



Class: IX	Department: Computer Science	Date:01-09-2023
Worksheet No: 2	ARTIFICIAL INTELLIGENCE	

CHAPTER 2: AI Project cycle

One (01) Mark Questions

1. Name all the stages of an AI Project cycle.

Problem Scoping, Data Acquisition, Data Exploration, Modeling, Evaluation

2. Name the 4Ws of problem canvases under the problem scoping stage of the AI Project Cycle.

a. Who, b. what c. where d. why

3. What is Testing Dataset?

The dataset provided to the model ML. algorithm after training the algorithm

4. Mention the types of learning approaches for AI modeling.

Supervised, unsupervised and re-enforcement

5. What is the objective of evaluation stage?

It is to evaluate whether the ML algorithm is able to predict with high accuracy or not before deployment.

6. Fill in the blank:

The analogy of an Artificial Neural Network can be made with _____?

(Parallel Processing)

7. Which of the following is not an authentic source for data acquisition?

a. Sensors b. Surveys c. Web Scraping d. System Hacking

Ans: System Hacking

8. Which type of graphical representation suits best for continuous type of data like monthly exam scores of a student?

Linear graph

Two (02) Mark Questions

1. What are the two different approaches for AI modelling? Define them.

There are two approaches for AI Modelling; Rule Based and Learning Based. The Rule based approach generates pre-defined outputs based on certain rules programmed by humans. Whereas, machine learning approach has its own rules based on the output and data used to train the models.

OR

Rule Based Approach Refers to the AI modelling where the relationship or patterns in data are defined by the developer. The machine follows the rules or instructions mentioned by the developer, and performs its task accordingly. Whereas in Learning based approach, the relationship or patterns in data are not defined by the developer. In this approach, random data is fed to the machine and it is left to the machine to figure out patterns and trends out of it

2. What is a problem statement template and what is its significance?

The problem statement template gives a clear idea about the basic framework required to achieve the goal. It is the 4Ws canvas which segregates; what is the problem, where does it arise, who is affected, why is it a problem? It takes us straight to the goal.

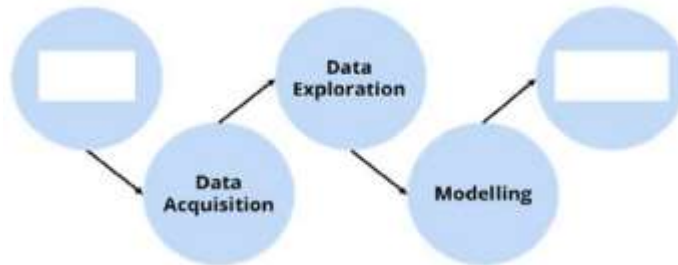
3. Mention the precautions to be taken while acquiring data for developing an AI Project.

It should be from an authentic source, and accurate. Look for redundant and irrelevant data parameters that does not take part in prediction.

4. What do you mean by Data Features?

The type of data to collect, It should be relevant data.

5. Write the names for missing stages in the given AI project cycle:



Problem scoping, Evaluation

6. Explain Data Exploration stage.

In this stage of project cycle, we try to interpret some useful information out of the data we have acquired. For this purpose, we need to explore the data and try to put it uniformly for a better understanding. This stage deals with validating or verification -of the collected data and to analyze that:

- The data is according to the specifications decided.
- The data is free from errors.
- The data is meeting our needs.

7. What are the different types of sources of data from where we can collect reliable and authentic datasets? Explain in brief.

Data can be a piece of information or facts and statistics collected together for reference or analysis. Whenever we want an AI project to be able to predict an output, we need to train it first using data There could be many ways and sources from where we can collect reliable and authentic datasets namely Surveys, Web scrapping, Sensors, Cameras, Observations, Research, Investigation, API etc. Sometimes Internet is also used to acquire data but the most important point to

keep in mind is that the data should be taken from reliable and authentic websites only. Some reliable data sources are UN, Google scholar, Finance, CIA, Data.gov etc.

Four (04) Mark Questions

1. Explain the AI Project Cycle in detail.

The steps involved in AI project cycle are as given:

- The first step is Scope the Problem by which, you set the goal for your AI project by stating the problem which you wish to solve with it. Under problem scoping, we look at various parameters which affect the problem we wish to solve so that the picture becomes clearer
- Next step is to acquire data which will become the base of your project as it will help you in understanding what the parameters that are related to problem scoping.
- Next, you go for data acquisition by collecting data from various reliable and authentic sources. Since the data you collect would be in large quantities, you can try to give it a visual image of different types of representations like graphs, databases, flow charts, maps, etc. This makes it easier for you to interpret the patterns in which your acquired data follows.
- After exploring the patterns, you can decide upon the type of model you would build to achieve the goal. For this, you can research online and select various models which give a suitable output.
- Modelling : You can test the selected models and figure out which is the most efficient one. The most efficient model is now the base of your AI project and you can develop your algorithm around it.
- Testing/Evaluation: Once the modelling is complete, you now need to test your model on some newly fetched data. The results will help you in evaluating your model and hence improving it. Finally, after evaluation, the project cycle is now complete and what you get is your AI project.

