

**20:25**

Aman MCT  
Foreign.

**20:33**

Aman MCT  
Welcome to AI for Beginners course.

**20:36**

Aman MCT  
I welcome you all to this two.

**20:38**

Aman MCT  
Day course on AI for beginners. This is our day one of the course and I am your instructor Aman. I'm a Microsoft certified trainer who delivers.

**20:50**

Aman MCT  
Advanced role based certifications.

**20:52**

Aman MCT  
And this is our day one for.

**20:54**

Aman MCT  
AI for Beginners course.

**20:57**

Aman MCT  
So I welcome you all to this day one.

**20:59**

Aman MCT  
And let us get started with our courseware. You know that we have two days of study.

**21:06**

Aman MCT  
In the day one we will be.

**21:08**

Aman MCT  
Looking at some fundamentals of artificial intelligence. We are living in the world of AI, right? We hear artificial intelligence, particularly generative artificial intelligence and everywhere, right?

**21:24**

Aman MCT  
You all use chat, GPT, Claude, AI, etc.

**21:29**

Aman MCT  
So we as technology professionals must learn this technology, adopt this in our business processes and help our clients and customers to innovate with artificial intelligence.

**21:46**

Aman MCT  
So let us get started.

**21:47**

Aman MCT

Today we will be learning about machine learning, deep learning, types of machine learning, model lifecycle and workflow. We'll be talking about generative AI technology, what is transformer architecture, attention mechanism, etc.

**22:06**

Aman MCT

So without any further ado, let us get started with our two hours session.

**22:11**

Aman MCT

On AI for beginners.

**22:15**

Aman MCT

So let's get started with the first.

**22:17**

Aman MCT

Point, the AI hierarchy. We hear this term everywhere surrounding us, right? We, whenever we open news or whatever,.

**22:31**

Aman MCT

The.

**22:34**

Aman MCT

Article you read on the Internet, it's all about artificial intelligence, generative artificial intelligence.

**22:42**

Aman MCT

So first of all we need to.

**22:44**

Aman MCT

Define what is artificial intelligence.

**22:48**

Aman MCT

Now as the word says artificial intelligence,.

**22:51**

Aman MCT

We as human beings are biological intelligence. We are made out of carbon and hydrogen, biological material, proteins, you, I, we all are biological intelligence, right? Now if electronic computers which are made.

**23:09**

Aman MCT

Out of silicon, they can exhibit behaviors.

**23:13**

Aman MCT

Like humans, we can say such electronic machines as artificially intelligent. So artificial intelligence essentially means that just like biological intelligence, which are human beings, if electronic computers encompass a wide range of technologies and applications which can perform.

**23:39**

Aman MCT

Tasks which require human like intelligence,.

**23:44**

Aman MCT

Then we would say that as artificial intelligence, for example, natural language processing, natural language understanding, natural language generation, large language models, vision, image classification, object detection, you name it, right? They all are artificial intelligence workloads. Then what is machine learning? Machine learning involves the use of statistical and probabilistic algorithms and models to learn the pattern from data and then make predictions or decisions based on that data. So it's not like that we will write the program to solve a problem. Rather, if the problem cannot be solved by writing the code, we can let.

**24:44**

Aman MCT

The machine learn through the data.

**24:47**

Aman MCT

That's machine learning, solving problems without coding, you Let the machine get trained on the data.

**24:58**

Aman MCT

So you might have heard about various.

**25:00**

Aman MCT

Kinds of machine learning algorithms, right? You might have heard about logistic regression, decision forest support, vector machines, stochastic gradient descent, etc.

**25:11**

Aman MCT

You might have heard about a lot.

**25:13**

Aman MCT

Of different learning algorithms.

**25:16**

Aman MCT

So they are used along with the statistics probability models to learn the pattern.

**25:24**

Aman MCT

From the data which we give to the learning algorithm as an input. Deep learning uses artificial neural networks, typically.

**25:37**

Aman MCT

Called as perceptrons with multiple hidden layers.

**25:42**

Aman MCT

To analyze complex data like images, handwritten text. Because they are very complex to understand, traditional machine learning algorithms cannot work with such high complexity data like images, videos, handwritten characters, which we use as human beings. So deep learning uses neural networks with many layers to analyze various factors of data to automatically discover the representations and pattern which are the part of the feature engineering. We can then do detection and classification neural networks. Artificial neural networks, typically called as a perceptron, is the foundational technology that enables deep learning and the generative AI. What is then generative AI? Generative AI is possible because of the transformer architecture as invented by Google. We will be talking about the transformer.

**26:59**

Aman MCT

Architecture as we move ahead.

**27:01**

Aman MCT

But if you are in the domain of data and AI, you might have heard about recurrent neural networks, you might.

**27:10**

Aman MCT

Have heard about feedforward neural networks, you.

**27:14**

Aman MCT

Might have heard about generative adversarial networks, Gans. They all are nothing but generative AI technology. But transformer architecture, along with attention mechanism, has allowed us to create models that can generate original human like content.

**27:40**

Aman MCT

So if I were to ask you.

**27:41**

Aman MCT

That you write a novel, just like some great novelist has written a novel,.

**27:47**

Aman MCT

You might ask a question.

**27:49**

Aman MCT

Hey, I am not a novelist, I cannot write a novel. But we have the models in the world which can generate original human like content. They are trained on data, obviously on the transformer architecture, and they have billions and billions of learned parameters. Now you know that generative AI means that you generate a human like content. Now, we all have two kinds of friends, right? You all have friends, right? With whom you enjoy your weekends. So we all have friends.

**28:34**

Aman MCT

You might have seen that you have.

**28:36**

Aman MCT

Two kinds of friends.

**28:38**

Aman MCT

One of the friend that you have, he or she talks with you, right?

**28:46**

Aman MCT

So you can have gossip with your friend, you can have chat with your friend.

**28:50**

Aman MCT

But when you ask your friend to.

**28:51**

Aman MCT

Do something for your friend says, I am busy, I am not available at the moment. He does not do anything for you,.

**29:01**

Aman MCT

He or she, right?

**29:02**

Aman MCT

We all have these kinds of friends, obviously, right?

**29:05**

Aman MCT

Lazy friends, they talk with us they.

