**Assignment 1**

**Name:** Sahil Kaundal **UID:** 21BCS8197

**Sem.:** 4th **Section/Group:** 807/B

**Subject:** Principles of AI **Subject Code:** 20CST-258

**Q1.**

**How state space strategy is useful in problem solving?**

**Answer.**

A state contains all of the information necessary to predict the effects of an action and to determine if it is a goal state.

The idea is that a problem can be solved by examining the steps that can lead to a goal state (solution).This may involve several searches from the initial state to the goal state within an optimal time

State-Space searching assumes that:

* The agent has a perfect knowledge of the state space and can observe what it is in (i.e., there is full observability);
* The agent has a set of actions that have known deterministic effects;
* Some states are goal states, the agent wants to reach one of these goal states, and the agent can recognize a goal state;
* A solution is a sequence of actions that will get the agent from the current state to a goal state.

**Q2.**

**A bank manager is given a dataset containing 1000 records of applicants who have applied for loan. How can AI help the manager understand which loan he can approve? Explain.**

**Answer.**

This problem statement can be solved using the KNN algorithm, which will classify the applicant’s loan request into two classes:

1. Approved
2. Disapproved

K Nearest Neighbour is a Supervised Learning algorithm that classifies a new data point into the target class, depending on the features of its neighboring data points.

The following steps can be carried out to predict whether a loan must be approved or not:

**Data Extraction:** At this stage data is either collected through a survey or web scraping is performed. Data about the customers must be collected. This includes their account balance, credit amount, age, occupation, loan records, etc. By using this data, we can predict whether or not to approve the loan of an applicant.

**Data Cleaning:** At this stage, the redundant variables must be removed. Some of these variables are not essential in predicting the loan of an applicant, for example, variables such as Telephone, Concurrent credits, etc. Such variables must be removed because they will only increase the complexity of the Machine Learning model.

**Data Exploration & Analysis:** This is the most important step in AI. Here you study the relationship between various predictor variables. For example, if a person has a history of unpaid loans, then the chances are that he might not get approval on his loan applicant. Such patterns must be detected and understood at this stage.

**Building a Machine Learning model:** There are n number of machine learning algorithms that can be used for predicting whether an applicant loan request is approved or not. One such example is the K-Nearest Neighbor, which is a classification and a regression algorithm. It will classify the applicant’s loan request into two classes, namely, Approved and Disapproved.

**Model Evaluation:** Here, you basically test the efficiency of the machine learning model. If there is any room for improvement, then parameter tuning is performed. This improves the accuracy of the model.