IML

MID EXAM IMP QUESTIONS

1. what is machine learning ?

Ans: " In other words, machine learning algorithm use statistical techniques to identify patterns in large amounts of data and then use these patterns to make predications or decisions about new data."

OR

" machine learning is a field of artificial intelligence (AI) that focuses on creating algorithms and statistical models that enable computes to automatically improve their performance and specific task by learning from Data, without being explicity programmed."

2. Difference between Human Learning and machine learning.

Ans:	Human learning	Machine learning
-	Natural process of acquiring knowledge, skills & understanding thingk experiance is know as human learning.	- Machine learning is a subset of AI that mainly focuses on creating algorithm and model is known as machine learning.
-	It is a slows process.	- It is a fast process.

- humans have the capability tool in a creativity, inovation, and obstract thingking which allows then to solve complex problems.	- machine learning models are typically focues on specific task and then lack of creativity and invesion capabenity.
- Human's may learn from different sources including first hand knowledge, observation and teaching.	- To identify patterns and generate predictions machine learning algorithm lagely uely on have amount of Data.

3. Explain supervised machine learning with example.

Ans: Algorithm is trained on labled datasets where each input is associated with corresponding output.

- It requires both input & output.
- the goal is to learn mapping from inp to output.

Regression : These algorithms are used to predict classification discart values such as male or female, true or false. spam or not spam.

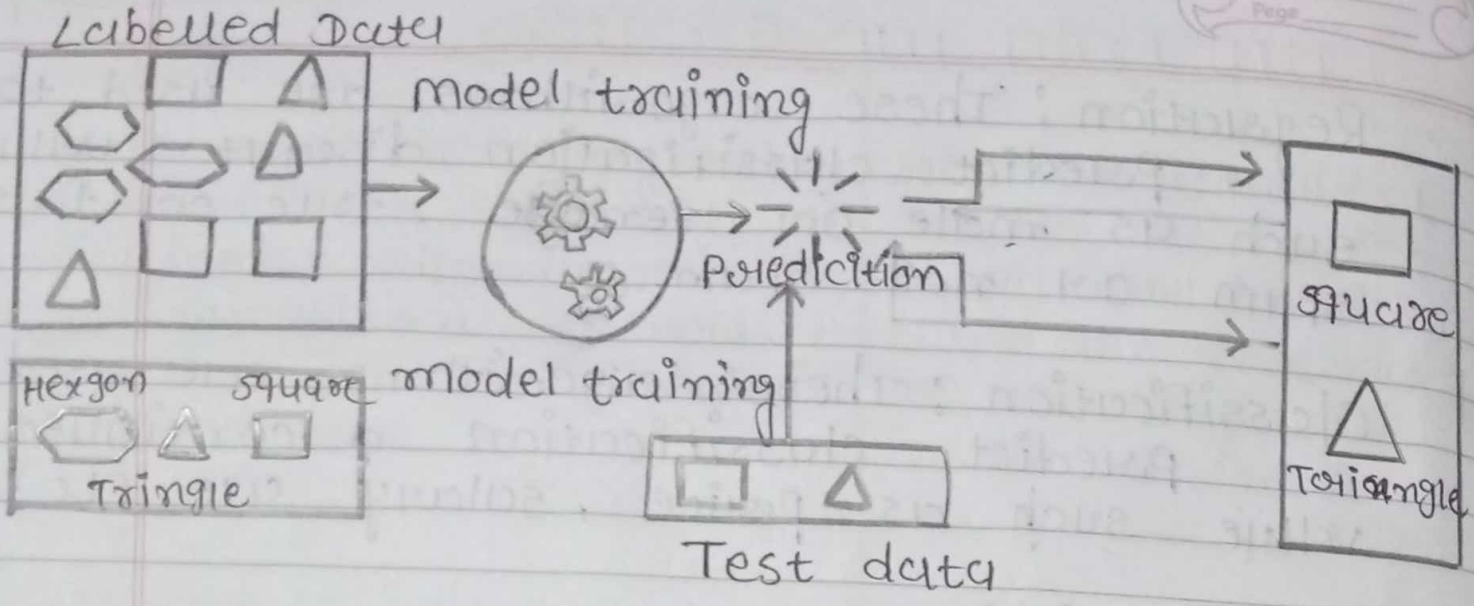
Classification : These algorithms are used to predict classification & continues value such as price, salary age etc...

characteristics :

1] Labelled Training data 2] Training phase
3] Supervised learning task 4] model evaluation
5] model prediction

1] Labelled Training data : The foundation of supervised learning is availability of labelled datasets where each example contains both input feature & their corresponding correct output labels.