**29:08**

Aman MCT

Enjoy with us, but when we ask them to do something for us, they say that, hey, I can't do it.

**29:14**

Aman MCT

But then we have other kinds of friends, right?

**29:18**

Aman MCT

Who not only talk with us, but.

**29:20**

Aman MCT

They also do something for us. They help us in something, right? If you ask your friend to do something for your friend will do it for you.

**29:30**

Aman MCT

Okay?

**29:31**

Aman MCT

We have these kinds of friends also. Generally, we want the second kind of friend. We don't want the first kind of friend. So agentic artificial intelligence is the second kind of the friend which will not only talk with you, but when you ask it to do something for you, will also do something for you using various kinds of tools which we give to the agent. So agentic AI is the next level of generative AI where the agent will not only talk with you just like conversational chatting, but will also do something for you using the tools. So that's where generative AI and agentic AI difference. When we develop agents, we give agents knowledge using private data tools of various kinds. For example, code interpreter tool, custom function calling tools, MCP model, context protocol tools.

**30:36**

Aman MCT

And we also give context to the.

**30:38**

Aman MCT

Agent, which is called as conversation history,.

**30:41**

Aman MCT

Also called as a thread.

**30:43**

Aman MCT

And then the agent uses some kind of gen AI model like GPT 5.2 or GPT 4 omni, etc.

**30:53**

Aman MCT

So you give four things to an.

**30:56**

Aman MCT

Application, you give a large language model like GPT4 Omni, you give the knowledge.

**31:03**

Aman MCT

Using private data asset, you give context, which is the history thread, conversation, and.

**31:10**

Aman MCT

You give various kinds of tools like MCP tool or code interpreter tool, etc. That creates an agent because the application will not only talk with you, but will also do something for you using the tools.

**31:27**

Aman MCT

Later in the course where you will.

**31:28**

Aman MCT

See that we will design the tools, right? And we will create agents. So that's agent AI. I always let people remember it this way, that you have friends who only talk with you, but then you have friends who not only talk with you, but also do something for you when you ask them. So one is called as conversational gen AI. Another one is called as agentic gen AI, where it will not only talk, but will also do something for you.

**31:53**

Aman MCT

Okay,.

**31:57**

Aman MCT

Now we are living in the world of artificial intelligence, and you see that everywhere there is generative AI, right? You see everywhere there is generative AI. So generative means. What do the word generative mean? Generative means generate original human like content. Now that human like content could be anything.

**32:22**

Aman MCT

It could be text, it could be.

**32:24**

Aman MCT

Images, it could be videos, it can be Music.

**32:29**

Aman MCT

It can be anything.

**32:31**

Aman MCT

The only point is that you are generating original human like content. The traditional artificial intelligence analyzes lot of.

**32:40**

Aman MCT

Data, classifies or predicts.

**32:43**

Aman MCT

Generative AI is the subset of artificial.

**32:47**

Aman MCT

Intelligence that focuses on creating new original content that didn't exist before.

**32:56**

Aman MCT

So the key difference that we have.

**32:58**

Aman MCT

To remember is that gen AI will not only just analyze or classify or.

**33:03**

Aman MCT

Reason, but it will only generate, it.

**33:06**

Aman MCT

Will also generate original human like content. And you know that the entire process is fairly complex. But in the generative AI domain, how generative AI works is that we have two phases, the training phase and the generation phase. And in the training phase, AI, which is the Geni training algorithm, it will study the example data sets, identify patterns and relationships from the data, and build the understanding of how the thing should look, sound or read by looking at the human data. And in the generation phase, we give it the instruction which is called as a prompt AI because it has learned the patterns in the training along with our instructions. It goes on for creating what is the next sequence which completes the pattern. So it generates the tokens, it generates the content that completes the pattern which is in our instruction.

**34:15**

Aman MCT

So it is like completion.

**34:18**

Aman MCT

Remember, you use keyboards on your cell phone.

**34:22**

Aman MCT

You might have seen sometimes the keyboard automatically completes your words, right?

**34:30**

Aman MCT

That is sort of intelligence that knows what will come after what you are typing. So you might use you all, you use phones, right? Every one of us, we use phones. And I remember right? A kid asked me that what is generative AI?

**34:50**

Aman MCT

So I cannot tell the kid that.

**34:52**

Aman MCT

Generative AI is transformer architecture, or it is essentially GPUs and attention mechanism.

**35:01**

Aman MCT

I said, do you use the phone? The kid said, yes, I use the phone. Do you type on your phone?

**35:08**

Aman MCT

Yes, I type a lot with my friends when I chat with them.

**35:12**

Aman MCT

Have you seen that when you type the words, when you type certain letters, the keyboard gives you suggestions for the.

**35:20**

Aman MCT

Auto completion of the words.

**35:23**

Aman MCT

So he says, yes, the I type.

**35:26**

Aman MCT

Few letters of the word.

**35:27**

Aman MCT

And I see that the keyboard which.

**35:30**

Aman MCT

I am using gives me the completion.

**35:32**

Aman MCT

Of the word that is what is generative AI. It gives you a sense that it.

**35:40**

Aman MCT

Knows what will come after this.

**35:43**

Aman MCT

So in the generation phase, the generative AI model generates tokens that complete your pattern that will come after your pattern.

**35:55**

Aman MCT

So whatever you have given in the instruction, it will generate which is highly.

**36:00**

Aman MCT

Likely to complete that pattern.

**36:03**

Aman MCT

Just like the keyboard, you type certain.



**36:05**

Aman MCT

Letters, it gives you the suggestion that this may be what you are typing, right? It gives you the words.

**36:12**

Aman MCT

So that is what is generative intelligence that it knows what will come afterwards. So what are large language models?

**36:24**

Aman MCT

So we hear this everywhere.

**36:26**

Aman MCT

Large language models. Large language models are essentially the models.

**36:35**

Aman MCT

That we use which have been trained.

**36:38**

Aman MCT

On massive data sets.

**36:41**

Aman MCT

Okay?

**36:42**

Aman MCT

We have deep learning and then we have large learning, which means when the amount of data set, when the amount of data is very large, then it goes into the domain of large language models because it will have billions and billions of learned parameters in the deep learning architecture, in the transformer architecture. So what are large language models? Large language models are text specialists model.

