar has collected a significant amount of user data, including their ratings on various artists and artworks. They plan to use the k-NN algorithm to improve their recommender system.

3: Explain how the k-NN algorithm can be used within a recommender system for NextStar. Provide an example of how it could work for recommending artists to users. [6 marks]

Students should give a detailed account including reasons or causes.

Example points could include;

Introduction to the k-NN algorithm and its use in recommender systems.

Explanation of user-based collaborative filtering and how it can be used to recommend artists to users.

Explanation of item-based collaborative filtering and how it can be used to recommend artists to users.

Explanation of hybrid approaches and how they can improve the accuracy and diversity of recommendations.

Example of how the k-NN algorithm can be used to recommend artists to users, including how it identifies similar users or items and recommends new artists based on their preferences or characteristics.

Conclusion on the benefits of using the k-NN algorithm in NextStar's recommender system, including improved accuracy, diversity, and user satisfaction.

[1-2 marks]

A limited response that indicates very little understanding of how the k-NN algorithm can be used within a recommender system for NextStar. Uses little or no appropriate subject-specific terminology. No reference is made to the NextStar case study scenario in the response. The response is theoretical and descriptive.

[3-4 marks]

A superficial explanation of how the k-NN algorithm can be used within a recommender system for NextStar to recommend artists to users. There is some use of appropriate subject-specific terminology in the response, but explicit and relevant references to the NextStar case study scenario are missing.

[5-6 marks]

A thorough explanation of how the k-NN algorithm can be used within a recommender system for NextStar to recommend artists to users. Explicit and relevant references are made to the NextStar case study scenario. There is appropriate use of subject-specific terminology throughout the response. The response demonstrates a clear understanding of how the k-NN algorithm can be applied to the NextStar platform to provide personalized recommendations to users.

NextStar has incorporated a recommender system into their application, which provides personalized recommendations to users based on their ratings and preferences. As the system becomes more sophisticated, it is critical to ensure that it is providing accurate and relevant recommendations to users.

4: How can NextStar test and evaluate their recommender system to ensure it provides accurate and relevant recommendations to users? [12 marks]

A/B testing:

User surveys:

Cross-validation:

Diversity and novelty analysis:

Performance metrics:

Marks	Level descriptor
Adequate 4–6 marks	<ul style="list-style-type: none"> • A descriptive response with limited knowledge and/or understanding of the relevant issues or concepts. • A limited use of appropriate terminology. • There is limited evidence of analysis. • There is evidence that limited research has been undertaken.
Competent 7–9 marks	<ul style="list-style-type: none"> • A response with knowledge and understanding of the relevant issues and/or concepts. • A response that uses terminology appropriately in places. • There is some evidence of analysis. • There is evidence that research has been undertaken.
Proficient 10–12 marks	<ul style="list-style-type: none"> • A response with a detailed knowledge and clear understanding of the relevant issues and/or concepts. • A response that uses terminology appropriately throughout. • There is competent and balanced analysis. • Conclusions are drawn that are linked to the analysis. • There is clear evidence that extensive research has been undertaken.

From the IB Specification 2014