2] Training phase : During training phase the algorithms take labelled data & learn patterns, relationship & mapping between the input features & outputs labels.



5. List and explain application of machine learning.

Ans: 1] Image Recognition: It is one of the most comman application of machine learning. It is used to identify object, person, Places, digital images, etc.

2] Speech Recognition: Speech Recognition is a voice into process of converting instruction into text, and it is known as "Speech-to-text" or "computer"-speech-recognition". It is one of the most popular application of machine learning.

Ex: google Assistant
Alexa
Siri, etc...

3] Self-driving cars: One of the most exciting application of machine learning is self driving cars. Tesla, the most popular car manufacturing company is working on self-driving cars.

4] Product Reccomendations: Whenever we search for some product on Amazon, flipkart, etc. then we started getting an advantisement for the same product. This is done because of machine learning.

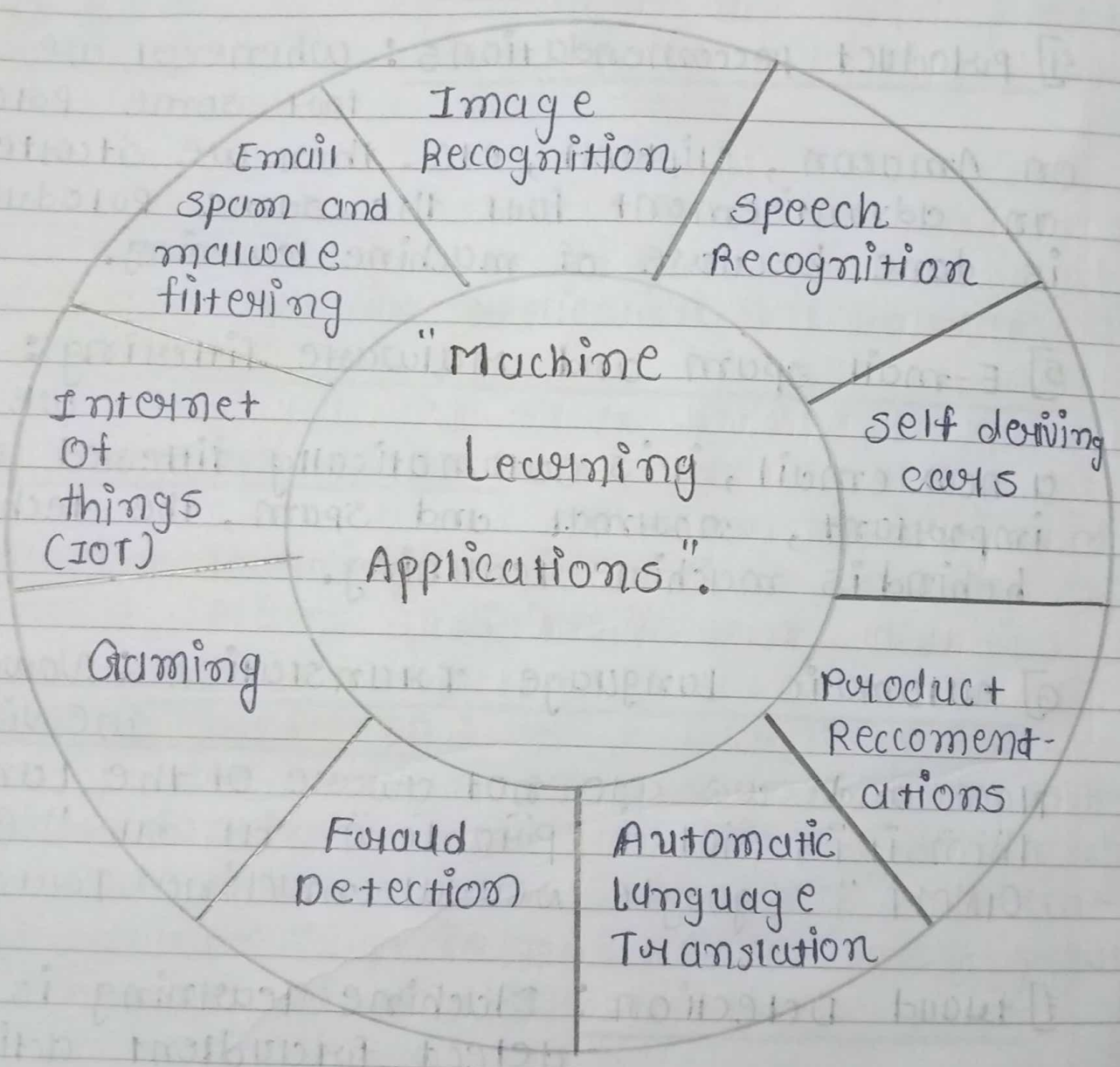
5] E-mail spam and Malware filtering: Whenever we recieve a new email, it is automatically filtered as important, normal and spam, the technology behind is machine learning.