**37:12**

Aman MCT

They are a specific type of generative AI that specializes in understanding and creating text based content.

**37:24**

Aman MCT

We as human beings, because, you know, we wanted to record knowledge, we invented the paper, we invented the ink, and.

**37:34**

Aman MCT

Whatever the knowledge we had as a.

**37:36**

Aman MCT

Human species, we noted it down on.

**37:39**

Aman MCT

The piece of paper so that future.

**37:41**

Aman MCT  
Generations can use that.

**37:45**  
Aman MCT  
So that the future generations so that.

**37:50**  
Aman MCT  
The future generations.

**37:54**  
Aman MCT  
So that the future.

**37:55**  
Aman MCT  
Generations can essentially do that.

**37:58**  
Aman MCT  
If you are having any questions, please feel free to put your questions in the chat.

**38:04**  
Aman MCT  
Right.

**38:04**  
Aman MCT  
In case you have any questions.

**38:07**  
Aman MCT  
You can put your questions in the chat. I get another question.

**38:10**  
Aman MCT  
In layman terms, does model means code.

**38:14**  
Aman MCT  
Which learns based on the data which has been provided?

**38:16**  
Aman MCT  
Yes, absolutely. A model is nothing but a prediction function. We will talk about that as we go ahead.

**38:25**  
Aman MCT  
But to answer your question, you are.

**38:27**  
Aman MCT  
Absolutely right that the model is nothing but a prediction function. It's a mathematical function which is learned.

**38:38**  
Aman MCT  
On the basis of the data that.

**38:39**

Aman MCT

We have given it during the training process.

**38:42**

Aman MCT

Absolutely right.

**38:44**

Aman MCT

If you have any questions, please feel free to punch them in the chat window.

**38:48**

Aman MCT

I will take your questions in the live mode.

**38:50**

Aman MCT

Okay, wonderful.

**38:53**

Aman MCT

Let's continue. So what is a large language model? Large language models are generalized specialist models.

**39:04**

Aman MCT

For text. There are specialist models also.

**39:08**

Aman MCT

Like embedding models. We have speech models.

**39:11**

Aman MCT

Yes, there are specialized, but generally when.

**39:14**

Aman MCT

We talk about LLMs, we have generalized models like GPT4 only, GPT 5.2, etc. GPT 5.4 now, etc. So yes, LLMs can be generalized. LLMs can also be very task specific.

**39:28**

Aman MCT

For example, LLMs which are only used.

**39:31**

Aman MCT

For embeddings, LLMs which are only used for speech, etc.

**39:35**

Aman MCT

Okay.

**39:36**

Aman MCT

And there are models across different domains.

**39:39**

Aman MCT  
Absolutely.

**39:40**

Aman MCT  
When you will look into the foundry model catalog, you will see that models are available for various industrial domains, models.

**39:49**

Aman MCT  
For your manufacturing, models for your healthcare, etc.

**39:53**

Aman MCT  
Absolutely.

**39:54**

Aman MCT  
Models are available for your specialist use.

**39:57**

Aman MCT  
Cases as well as for generalized. And the models are also available which.

**40:02**

Aman MCT  
Are proven across a certain industrial domain.

**40:08**

Aman MCT  
So LLMs, as you know, large language models, these are trained on the modern transformer architecture which was invented by Google. And they have billions and billions of.

**40:22**

Aman MCT  
Parameters because of the amount of data.

**40:24**

Aman MCT  
That they are trained on, right? Yes.

**40:29**

Aman MCT  
AI videos are generated by certain models,.

**40:33**

Aman MCT  
But that is not large language model,.

**40:36**

Aman MCT  
That is a video model, right?

**40:38**

Aman MCT  
Like Sora and others.

**40:40**

Aman MCT

Language model means text, right? So text is to be generated, you have to generate text, right? Written text. When you talk about image, that is a different model.

**40:52**

Aman MCT

That is called as a daily model.

**40:54**

Aman MCT

When you talk about videos, that's a separate model. We are talking about language model, which.

**40:59**

Aman MCT

Means text content like GPT4O, GPT5, etc. Okay,.

**41:07**

Aman MCT

So what are large language models?

**41:09**

Aman MCT

The cornerstone of modern artificial intelligence. It is what defines AI in the model world.

**41:18**

Aman MCT

It focuses on language related tasks, for.

**41:22**

Aman MCT

Example, extractive summarization, abstractive summarization. So what is extractive summarization?

**41:30**

Aman MCT

I give you a very large piece.

**41:32**

Aman MCT

Of text and then I tell you that using the sentences from this document, you summarize this document.

**41:42**

Aman MCT

So you have to use the sentences.

**41:44**

Aman MCT

From the document and then summarize the document.

**41:47**

Aman MCT

So that is called as extractive summarization.

**41:49**

Aman MCT

A summary has to be generated or abstractive summarization, that you do not have.

**41:56**

Aman MCT

To use the sentences of the document.

**42:00**

Aman MCT

Instead you have to create your own summary.

**42:03**

Aman MCT

You have to draft a summary.

**42:06**

Aman MCT

You cannot use the sentences of the document. That is called as abstractive summary. So, for example, this is what is.

**42:14**

Aman MCT

The work of an LLM.

**42:15**

Aman MCT

LLM can do it within a blink.

**42:18**

Aman MCT

Of an eye, right? So to give you an example, language related tasks.

**42:24**

Aman MCT

Now there are various language related tasks.

**42:26**

Aman MCT

That I will discuss very shortly with you.

**42:28**

Aman MCT

But just as an example, right?

**42:30**

Aman MCT

Extractive summarization, abstractive summarization. So this is where the modern artificial intelligence lies.

**42:44**

Aman MCT

We have come a very long journey, you know, right?

**42:47**

Aman MCT

We have been starting from 1970s, right?

**42:53**

Aman MCT

So right from 1970s to now, 2025,.

**42:57**

Aman MCT

2026 Is where we are living in the world of generative artificial intelligence, which.

**43:06**

Aman MCT

Is defined by large language models and also the foundational models, which are the underlying models, like your gpt4 omni part, mpt7b will discuss about them as we go ahead.

