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| **SESSION** | **JUL - AUG 2024** |
| **PROGRAM** | **MASTER OF BUSINESS ADMINISTRATION (MBA)** |
| **SEMESTER** | **IV** |
| **COURSE CODE & NAME** | **DADS401 ADVANCED MACHINE LEARNING** |
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**Assignment Set – 1**

**1. (a) Explain the elements of Time Series Model?**

**(b) Discuss ARIMA model for forecasting time series.**

**Ans 1.**

**(a) Elements of Time Series Model**

A time series model is a mathematical framework designed to analyze and forecast data points collected sequentially over time. The essential elements of a time series model include the following components:

1. **Trend Component**: The trend represents the long-term direction of the time series, which can be upward, downward, or stagnant. It captures the underlying movement of the data over an extended period, ignoring short-term fluctuations. For example, an

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**2. (a) State the difference between double exponential smoothing (DES) and triple exponential smoothing (TES)?**

**(b) Explain GARCH Model?**

**Ans 2.**

 **(a) Difference Between Double Exponential Smoothing (DES) and Triple Exponential Smoothing (TES)**

Double Exponential Smoothing (DES) and Triple Exponential Smoothing (TES) are methods used for time series forecasting. While both methods build upon the concept of exponential smoothing, they address different types of time series patterns.

1. **Double Exponential Smoothing (DES)**: DES is used for time series data with a trend but without seasonality. It extends single exponential smoothing by introducing a second smoothing parameter to capture the trend component. DES models changes in

**3. (a) Write some merits and demerits of using AI.**

**(b) Explain any three applications of AI in Business Analytics.**

### Ans 3.

### (a) ****Merits and Demerits of Using AI****

**Merits of Using AI**:

Artificial Intelligence (AI) offers numerous benefits across various fields, making it a transformative technology in today’s world. One of the primary advantages of AI is its ability to automate repetitive and mundane tasks, significantly improving efficiency and reducing

###  (b) ****Applications of AI in Business Analytics****

Artificial Intelligence (AI) plays a pivotal role in transforming business analytics, providing innovative solutions to analyze data, optimize operations, and enhance decision-making processes. Three key applications of AI in business analytics are discussed below:

**1. Predictive Analytics**: AI enables businesses to forecast future trends and outcomes through

**Assignment Set – 2**

**4. (a) Explain some challenges or limitations we face with Deep Learning.**

**(b) Discuss Back Propagation. 5+5**

**Ans 4.**

### (a) ****Challenges or Limitations of Deep Learning****

Deep learning, a subset of machine learning, has revolutionized fields like image recognition, natural language processing, and autonomous systems. However, it faces several challenges and limitations that hinder its widespread application.

**1. Data Dependency**: Deep learning models require vast amounts of labeled data to train effectively. In many domains, acquiring and annotating such large datasets can be expensive,

### (b) ****Back Propagation****

Backpropagation, short for "backward propagation of errors," is a fundamental algorithm used to train artificial neural networks. It enables the network to adjust its weights and biases to minimize the error between predicted and actual outputs, thus improving its accuracy over time.

**1. Process: Backpropagation has two phases: forward and backward. In the forward pass, the**

**5. (a) Differentiate CNN vs RNN.**

**(b) Describe the concept of LSTM.**

**Ans 5.**

**(a) Differentiation Between CNN and RNN**

Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) are two distinct architectures in deep learning, each designed for specific types of data and tasks. Their differences stem from their structural design and applications.

**Convolutional Neural Networks (CNNs)**: CNNs are specialized for processing grid-like data, such as images. They use convolutional layers to extract spatial features by applying filters to

 **(b) Concept of LSTM**

Long Short-Term Memory (LSTM) networks are a specialized type of RNN designed to overcome the limitations of traditional RNNs, particularly their inability to learn long-term dependencies. Introduced by Hochreiter and Schmidhuber in 1997, LSTMs address the vanishing and exploding gradient problems, enabling effective learning over extended time

**6. (a) State the difference between SARSA and Q-Learning.**

**(b) State the difference between Image recognition and Image detection.**

**Ans 6.**

**(a) Difference Between SARSA and Q-Learning**

SARSA (State-Action-Reward-State-Action) and Q-Learning are reinforcement learning algorithms used to solve Markov Decision Processes (MDPs). Both methods aim to find an optimal policy for an agent by updating Q-values, but they differ in how they update these

**(b) Difference Between Image Recognition and Image Detection**

Image recognition and image detection are two distinct tasks within the domain of computer vision, each serving unique purposes and employing different techniques.

**Image Recognition**: Image recognition focuses on identifying and classifying the content of an image. Given an input image, the model determines what object or category it belongs to.