Course: Artificial Intelligence and Machine Learning

Code: 20CS51I

WEEK1- Artificial intelligence concepts

Session3:

Significance of AI

1. It's garbage in and garbage out : The answer you seek from an AI system is known as the "output", and the only way you can get this output is by what the inputs are. In this case, it's in the form of datasets. If any of these are erroneous in any way, your output will get skewed, and your results will send you in the wrong direction.

2. The characteristics of a good data set: It is complete, it is comprehensive, It is consistent, It is accurate, It must be valid (recent data),It is unique

3. Not all AI systems are built equally

With actual datasets, we often think of a long series of numbers i.e. quantitative data. But there are also datasets in qualitative data i.e. videos, pictures, etc. With AI systems, these datasets are known as "Structured" and "Unstructured", respectively. It's important to note that not all AI systems can handle both of these sets.

AI Software Development Life Cycle

Since AI software development projects are undertaken to achieve high-value targets, deciding the requirements and finalizing them upfront can save effort, time, and funds. Going by this ideology, the waterfall SDLC method is considered most suitable for AI projects. The waterfall model consists of the following phases-

1. Planning
2. Requirement analysis phase
3. Design phase

4. Development phase
5. Testing or QA phase
6. Deployment phase
7. Maintenance phase

1.Planning

The planning phase of the SDLC is also when the project plan is developed that identifies, prioritizes, and assigns the tasks and resources required to build the structure for a project.

2. Requirements analysis phase

Business analysts are appointed in this phase to gather detailed requirements. This task involves direct communication with the client, to better understand what exactly they are looking for. There are established industry protocols for requirements analysis. However, in AI software development projects, certain best practices should also be adopted.

There are various factors to consider for effective requirements analysis. These include customer empathy, experiments, smaller components or modules within the AI software, among others. It is also important to look for real-life scenarios, gather user complaints and consider employee observations to understand the exact requirements and propose solutions.

During this phase, the financial aspects such as the budget estimate of the project and the ROI, should also be evaluated.

3. Software design phase

The design phase in AI software development involves extensive planning for designing all the different software versions – for the web and different mobile platforms like iOS and Android. In this phase, the low-level design of the AI solution is carried out and diverse parameters like sources of information, process stages, dynamic behaviours, target action conditions, and more are analyzed.

The entire process can be expedited using development platforms that come with ML, NLP, automation, vision, speech, and other AI capabilities and employing a strong cloud setup.

4. Application development phase

Depending on the project, the AI application development phase can range anything from a few weeks to several months. Forming the development team, giving it structure, checking necessary access to tools, processes, and data for software development, and ensuring seamless collaboration with other teams is critical to success.

Various AI development platforms offer detailed documentation that the development team can use for reference. The most popular AI development platforms include – Microsoft Azure AI Platform, IBM Watson Developer Platform, Google Cloud AI Platform, and many others.

5. Software testing *phase*

Along with the fundamental concepts of the QA or software testing phase, there are some extra considerations in the case of AI projects. They are-

Data sets for AI projects can be highly voluminous and complex

Data validation is crucial to eliminate biases in selected data sets and prevent adverse outcomes in testing

ML and AI algorithms should be tested keeping in mind model validation and effectiveness of algorithms

Testing for regulatory compliance is indispensable for sensitive data, along with performance testing

Test data sets must include relevant subsets of data that will be used to train the AI system

Creating test suites for validating ML models is mandatory

6. Deployment phase

The deployment phase is when the fully developed AI software goes live- this is where it starts showing the real-life real-time results after launch. There might be surprises, affirmations, and even shockers in the way, so all involved teams need to remain alert.

7. Monitoring and maintenance phase

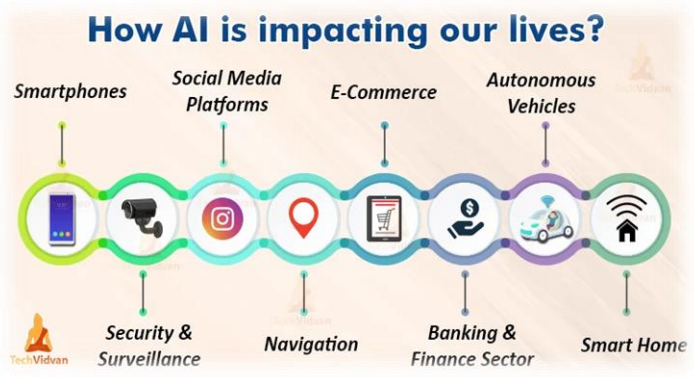
Maintenance involves offering support after deployment and warranty support. It requires a smooth collaboration among the development and maintenance teams to understand the AI system thoroughly and work on bug fixes, performance tuning modifications, and feature add-ons. Monitoring and maintenance is essentially a long-term, ongoing task that continues as long as the AI software runs in the live environment.

The Differences Between Artificial Intelligence and Traditional Software .

Artificial Intelligence	Traditional Software Model
• Artificial Intelligence software is accessed over the internet.	• Traditional software business models are based on the sale of licenses to use their software.
• You don't need to install it on your computer - you can access it from any device with an internet connection and Instead of selling licenses to use the software.	• The customer buys a license, installs the software on their own computer or server, and then uses it to run their business.
• AI companies sell access to their algorithms and data sets. This means that you do not need any hardware or infrastructure to use it - just an internet connection.	• In order to keep using the software, they must renew their license agreement with the software company on an annual basis.
• **Good at detail-oriented jobs**	• A traditional business plan is an effective business tool.
• AI-powered virtual agents are always available.	• Company executives are better equipped to manage spending since budgets are set within the plan.

Ethics in AI

- ✓ Safety
- ✓ Failure transparence
- ✓ Judicial
- ✓ Responsibility use of AI technology
- ✓ Value alignment
- ✓ Human values
- ✓ Personal Privacy
- ✓ Liberty Privacy
- ✓ Share benefit
- ✓ Human control
- ✓ Alarm Race
- ✓ Examples of AI in real world
- ✓ Manufacturing robots.
- ✓ Self-driving cars.
- ✓ Smart assistants.
- ✓ Healthcare management.
- ✓ Automated financial investing.
- ✓ Virtual travel booking agent.
- ✓ Social media monitoring.
- ✓ Marketing chatbots.



Descriptive questions:

1.Give the Significance of AI

2.Discuss AI Software Development Life Cycle(SDLC) phases

3.Discuss the ethics of AI

4. Differentiate Between Artificial Intelligence and Traditional Software

Multiple choice questions and answers

1.What are the ethics in AI

a) Safety

b) Human values

c)Judicial

d) all of the above

Ans :- d.

2.How many phases of the system development?

a)10

b)6

c)8

d)7

Ans :- d

3.Robots are also following ethics, true or falls

a) True

b) False

Ans :- True

4.Why we use Deploy phase

i.Develop project

ii.Provide support

iii.Identify problem

iv.Provide training

a) only i

b)only ii

c)ii and iv

d) i,ii,iii and iv

Ans :- c. 2 and 4

5. You do not need any hardware or infrastructure to use AI,state true or falls

a) true

b) false

Ans:a