**43:22**

Aman MCT

So when we talk about modern computer science and engineering, it's no longer that.

**43:29**

Aman MCT

We say only traditional computer science, where.

**43:33**

Aman MCT

You have to learn algorithms and you.

**43:34**

Aman MCT

Have to do coding, but now we.

**43:36**

Aman MCT

Have to learn that how do we teach machines? So machine learning, deep learning, and artificial intelligence and obviously generative artificial intelligence and agentic artificial intelligence is what the modern requirement of the industry is. And if you are in touch with Microsoft certifications, you know that most of.

**43:59**

Aman MCT

The Microsoft certifications are now upgraded with AI, which means every certificate would need.

**44:07**

Aman MCT

That you have sophisticated knowledge of modern generative artificial intelligence. Tomorrow we will focus on the details.

**44:16**

Aman MCT

Of these large language models.

**44:19**

Aman MCT

How they are trained, what are their architectures, what are foundational models, what is retrieval, augmented generation, what is fine tuning, etc.

**44:28**

Aman MCT

Right. Today we just introduce that large language models are essentially the cornerstone and they.

**44:35**

Aman MCT

Can generate human like content. They can do language related tasks very easily.

**44:42**

Aman MCT

Right. Now let's answer the question which would.

**44:49**

Aman MCT

Come into the mind of any beginner.

**44:52**

Aman MCT

If you say artificial intelligence means to.

**44:54**

Aman MCT

Mimic human beings because humans are biological.

**44:58**

Aman MCT

Intelligence, then what are the different types of artificial intelligence?

**45:02**

Aman MCT

Can you please define the types of artificial intelligence? The most important type of artificial.

**45:10**

Aman MCT

Intelligence is text and language. Text and language, Right. So the most important is text and language. Okay. The most important type of artificial intelligence is text and language. Can you give me some examples of.

**45:38**

Aman MCT

What you as a human being can do?

**45:41**

Aman MCT

When we talk about text and language,.

**45:43**

Aman MCT

We are biological intelligence, right? We are the original form of intelligence.

**45:49**

Aman MCT

So what can we do when it comes to language?

**45:55**

Aman MCT

Can we type something in the chat? Can you give some inputs?

**46:00**

Aman MCT

Let's make it a little interactive.

**46:03**

Aman MCT

What can we do as human beings.

**46:06**

Aman MCT

When it comes to text? Okay, Write program which is a formal language. Converse. Wonderful, wonderful. Conversation.

**46:15**

Aman MCT

Yes.

**46:15**

Aman MCT

Multi turn. Non linear conversation.

**46:18**



Aman MCT  
Speak different languages. Absolutely.

**46:20**  
Aman MCT  
Polyglot.

**46:20**  
Aman MCT  
Polyglot individual.

**46:22**  
Aman MCT  
Understand what you are trying to say. Talk in different languages.

**46:27**  
Aman MCT  
Wonderful.

**46:27**  
Aman MCT  
Polyglot individuals.

**46:30**  
Aman MCT  
Okay, so let's do something. Let me open notepad and let's do some things. Let's do few things. Let me open a quick notepad and you're going to be essentially helping me out. So if I type something here, for.

**46:47**  
Aman MCT  
Example, let us say I type.

**46:49**  
Aman MCT  
I am learning AI.

**46:53**  
Aman MCT  
Can you tell me the primary, also called as predominant language, which is the.

**47:01**  
Aman MCT  
Language in which it is written?

**47:03**  
Aman MCT  
Can you please tell me?

**47:05**  
Aman MCT  
Yes, you can tell, right?

**47:07**  
Aman MCT  
English.

**47:09**  
Aman MCT  
English. You can tell me that it is in English. So this is called as predominant and primary language detection. If I were to include some French in it, I, I'm not a French individual, but let's say bon appetit. Anything.

**47:25**

Aman MCT  
Right.

**47:26**

Aman MCT  
Now what is the primary language? First of all, are there more than one. Foreign.

**48:26**

Aman MCT  
Hello guys. So there's a technical issue at our trainer side. Just wait for five Minutes we will resolve it and come back to you. Okay, don't panic over this. Just give us five to ten minutes. We will hand sort these things out.

**49:03**

Aman MCT  
Unfortunately, Zoom crashed for me. The zoom had crashed for me. Now I am back in the class.

**49:10**

Aman MCT  
I quick confirm.

**49:15**

Aman MCT  
If I am audible.

**49:16**

Aman MCT  
To all of you.

**49:18**

Aman MCT  
The Zoom application crashed for me. So I am back for you. Wonderful.

**49:24**

Aman MCT  
Right?

**49:25**

Aman MCT  
Okay.

**49:26**

Aman MCT  
Wonderful, wonderful. So people have given me the confirmation. So let's get started.

**49:31**

Aman MCT  
So this is called as language detection born. How many tokens? So tokens of French, five tokens of English. So which is the primary language? The primary language is English. The primary language is English. Right. So what is text and language? So let me show you text and language.

**50:00**

Aman MCT  
So let us go to Google and.

**50:03**

Aman MCT  
Simply type pypy.org python package index.org and.

**50:09**

Aman MCT

When we type over here, when we.

**50:15**

Aman MCT

Type over here, Azure AI text analytics.

**50:21**

Aman MCT

You will see that this is the language I artificial intelligence.

**50:33**

Aman MCT

You know. There is a very heavy thunderstorm happening here.

**50:44**

Aman MCT

So this is the.

**50:47**

Aman MCT

Alert from imd Indian Meteorological department. All right, so let's continue. I have changed my network back to.

**51:17**

Aman MCT

The high speed Internet.

**51:19**

Aman MCT

If the voice breaks now then you.

**51:22**

Aman MCT

Please let me know.

**51:22**

Aman MCT

I have just changed the network.

**51:24**

Aman MCT

Right? And there is a warning from the Indian metrological department in my region that a lot of thunderstorm is about to happen. Whatever you heard the warning messages come on the iPhone on the Android device. Right? That's why the Internet is also fluctuating.

**51:42**

Aman MCT

Right?

**51:44**

Aman MCT

Let's continue.