2. Draw the 4Ws problem canvas and explain each one of them briefly.

The 4Ws problem canvas is the basic template while scoping a problem and using this canvas, the picture becomes clearer while we are working to solve it.

a) Who: The “Who” block helps you in analyzing the people getting affected directly or indirectly due to it? Under this, you find out who the ‘stakeholders’ to this problem are and what you know about them. Stakeholders are the people who face this problem and would be benefitted with the solution.

b) What: Under the “What” block, you need to look into what you have on hand. At this stage, you need to determine the nature of the problem. What is the problem and how do you know that it is a problem?

c) Where: In this block, you need to focus on the context/situation/location of the problem. It will help you look into the situation in which the problem arises, the context of it, and the locations where it is prominent.

d) Why: in the “Why” canvas, think about the benefits which the stakeholders would get from the solution and how would it benefit them as well as the society.

3. Differentiate between rule-based and learning-based AI modelling approaches.

Rule Based Approach: It refers to the AI modelling where the relationship or patterns in data are defined by the developer. The machine follows the rules or instructions mentioned by the developer, and performs its task accordingly.

For example, suppose you have a dataset comprising of 100 images of apples and 100 images of bananas. To train your machine, you feed this data into the machine and label each image as either apple or banana. Now if you test the machine with the image of an apple, it will compare the image with the trained data and according to the labels of trained images, it will identify the test image as an apple. This is known as Rule based approach. The rules given to the machine in this example are the labels given to the machine for each image in the training dataset.

Learning Based Approach: In this approach, the machine learns by itself. It refers to the AI modelling where the relationship or patterns in data are not defined

by the developer. In this approach, random data is fed to the machine and it is left on the machine to figure out patterns and trends out of it. Generally, this approach is followed when the data is unlabelled and too random for a human to make sense out of it.

For example, suppose you have a dataset of 1000 images of random stray dogs of your area. You would put this into a learning approach-based AI machine and the machine would come up with various patterns it has observed in the features of these 1000 images which you might not have even thought of!

4. What is the need of an AI Project Cycle? Explain.

Project cycle is the process of planning, organizing, coordinating, and finally developing a project effectively throughout its phases, from planning through execution then completion and review to achieve pre-defined objectives. Our mind makes up plans for every task which we have to accomplish which is why things become clearer in our mind. Similarly, if we have to develop an AI project, the AI Project Cycle provides us with an appropriate framework which can lead us towards the goal.

The major role of AI Project Cycle is to distribute the development of AI project in various stages so that the development becomes easier, clearly understandable and the steps / stages should become more specific to efficiently get the best possible output. It mainly has 5 ordered stages which distribute the entire development in specific and clear steps: These are Problem Scoping, Data Acquisition, Data Exploration, Modelling and Evaluation.

5. Explain the following: a. Supervised Learning b. Unsupervised Learning

Supervised learning is a learning in which we teach or train the machine using data which is well labelled that means some data is already tagged with the correct answer. After that, the machine is provided with a new set of examples (data) so that supervised learning algorithm analyses the training data (set of training examples) and produces a correct outcome from labelled data.

Unsupervised Learning: An unsupervised learning model works on unlabeled dataset. This means that the data which is fed to the machine is random and there is a possibility that the person who is training the model does not have any information regarding it. The unsupervised learning models are used to identify relationships, patterns and trends out of the data which is fed into it. It helps the user in understanding what the data is about and what are the major features identified by the machine in it.

6. Do ethics in AI hamper data acquisition stage? Justify your answer.

Data acquisition is the most important factor or stage as the entire project development is based on the acquired data. There are several ethical issues which must always be considered when planning any type of data collection. We need to understand that the data which is collected is ethical only if the provider agrees to provide. For example, in case of smartphone users, data is collected by clicking on allow when it asks for permission and by agreeing to all the terms and conditions. But at the same time if one does not want to share his/her data with anyone then this ethical issue hampers the acquisition process and lowers the accuracy or amount of data required for development. Hence Regardless of the type of data collection, it is absolutely necessary to gain the approval of the community from which the data will collected otherwise.