1. In the sense of machine learning, what is a model? What is the best way to train a model?

Ans:- Machine learning models are computer programs that are used to recognize patterns in data or make predictions. Machine learning models are created from machine learning algorithms, which are trained using either labelled, unlabeled, or mixed data.

steps to training a machine learning model

- Step 1: Begin with existing data. Machine learning requires us to have existing data—not the data our application will use when we run it, but data to learn from
- Step 2: Analyse data to identify patterns.
- Step 3: Make predictions.

2. In the sense of machine learning, explain the "No Free Lunch" theorem.

Ans:- The “No Free Lunch” Theorem argues that, without having substantive information about the modelling problem, there is no single model that will always do better than any other model. Because of this, a strong case can be made to try a wide variety of techniques, then determine which model to focus on.

3. Describe the K-fold cross-validation mechanism in detail.

Ans:- K-fold cross-validation approach divides the input dataset into K groups of samples of equal sizes. These samples are called folds. For each learning set, the prediction function uses k-1 folds, and the rest of the folds are used for the test set.

4. Describe the bootstrap sampling method. What is the aim of it?

Ans:-Bootstrapping is a method of inferring results for a population from results found on a collection of smaller random samples of that population, using replacement during the sampling process.

Bootstrap sampling is used in a machine learning ensemble algorithm called bootstrap aggregating (also called bagging). It helps in avoiding overfitting and improves the stability of machine learning algorithms.

5. What is the significance of calculating the Kappa value for a classification model?Demonstrate how to measure the Kappa value of a classification model using a sample collection of results.

Ans:- It basically tells you how much better your classifier is performing over the performance of a classifier that simply guesses at random according to the frequency of each class. Cohen's kappa is always less than or equal to 1. Values of 0 or less, indicate that the classifier is useless

This is calculated by multiplying the expected probability that both the raters are in agreement that the classes are positive, and, the classes are negative. Kappa can range from 0 to 1.

6. Describe the model ensemble method. In machine learning, what part does it play?

Ans:-Ensemble models are a machine learning approach to combine multiple other models in the prediction process. These models are referred to as base estimators. Ensemble models offer a solution to overcome the technical challenges of building a single estimator..

There are two main reasons to use an ensemble over a single model, and they are related; they are: Performance: An ensemble can make better predictions and achieve better performance than any single contributing model. Robustness: An ensemble reduces the spread or dispersion of the predictions and model performance.

7. What is a descriptive model's main purpose? Give examples of real-world problems that descriptive models were used to solve.

Ans:- A descriptive model describes a system or other entity and its relationship to its environment. It is generally used to help specify and/or understand what the system is, what it does, and how it does it. A geometric model or spatial model is a descriptive model that represents geometric and/or spatial relationships.

The steps used by the students to calculate the number of pizza kits to sell for their class trip represent an example of a descriptive model.

8. Describe how to evaluate a linear regression model in machine learning.

Ans:-

- Step 1: Load the data into R. Follow these four steps for each dataset
- Step 2: Make sure your data meet the assumptions.
- Step 3: Perform the linear regression analysis.
- Step 4: Check for homoscedasticity.
- Step 5: Visualise the results with a graph.
- Step 6: Report your results.