**51:46**

Aman MCT

Wonderful.

**51:46**

Aman MCT

Yeah, I switched it back to the high speed Internet. So if you observe as a technology.

**51:53**

Aman MCT

Professional, look at this Azure text analytics.

**51:58**

Aman MCT

Client library for Python. So what do you observe?

**52:02**

Aman MCT

This is artificial intelligence called as text and language.

**52:08**

Aman MCT

We will do all of these things.

**52:12**

Aman MCT

Sentiment analysis with opinion mining, named entity recognition, language detection, key phrases extraction.

**52:23**

Aman MCT

Named entity linking for disambiguation.

**52:27**

Aman MCT

Multiple analysis in a single request call.

**52:31**

Aman MCT

So if you place a single request.

**52:32**

Aman MCT

You can do all of these things, right?

**52:38**

Aman MCT

I am already sharing the screen. Let me share it again. Don't know. Some participants are saying the screen is not visible. I've shared it again. So you can see over here you.

**52:50**

Aman MCT

Have all these text and language AI.

**52:55**

Aman MCT

Look at the sentiment analysis with opinion mining.

**52:58**

Aman MCT

Named entity recognition, language detection. Okay.

**53:03**

Aman MCT

Key phrases extraction. Okay. Named entity linking for disambiguation. Multiple analysis in a single call. Detection of personally identifiable information like your income tax numbers, your Social Security numbers,.

**53:21**

Aman MCT

Etc, your passport etc. Text analytics for health care data. Right.

**53:26**

Aman MCT

Private patient data, medical records, custom named entity recognizers.

**53:32**

Aman MCT

Custom text classifiers, extractive text summarizations, and abstractive text summarizations. So all of these are essentially what.

**53:45**

Aman MCT

Is called AS text and language AI when it comes to text and language AI.

**53:51**

Aman MCT

Now, when you're going to go and learn in the future, right?

**53:56**

Aman MCT

This is just for beginners, it's an introduction. But when you will proceed ahead, you will see that you will be writing all of these Python scripts. So you will be writing all of.

**54:06**

Aman MCT

These Python scripts from scratch to do all of this. Right? Because when you do these AI workloads,.

**54:14**

Aman MCT

You learn how to do them.

**54:16**

Aman MCT

Right. So this is for beginners.

**54:18**

Aman MCT

Obviously we will not be deep diving into hands on, as you know, right? But when you will proceed ahead, you.

**54:25**

Aman MCT

Will see that you're going to be developing all of these Python scripts to do these things.

**54:31**

Aman MCT

For example, detect language. So this is how you do it. This is how you do it, right? So this is the code to do it. Detect language, right. Don't worry too much about the code as of now, just.

**54:47**

Aman MCT

Remember that something.

**54:49**

Aman MCT

Which you will engage as you move ahead as an AI professional. So this is for detection of the language.

**54:56**

Aman MCT

And in a similar fashion, you see.

**54:57**

Aman MCT

If you open, let's say analyze sentiments with opinions. So if you open that, this is a small little Python program which can help you do that.

**55:07**

Aman MCT

Small little AI, right, so this is AI, right? Analyze the sentiments and opinion mining.

**55:17**

Aman MCT

True.

**55:18**

Aman MCT

And you will do all of this.

**55:20**

Aman MCT

When you enter into associate level learning.

**55:23**

Aman MCT

Right.

**55:24**

Aman MCT

So this is, you know, beginners at the beginner level there is no need for you to write programs. But when you move ahead into the associate level, then you will see that you will be asked to write all of these things as a part of your learning. Write a Python program to analyze the sentiments and also the opinions hidden in the sentiments.

**55:46**

Aman MCT

Okay, so you will do that. Okay, so this is called as text and language, right? What about vision?

**55:56**

Aman MCT

Vision is also very important, right? So if I were to now take.

**56:02**

Aman MCT

You back to pypy.org and I were to open another tab and let's type.

**56:10**

Aman MCT

Here Azure Hyphen, AI hyphen, Vision hyphen, Image analysis. Look at this. This is called AS Vision Client challenge. Yeah, Here you see Azure AI Vision. So let's open that. So what do you see?

**56:30**

Aman MCT

You see vision Artificial intelligence.

**56:33**

Aman MCT

So if I were to bring you.

**56:34**

Aman MCT

A little bit down, you'll see these.

**56:38**

Aman MCT

Are the seven things that you can.

**56:40**

Aman MCT

Do with when it comes to vision. Artificial intelligence. Caption read, dance captions, tags, objects, smart.

**56:53**

Aman MCT

Cropping for thumbnails and Detection of human beings.

**56:59**

Aman MCT

These are the seven things which come under AI vision. Right? So read also means optical character recognition, ocr. Now again, as we will move ahead.

**57:14**

Aman MCT

Into the associate level, you will have to write a lot of code as a part of your learning.

**57:20**

Aman MCT

So here, you see, here are the Python scripts that you will be practicing. Okay?

**57:27**

Aman MCT

Sample OCR image file. Sample OCR image URL. So give an image as a URL or as a file. I will read the printed or the handwritten text in that image. So you give me an image of some kind of a bill or an.

**57:42**

Aman MCT

Invoice, I will extract whatever is written inside that image.

**57:46**

Aman MCT

You give me some ticket, you give me some letter, contract, purchase order, I will extract what is written inside that piece of document as an image.

**57:58**

Aman MCT

So obviously, you know, at the beginner level, we have to feel what is AI.

**58:04**

Aman MCT

But as we move ahead, you will get your hands dirty and you will.

**58:09**

Aman MCT

Do all these stuff.

**58:10**

Aman MCT

So this is what's called as vision, right?

**58:14**

Aman MCT

So this is called as your vision image analysis.

**58:17**

Aman MCT

Okay?

**58:18**

Aman MCT

This falls into image analysis, which is this computer vision, right? Yes, yes.

**58:25**

Aman MCT

You, you will do all these things in the associate level in the Python, yes.

**58:31**

Aman MCT

Then comes the generative AI and agents.

**58:36**

Aman MCT

Now, we all are familiar with what is that generative AI and agents.

**58:42**

Aman MCT

This is nothing but the open AI chat completions endpoint.