6] Automatic Language Translation: Nowdays, if we visit a new place and we are not aware of the Language then it is not a problem at all "Google's GNMT" (google neural machine Translation)

7] fraud Detection: Machine learning is used to detect fraudient activities in finance, online transaction and cybersecurity.

8] Internet of things (IOT): Machine learning is Applied in IOT devices and systems to enable smart homes, predective maintenance and energy efficiency.

9] Gaming: Machine learning techniques are used in game development for creating non-player characters (NPC's) with adaptive and intelligent behaviours.



6. Explain tools and Technology of machine learning (any two):

Ans:→ There are many tools and technologies that are commonly used in machine learning, here are some of them:

- list out of machine learning tools and Technology -

1. Programming Languages:
2. Machine Learning libraries and Framework.
3. Data visualisation tools.
4. Cloud computing platforms.
5. Data preprocessing tools.
6. version control systems.
7. Integrated development enviroment (IDEs).
8. Automatel machine learning (Automl) tools.
9. Model deployment tools.
10. Hardware accelerators.

1] Programming Languages: some popular programming Languages used for machine Learning include python, R and Julia.

2] Machine Learning libraries and Framework:

There are many libraries and Frameworks that provide pre-built algorithms, such as Tensorflow, pytorch, Scikit-learn, Keras and Mxnet.

7. Define Numpy Array. How to create Numpy Array explain with example.

Ans: • Create a Numpy array:

- Install Numpy library in the system or use specific editer to perform Numpy program like Anaconda now.
- Python IDE etc....
- Open the editor & write code import Numpy lib. using import statement.
- import numpy as np...

• How to create Array in Numpy:

- To create on initike array is mostly used numpy array ()function.
- Numpy array are simple list with supported additional features of array.

Example: One Diamasional Array using numpy array.

```
import numpy as np
a = [1,2,3,4,5]
b = np.array(a)
print(b)
```

8. Explain array stacking function with example.

Ans: stack(): "array staking refer to combaing multipie array into single array all of axitiy safify axies".

- There are two type:

1. Horizontal stak.
2. vartical stak.

1] Horizontal stak: this function cambaind the array into Horizontal staking this hstack().function.

2] vartical stak: vartical stacking this function into combaind the array elements in vartical array vstack(functi

Example: import numpy as np

```
a=np.array ([1,2,3,4])
b=np.array ([5,6,7,8])
c = np.hstack (a,b)
d = np.vstack (a,b)
print (a)
print (d)
```

(9.) Explain following function with example, (amin, mean, median, std, var).

Ans: 1] amin ():
2] mean ():
3] median ():
4] std ():
5] var ():

→ 1] amin ():

- This function used to find out minimum value of numpy element value.

Example: import numpy as np
a = np.array ([1, 2, 3, 4, 5])
b = np.amin (a)
print (b)

→ 2] mean ():

- This function used to the sum of all the elements Divided by it's total Number of elements find average of Data in a Data set.

- This function follows the following equation.

$$\bar{x} = \frac{1}{n} (x_1 + x_2 + x_3 + \dots + x_n)$$

Example: import numpy as np
a = np.array ([17, 20, 45])
b = np.mean(a)
print(b)

→ 3] median ():

- This function used to findout midle element of array using following formula.

