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Institute of Management & Research
Approved by A.I.C.T.E., Ministry of HRD, Govt. of India
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Roll No……

POST GRADUATE DIPLOMA IN MANAGEMENT (2020-22)
END TERM EXAMINATION (TERM -III)

Subject Name: **Artificial Intelligence for Managers** Time: **02.30 hrs**
Sub. Code: PG-35 Max Marks: **60**

Note:
All questions are compulsory. Section A carries 10 marks: 5 questions of 2 marks each, Section B carries 30 marks having 3 questions (with internal choice question in each) of 10 marks each and Section C carries 20 marks one Case Study having 2 questions of 10 marks each.

SECTION - A

Attempt all questions. All questions are compulsory. **2×5 = 10 Marks**

Q. 1 (A): Discuss the importance of AI in the day to day functioning of a hospital.
Q. 1 (B): What are is Peer to Peer Economy? How it is enabled by analytics and AI?
Q. 1 (C): What is the importance of Clustering in Business Proximity?
Q. 1 (D): Discuss the Morvac's Paradox for IT and AI.
Q. 1 (E): What are the First Principles for Artificial Intelligence? How do they apply for developing a business case? (Entire Sec A to be assigned one CO.)

SECTION - B

10 x 3 = 30 Marks

All questions are compulsory (Each question has an internal choice. Attempt any one (either A or B) from the internal choice)

Q. 2: Discuss the important Data Analysis methods being used in the Business Analytics? How they help the businesses in decision making?
Or
Explain the relevance of Business Intelligence Model. What are the major stages from BI Model to be adopted by the Manufacturing Organisations?

Q. 3A: Discuss the opportunities for application of Artificial Intelligence in Logistics department. Explain with suitable examples.
Or
Q. 3B: What is the role of Artificial Intelligence in Service Innovations? How the companies like banking or insurance can innovate their services with AI?

Q. 4A: How is Deep Learning different than the Machine Learning programmes? Discuss the challenges faced by Deep Learning solutions by the businesses with suitable example.
or
Q 4B: Explain the role of Neural Networks in the Machine Learning solutions. Discuss the relevance of Machine Learning in the marketing and sales department of modern businesses.

SECTION - C

Read the case and answer the questions **10×02 = 20 Marks**

Q. 5: Case Study: ***Data Science Case Study – How Netflix Used Data Science to Improve its Recommendation System?***

Do you remember the last movie you watched on Netflix? I don't want to know the name; just think about it- after watching the movie, were you recommended of similar movies? How does Netflix know what you'd like? The secret here is Data Science. Netflix initially started as a DVD rental service in 1998. It mostly relied on a third party postal services to deliver its DVDs to the users. This resulted in heavy losses which they soon mitigated with the introduction of their online streaming service in 2007.

In order to make this happen, Netflix invested in a lot of algorithms to provide a flawless movie experience to its users. One of such algorithms is the recommendation system that is used by Netflix to provide suggestions to the users.

A recommendation system understands the needs of the users and provides suggestions of the various cinematographic products. A recommendation system is a platform that provides its users with various contents based on their preferences and likings. A recommendation system takes the information about the user as an input.

This information can be in the form of the past usage of product or the ratings that were provided to the product. It then processes this information to predict how much the user would rate or prefer the product. A recommendation system makes use of a variety of machine learning algorithms. Another important role that a recommendation system plays today is to search for similarity between different products. In the case of Netflix, the recommendation system searches for movies that are similar to the ones you have watched or have liked previously.

This is an important method for scenarios that involve cold start. In cold start, the company does not have much of the user data available to generate recommendations. Therefore, based on the movies that are watched, Netflix provides recommendations of the films that share a degree of similarity.

Back in 2006 when Netflix wanted to tap into the streaming market, it started off with a competition for movie rating prediction. It provided a prize of $ 1 million to whoever increased the accuracy of their then existing platform 'Cinematch' by 10%. At the end of competition, the BellKor team presented their solution that increased the accuracy of prediction by 10.06%. With over 200 work hours and an ensemble of 107 algorithms provided them with this result.

Their final model gave an RMSE of 0.8712. For their solution, they made use of K-nearest neighbor algorithm for post-processing of the data. Then they implemented a factorization model which is popularly known as Singular Value Decomposition (SVD) for providing an optimal dimensional embedding to its users. They also made use of Restricted Boltzmann Machines (RBM) for enhancing the capability of the collaborative filtering model. These two algorithms in the ensemble, SVD and RBM provided them with the best results. A linear combination of these two algorithms reduced the RMSE to 0.88.

However, even after reduction of RMSE and increase in accuracy, Netflix suffered from two major challenges – Firstly, the data that provided during the competition comprised of 100 million movie ratings, as opposed to more than 5 billion ratings that Netflix constituted of. Furthermore, the algorithms were static, meaning that they only dealt with historical data and did not take into account the dynamicity of users adding reviews in real-time. After Netflix overcame these challenges, it made the winning algorithms a part of its recommendation system.

Netflix uses Ranking Algorithms to provide a ranked list of movies and TV Shows that appeal the most to its users. However, with the presence of various ranking algorithms, it is often difficult to accommodate all of them and test their performance simultaneously. While the traditional A/B testing on a reduced set of algorithms could not identify the best algorithms with smaller sample size and also consumed a lot of time, Netflix decided to innovate its algorithmic process. In order to speed up its experimentation process of its ranking algorithms, Netflix implemented the interleaving technique that allowed it to identify best algorithms. This technique is applied in two stages to provide the best page ranking algorithm to provide personalized recommendations to its users.

Netflix provides its users with enriched content based on this interleaving technique that is highly sensitive towards ranking the algorithm quality. Netflix makes use of a recommendation system to provide movie suggestions to its users. Netflix is heavily relying on various techniques in Data Science for providing recommendations to the user. Netflix Prize competition used the algorithms of the winning team to improve its accuracy.

Question:
Q5(A): Discuss the role of recommender system and personalisation adopted by Netflix in the personalization and customer value enhancement.
Q5(B): What are the other applications areas of Artificial Intelligence and Business Analytics which may prove critical for the stiff competition in the OTT market in the near future? Discuss with examples.

(Entire Sec C to be assigned one CO. Both questions corresponding to the same CO)

Mapping of Questions with Course Learning Outcome

Question Number	**COs**	**Marks Allocated**
Q. 1:	**CO1**	**10 marks**
Q. 2:	**CO2**	**10 marks**
Q. 3:	**CO3**	**10 marks**
Q. 4:	**CO4**	**10 marks**
Q. 5:	**CO5**	**20 marks**

Note: Font: Times New Roman, Font size: 12.