**58:50**

Aman MCT

So if I were to now take.

**58:51**

Aman MCT

You to again duplicate, and this time.

**58:55**

Aman MCT

We type simply OpenAI. Then we find the OpenAI package. Let's open the OpenAI package.

**59:06**

Aman MCT

And in the OpenAI package, if you observe, you have two APIs, responses and completions, right?

**59:18**

Aman MCT

So this is what causes generative artificial intelligence that you generate.

**59:24**

Aman MCT

You generate the, what is called as.

**59:28**

Aman MCT

The completion, the response, right?



**59:31**

Aman MCT

And I hope you all have already.

**59:34**

Aman MCT

Used generative AI, right? It's not something which is new chat GPT copilots. We are using all of those things. So when you move ahead in your courseware, right, you will see that you will be creating open AI clients in your foundry projects. And then you will go for responses, API and chat completions, API as we.

**59:58**

Aman MCT

Move ahead in the course, right?

**01:00:01**

Aman MCT

So this is what is there. When you will be coming to AZ9 01, we will have labs on this where we will be demonstrating that how.

**01:00:08**

Aman MCT

To go with responses endpoint and how to go with chat completions endpoint and do generative artificial intelligence. Now, what are agents? Who is an agent?

**01:00:22**

Aman MCT

An agent is something which can do.

**01:00:24**

Aman MCT

Something for you, right?

**01:00:27**

Aman MCT

So with generative AI we can develop conversational agent.

**01:00:32**

Aman MCT

Conversational Assistant, we do conversations, but when it is asked to do something, it.

**01:00:38**

Aman MCT

Will say, I cannot do something for you. For example, let me open the copilot, let me show you. I will ask it to generate something. Generate. Generate a Python script.

**01:00:57**

Aman MCT

Python script to create a file in my C drive.

**01:01:06**

Aman MCT

And you see, it generates the Python script. So that is generative AI, because it is writing Python code. So it has written the Python code,.

**01:01:15**

Aman MCT

But now I ask it execute this Python code.

**01:01:23**

Aman MCT  
So what do you think?

**01:01:24**

Aman MCT  
What will it say? It will say, hey, I can talk.

**01:01:30**

Aman MCT  
With you, but if you ask me to do something, I cannot do it.

**01:01:35**

Aman MCT  
So it will say, I cannot do it, I can't run it, but I.

**01:01:40**

Aman MCT  
Can tell you how to do it.

**01:01:43**

Aman MCT  
Why can't it do anything for me? Why will it only talk with me?

**01:01:47**

Aman MCT  
Why will it only generate? Why will it not do something? Because large language models cannot do something. They can only talk.

**01:01:58**

Aman MCT  
So it's like that friend who only talks. How will it be able to do something if it is given something called as tools? Which tool is required to run this script?

**01:02:15**

Aman MCT  
We all do programming, right? You do programming, I do programming.

**01:02:20**

Aman MCT  
In order to run Python program, what do we need?

**01:02:25**

Aman MCT  
Python interpreter.

**01:02:28**

Aman MCT  
We need to install Python interpreter that.

**01:02:32**

Aman MCT  
Is called as code interpreter tool.

**01:02:35**

Aman MCT  
If I give you code interpreter tool access Interpreter tool access. Can you run this for me? I can run it for you directly. Right now I do not have it. So it says. It says that, hey, if you give me that tool code interpreter tool, I can do it for you, but if.

**01:03:15**

Aman MCT  
You do not give me the tool,.

**01:03:17**  
Aman MCT  
I cannot run it.

**01:03:19**  
Aman MCT  
So what is the difference between conversational.

**01:03:23**  
Aman MCT  
Assistant and the agentic AI? Agentic AI means you have given four things. Let's say do you become an agent.  
If I give you various tools like.

**01:03:48**  
Aman MCT  
Code interpreter,.

**01:03:51**  
Aman MCT  
Custom function tools,.

**01:03:57**  
Aman MCT  
McP model,.

**01:03:58**  
Aman MCT  
Context, protocol tools, OpenAI open API specification tools. So these are all technical terms that.

**01:04:09**  
Aman MCT  
You will study as you go ahead.

**01:04:11**  
Aman MCT  
Open API specification, tools, etc. Along with knowledge.

**01:04:21**  
Aman MCT  
And conversation history.

**01:04:28**  
Aman MCT  
For context. Do you become an agent if I give you all these things?

**01:04:34**  
Aman MCT  
Yeah. Memory, conversation history. The memory is nothing but the context.

**01:04:39**  
Aman MCT  
Chad, the conversation thread history for context.

**01:04:43**  
Aman MCT  
Do you become an agent so it will say yes, that's what's an agent is because I will be able to do.

**01:04:51**

Aman MCT  
It's a copilot.

**01:04:52**

Aman MCT  
It says I am co pilot.

**01:04:53**

Aman MCT  
But if you give all these things,.

**01:04:54**

Aman MCT  
It becomes an agent. I'd behave like an agent.

**01:05:01**

Aman MCT  
I behave like an agent. Why? Because I could do something for you. Context.

**01:05:09**

Aman MCT  
Wonderful.

**01:05:10**

Aman MCT  
The word Context means conversation thread.

**01:05:14**

Aman MCT  
How do we as human beings interact?

**01:05:17**

Aman MCT  
So if you interact with any human being, how do we interact? Let's say I want to book pizza. So I call the pizza guy, hey,.

**01:05:27**

Aman MCT  
I want to order the pizza. So he says, welcome sir.

**01:05:31**

Aman MCT  
Tell me, vegetarian or non vegetarian? So you tell vegetarian. Okay, sir, vegetarian. Which kind of a crust? Thin crust, flat pan. What kind of a crust do you want?

**01:05:45**

Aman MCT  
So you say, I want thin crust.

**01:05:47**

Aman MCT  
Then he says, sir, do you want cheese burst? Extra cheese.

**01:05:50**

Aman MCT  
What do you want?

**01:05:51**

Aman MCT  
So you say, cheese burst.

**01:05:53**

Aman MCT  
Then he says, which flavor do you want, sir? We have farmhouse. We have this and that. So you say, let's say farmhouse pizza, which is my favorite.

