**Assignment\_3**

1.Explain the term machine learning, and how does it work? Explain two machine learning applications in the business world. What are some of the ethical concerns that machine learning applications could raise?

**Ans: ML is a type of artificial intelligence that allows software applications to become more accurate at predicting outcomes without being explicitly programmed. It works on set of algorithms where we trainee the model. Some of examples are – Image recognition , speech recognition, medical diagnosis, extraction, predictive analytics.**

2. Describe the process of human learning:

i. Under the supervision of experts

ii. With the assistance of experts in an indirect manner

iii. Self-education

3. Provide a few examples of various types of machine learning.

**Ans: supervised learning, unsupervised learning, reinforcement learning.**

4. Examine the various forms of machine learning.

**Ans: supervised learning, unsupervised learning, reinforcement learning.**

5. Can you explain what a well-posed learning problem is? Explain the main characteristics that must be present to identify a learning problem properly.

**Ans: A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E. This is called well – posed Learning Problems.**

**Example –**

**A checkers learning problem**

**Task T : playing checkers**

**– Performance measure P : percent of games won against opponents**

**– Training experience E : playing practice games against its**

6. Is machine learning capable of solving all problems? Give a detailed explanation of your answer.

**Ans: It is not proved that ML can solve all the problems. But yes, ML technology has most of the answers. The trained model has capability to predict certain things like, analysis of netfilx data for customer ease.**

7. What are the various methods and technologies for solving machine learning problems? Any two of them should be defined in detail.

**Ans: Supervised learning, which trains a model on know input and output data so that it can predict future outputs. Ex – decision tree, logistic regression**

**Unsupervised learning finds the hidden pattern or intrinsic structures in input data.**

**Ex – k-means clustering , hierarchical clustering**.

8. Can you explain the various forms of supervised learning? Explain each one with an example application.

**Ans: supervised learning, unsupervised learning, reinforcement learning.**

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**Ex – k-means clustering , hierarchical clustering**.

9. What is the difference between supervised and unsupervised learning? With a sample application in each region, explain the differences.

**Ans: In supervised learning , Input Data is provided to the model along with the output in the Supervised Learning whereas only input data is provided in unsupervised learning. Hidden patterns in the data can be found using the unsupervised learning model.**

**Some of the applications of Supervised Learning are Spam detection, handwriting detection, pattern recognition, speech recognition etc.**

**Some of the applications of Unsupervised Learning are detecting fraudulent transactions, data preprocessing etc**

10. Describe the machine learning process in depth.

a. Make brief notes on any two of the following:

1. MATLAB is one of the most widely used programming languages.

**MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms creation of user interfaces and interfacing with programs written in other languages.**

1. Deep learning applications in healthcare

**Deep learning models can interpret medical images like X-ray , MRI scan, CT scan. To perform diagnosis. The algorithms can detect any risk and flag anomalies in the medical images. Deep learning is extensively used in detecting canar.**

1. Study of the market basket

**Market basket analysis is a data mining technique used by retailers to increase sales by better understanding customer purchasing patterns. It involves analyzing large data sets, such as purchase history, to revel product grouping, as well as products that are likely to be purchased together.**

1. Linear regression (simple)

**Ans: Linear Regression is a supervised machine learning algorithm where the predicted output is continuous and has a constant slope. It’s used to predict values within a continuous range, (e.g. sales, price) rather than trying to classify them into categories (e.g. cat, dog). There are two main types:**

**Simple regression and multivariable regression.**

11. Make a comparison between:-

1. Generalization and abstraction:

**Abstraction reduces complexity by hiding irrelevant detail, generalization reduces complexity by replacing multiple entities which perform similar functions with a single construct.**

2. Learning that is guided and unsupervised:

**Input data is provided in unsupervised learning. Hidden patterns in the data can be found using the unsupervised learning model. Model is left to learn by itself by just providing data.**

3. Regression and classification:

**The main difference between regression and classification algorithms that regression algorithms are used to predict the continuous values such as price, salary, age,etc. and classification algorithms are used to predict the discrete values such as male or female.**