- Odd Number: $\frac{n+1}{2}$

- even Number: $\frac{n}{2}, \frac{n}{2}+1$

Odd- Example: import Numpy as np
a = np.array ([45, 67, 79])
b = np.median (a)
print(b)

even Example: import Numpy as np
a = np.array ([45, 67, 79, 107])
b = np.median (a)
print(b)

→ 4] var ():

- This function is variance.
- This function used to findout averge of deviation

$$\sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n}$$

Example: import numpy as np
a = np.array([5,6,7])
b = np.var(a)
print(b)

→ 5] std():

- Standard deviation
- This () used to findout of average of square deviation of Data.
- This function following equation.

$$SD = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Example: import numpy as np
a = np.array([5,6,7])
b = np.std(a)
print(b)

4. Explain reinforcement learning with example?

Ans: It focuses on training agents make sequen of decisions to maximize cumulative reward.

- Agents learn by interacting with environment & receving Feedback.
- It work with Feedback.

• key components of reinforcement learning:

- Agent : The entity or system that learn & take action in environment.
- environment : It provides Agent with Features / Feedback in Form of rewards or panlties after each action.
- State : A state represents current situation or configuration of environment at specific time.
- Action : Action are decision made by the agent to interact with environment.
- Reward : Reward is scalar value that repres immediate feedback provided to agent after each action.

- Policy : The policy is strategy or mapping that agent uses to determine which action to take in given state.

- Reinforcement learning algorithm :

- There are various RL Algorithm, including model Free method such as Q-learning SARSA & Deep-Q networks as well as model based approaches like policy gradient methods & Actor critic metho

- Each Algorithm has its strength and week-ness & choice depends on specific problem environment.

- Applications :

1. Robotics
2. game playing
3. Recommentation system
4. Autonomous vechiles
5. Optimising control system.

10] listout Numpy Mathsfunction. (any one)

Ans: This () perform arithmetic Operations are applied to each element on by one.

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Power

1] Addition: This () is used to same of different array.

- add () is used to perform this operation.

Example:
```
import numpy as np
a = np.array ([1,2,3,4])
b = np.array ([1,2,3,4])
c = np.add (a,b)
print (c)
```

11. Explain pandas series explain with example.

Ans: a pandas series is a like colums in a table.

- " pandas series is a one demisional array like colums in a table to store any types of Data ".

- the series () is used to create pandas series, first week in part library of pandas library.

• create a pandas series using python list:

- Example : import pandas as pd
  a = [10, 20, 30, 40]
  b = pd.series (a)
  Print (b)

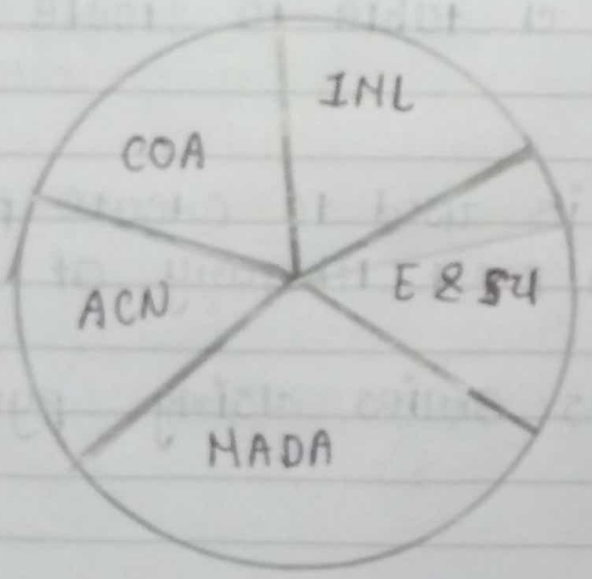
12] Explain PIE / bar chart with example.

Ans : PIE Chart :

- In matplotlib, you can create a pie chart to display the proportion or percentage distribution of different categories within a dataset using the pie() function.

- Here's an example of how to create a basic pie chart using matplotlib.

Example - import matplotlib.pyplot as plt
S = [" IML ", " COA ", " ACN ", " MADA ", " E & SU "]
M = [46, 40, 41, 53, 48]
plt = pie (m, labels = S, explode = e)



- BAR Chart :

- In matplotlib, you can create bar plots using the bar() function to visually represent categorical data or compare different categories.

- Example : import pandas as pd
import
data = {'year': [2015, 2016, 2017, 2018, 2019],
'sales': [100, 150, 200, 180, 220],
'Expenses': [80, 100, 120, 100, 130]}
df = pd.DataFrame(data)
df = plot(x='year', y='sales', kind='bar
plt.title('sales Over years')
plt.xlabel('year')
plt.ylabel('sales')
plt.show()