**01:06:03**

Aman MCT  
Then he says, so do you want extra toppings of any kind?

**01:06:05**

Aman MCT  
So you tell the extra toppings. Then that person says, sir, are you done? Should I make this as a final order?

**01:06:13**

Aman MCT  
You said, no, no, please change my crust.

**01:06:16**

Aman MCT  
Now what did you do?

**01:06:19**

Aman MCT  
You changed the context.

**01:06:25**

Aman MCT  
Instead of moving ahead, that is to book the pizza. That is to finalize the pizza, you non linearly changed it back. Now. So how do I know that you have already chosen the pizza crust? Because I have memory. I know the thread context. I am talking with you right from the beginning. I am remembering everything in the memory that in this thread when I am talking with you have told sir that you want thin crust pizza. So before finalizing your order, you now.

**01:06:57**

Aman MCT  
Want to change the crust.

**01:06:59**

Aman MCT  
So I will say, okay sir, earlier you said thin crust. Now which one do you want? Oh, I want flat pan. Okay, so flat pan. Now should I go ahead?

**01:07:08**

Aman MCT  
No, no.

**01:07:08**

Aman MCT  
I want to change it to non veg. I want some non veg topping.

**01:07:12**

Aman MCT  
So again you changed the context.

**01:07:14**

Aman MCT

I need to remember that you have chosen earlier something. So this is called as conversation history or thread context. What are we conversing? Because depending on that, an action has.

**01:07:27**

Aman MCT

To be taken, right?

**01:07:29**

Aman MCT

So whatever has happened in the thread.

**01:07:32**

Aman MCT

Context, depending on that, an action has to be taken. So that's where context kicks in.

**01:07:41**

Aman MCT

If I don't know your context, I will not be able to take the right action. So how do the modern generative AI applications maintain the context?

**01:07:50**

Aman MCT

Using conversation memory, Thread memory. We have thread databases, right? We can process the threads for very long, right?

**01:08:00**

Aman MCT

Which is called as context.

**01:08:01**

Aman MCT

Okay, Context means all the required history. No, prompt is an instruction. Prompt is not a context. Prompt is an instruction. Okay? So you discuss something with the agent, and the agent then reasons on that and then remembers your past and then takes an action. So prompt is an input, is an instruction.

**01:08:27**

Aman MCT

It's not essentially the context. Context is the conversation thread history.

**01:08:33**

Aman MCT

Okay. Okay, yes, it's in a thread database.

**01:08:38**

Aman MCT

It's a in memory vector database, like redis.

**01:08:42**

Aman MCT

Right?

**01:08:42**

Aman MCT

So when you will move ahead in the course where you'll see that the thread databases are essentially in memory databases.

**01:08:49**

Aman MCT

Like REDIS cache, we can maintain that in the reddish. Okay, no, then there is no context.

**01:08:58**

Aman MCT

You are talking to a stranger, so you don't know anything about the stranger.

**01:09:01**

Aman MCT

Right?

**01:09:02**

Aman MCT

So then there is no context because.

**01:09:04**

Aman MCT

There is no thread.

**01:09:05**

Aman MCT

Conversation, past conversation. Right. Then it's like a stranger.

**01:09:09**

Aman MCT

You're talking to a stranger.

**01:09:11**

Aman MCT

Okay, so that is nothing.

**01:09:13**

Aman MCT

But you know, you see generative AI and agentic AI.

**01:09:18**

Aman MCT

Okay, Speech, you know, right. Speech to text and text to speech. So I am speaking in English.

**01:09:26**

Aman MCT

Convert this into text transcription.

**01:09:29**

Aman MCT

If I have a book from some.

**01:09:33**

Aman MCT

Author, I want to convert it into an audiobook. So that is text to speech, which.

**01:09:38**

Aman MCT

Is called a speech synthesis.

**01:09:40**

Aman MCT

Right?

**01:09:41**

Aman MCT

So computer speech essentially means text to speech and speech to text, right?

**01:09:47**

Aman MCT

Like your Siri, Alexa, Cortana, all of these things.

**01:09:50**

Aman MCT

Okay.

**01:09:51**

Aman MCT

They are essentially SST and TTS systems. Speech to text, which is transcription and.

**01:09:57**

Aman MCT

Text to speech with a synthesis. Right. So if you see we have a packet.

**01:10:02**

Aman MCT

Sorry, I'm sorry.

**01:10:04**

Aman MCT

By mistake I clicked on that.

**01:10:06**

Aman MCT

So if you go here again, we.

**01:10:08**

Aman MCT

Have a beautiful package which you as a AI engineer would have to use. Azure, hyphen, AI, hyphen, speech,.

**01:10:22**

Aman MCT

Azure AI.

**01:10:24**

Aman MCT

You see, Azure Cognitive Services, speech.

**01:10:27**

Aman MCT

So if you open that, right, you'll.

**01:10:29**

Aman MCT

See that documentation and you will find that here you have speech package and.

**01:10:38**

Aman MCT

In the speech package you can do transcriptions, translations and synthesis. All three could be done. So there would be over here, speech configuration, you will have audio configuration. Audio will come from microphone.

**01:10:54**

Aman MCT

So you will see all these things, right?

**01:10:57**



Aman MCT

So pronunciation recognition results, speech configuration, speech.

**01:11:02**

Aman MCT

Recognizer and the speech synthesizer. So SST and tts. How to design SST and TTS is something that you will be learning as.

**01:11:15**

Aman MCT

You move ahead in the courseware.

**01:11:18**

Aman MCT

And obviously information extraction. Yes, the field of AI is very vast.

**01:11:25**

Aman MCT

At the beginner level, you are not required to think very deeply.

**01:11:31**

Aman MCT

I am just showing you a picture and the picture has multiple dimensions, right?

**01:11:36**

Aman MCT

So just look at what all this is. Don't worry too much about that. How do It? Why is there so many coding?

**01:11:43**

Aman MCT

Don't worry on that front.

**01:11:44**

Aman MCT

You just need to define what is what. If I ask you what is text and language? You simply say there are.

**01:11:51**

Aman MCT

This is text and language. That's it? Don't worry too much. What is this?

