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**MATRIC NO: F/HD/32/3210029**

**COURSE: ARTIFICIAL INTELLIGENCE**

**ASSIGNMENT**

**Write a short note on the following**

**Machine learning, A.I, Supervised Data/Model, Unsupervised, Deep learning.**

**Machine Learning**  
Machine Learning (ML) is a pivotal subfield of Artificial Intelligence (AI) that empowers systems to learn and adapt through data-driven experiences, without explicit programming. By analyzing data, ML algorithms identify intricate patterns, enabling predictive models and decision-making processes across a wide range of applications, including recommendation systems, fraud detection, and real-time data analysis. It bridges the gap between theoretical research and real-world problem-solving, revolutionizing industries.

**Artificial Intelligence (AI)**  
Artificial Intelligence (AI) represents the broader concept of simulating human-like cognitive functions in machines, including reasoning, learning, problem-solving, and decision-making. As a multidisciplinary field, AI integrates techniques from machine learning, natural language processing, robotics, and computer vision to build intelligent systems that perform tasks traditionally requiring human intelligence. AI's profound impact spans industries like healthcare, autonomous systems, and finance, marking a paradigm shift in technology.

**Supervised Learning/Model**  
Supervised learning is a cornerstone of machine learning, where models are trained on labeled datasets—each input is associated with a corresponding output. This approach enables the model to learn from known examples, refining its predictive accuracy over time by minimizing the discrepancy between its predictions and actual labels. Supervised learning is central to tasks like classification (e.g., image recognition) and regression (e.g., financial forecasting), and it drives a wide range of industry applications.

**Unsupervised Learning**  
Unsupervised learning represents a powerful technique in which models are exposed to unlabeled data, allowing them to autonomously identify patterns, structures, or relationships without predefined outputs. This approach excels in discovering hidden insights within large datasets, such as grouping similar data points through clustering or detecting anomalies. Unsupervised learning is widely applied in exploratory data analysis, customer segmentation, and fraud detection, offering profound insights across diverse domains.

**Deep Learning**  
Deep Learning, a sophisticated subset of machine learning, utilizes multi-layered neural networks to model complex, non-linear relationships in large-scale datasets. This approach is particularly adept at processing and analyzing unstructured data, including images, speech, and text, with applications such as natural language processing, autonomous driving, and advanced healthcare diagnostics. While requiring vast computational resources and extensive datasets, deep learning pushes the boundaries of AI, enabling transformative advancements in cutting-edge technologies.