**01:11:56**

Aman MCT

So this is what is text and language AI sentiment analysis named entity recognition, Language detection.

**01:12:04**

Aman MCT

When I say computer vision, don't worry.

**01:12:07**

Aman MCT

Too much, just say this is computer vision.

**01:12:10**

Aman MCT

Caption, read dense captions, tags, objects, smart cropping people.

**01:12:15**

Aman MCT

When I say generative AI, you simply say responses, APIs and chat completions.

**01:12:21**

Aman MCT

APIs of the OpenAI client is nothing but generative AI agents.

**01:12:27**

Aman MCT

Add the tools, add the memory, add the context, that becomes an agent.

**01:12:32**

Aman MCT

Best example. So if someone tells me as a beginner in AI, hey, tell me the difference between conversational AI and agent AI, you just open the copilot, ask it.

**01:12:47**

Aman MCT

To write a python script and then ask it a question. Hey, can you run this script for me? It will say I cannot run it.

**01:12:54**

Aman MCT

Why it cannot run it because it.

**01:12:56**

Aman MCT

Does not have the tool.

**01:12:58**

Aman MCT

So which tool is required to run Python language? The Python interpreter. So if you give it the access.

**01:13:04**

Aman MCT

To the code interpreter, it will run it for you, which you will do.

**01:13:08**

Aman MCT

As you move ahead.

**01:13:09**

Aman MCT

So agents are nothing but.

**01:13:12**

Aman MCT

Generative AI applications which also have access to various kinds of tools. If you ask any sophisticated AI engineer, they will tell you code interpreter is a tool.

**01:13:24**

Aman MCT

Custom function calling tools, Open API specification.

**01:13:28**

Aman MCT

Tools, model context protocol tools.

**01:13:31**

Aman MCT

So there are various kinds of tools that we have. Okay,.

**01:13:37**

Aman MCT

Knowledge is available in the vector databases context, is available in the thread context.

**01:13:42**

Aman MCT

So as you move ahead you will.

**01:13:44**

Aman MCT

Be getting the full picture how it happens. But at a beginner level, we just need to educate ourselves that yes, when I talk about geni and agentic AI, what do I really mean about it?

**01:13:56**

Aman MCT

Okay, speech is obviously when I say speech means essentially this, that you.

**01:14:03**

Aman MCT

Do speech recognition and you do speech synthesis.

**01:14:06**

Aman MCT

Right, and information extraction.

**01:14:10**

Aman MCT

Now what do we mean by that?

**01:14:12**

Aman MCT

Information extraction means document intelligence and model embeddings.

**01:14:21**

Aman MCT

Right.

**01:14:22**

Aman MCT

So there is something called AS Document Intelligence from Microsoft. So again I will take you here,.

**01:14:28**

Aman MCT

Let's duplicate and you will see something called AS Document Intelligence. Document Document Intelligence MCP Server. Right, so you have over here, this.

**01:14:46**

Aman MCT

Is model context protocol. We don't need this one, but need to find which one is that.

**01:14:53**

Aman MCT

Microsoft Azure AI Document Intelligence.

**01:14:58**

Aman MCT

So there would be a package only for Azure.

**01:15:02**

Aman MCT

Document Intelligence.

**01:15:03**

Aman MCT

Azure AI translation. Looks like this one.

**01:15:07**

Aman MCT

Yeah, Azure AI Document Intelligence. Right, so this is all what's called as information extraction. Don't worry what all this is. If I ask you a question, hey,.

**01:15:21**

Aman MCT

Tell me what is information extraction?

**01:15:23**

Aman MCT

Agent A.I. Sorry, A.I. You simply say layout document, read various.

**01:15:32**

Aman MCT

Kinds of pre built document Intelligence models, custom models, classifier models, they all fall into the domain of information extraction models.

**01:15:42**

Aman MCT

If I give you a marriage card, can you extract the information out of it?

**01:15:47**

Aman MCT

Can you tell me on which date is the marriage? Who is the groom? Who is the bridegroom? Where is the function going to happen?

**01:15:56**

Aman MCT

Who is the father of the do?

**01:15:58**

Aman MCT

Who is the father of the bride and who's the father of the bridegroom? Who's the mother of the bride and who's the mother of the bridegroom? Because this information is there inside the marriage card.

**01:16:08**

Aman MCT

If I give you some contract, can.

**01:16:11**

Aman MCT

You tell me the information that is there in the contract?

**01:16:15**

Aman MCT

If I give you the expense policy of any organization, can you extract the.

**01:16:20**

Aman MCT

Information that is there in the expense policy document of the organization?

**01:16:27**

Aman MCT

So that's called as information extraction.

**01:16:30**

Aman MCT

Because using information extraction, what do we develop?

**01:16:34**

Aman MCT

Vector databases.

**01:16:36**

Aman MCT

And what are vector databases?

**01:16:38**

Aman MCT

Knowledge for agents.

**01:16:41**

Aman MCT

So when we will discuss tomorrow Retrieval Augmented generation.

**01:16:45**

Aman MCT

You might have heard about this term rag.

**01:16:49**

Aman MCT

Everyone is talking about rag, Multimodal rag.

**01:16:52**

Aman MCT

And agentic rag, right? Technology has surpassed.

**01:16:58**

Aman MCT

So every now and then we hear this term rag, multimodal rag, agentic rag. So when we will talk about rag, it will say, hey, in order to.

**01:17:10**

Aman MCT

Do rag, you need a knowledge base, a vector database.

**01:17:16**

Aman MCT

How do we develop vector databases if we do not have information? If we cannot extract information, we cannot.

**01:17:23**

Aman MCT

Develop a knowledge base, right?

**01:17:25**

Aman MCT

So in order to develop any kind of a knowledge base, information extraction is the foundation for it.

**01:17:34**

Aman MCT

So this is the fifth kind of artificial intelligence.

**01:17:39**

Aman MCT

So as a beginner in artificial intelligence,.

**01:17:42**

Aman MCT

You must be very well aware that if someone tells you, hey, can you.

**01:17:49**

Aman MCT

Please tell me what is text and language? AI? Can you please tell me what is vision, image analysis, classification detection? Can you please tell me what is.

**01:17:59**

Aman MCT

Speech to text and text to speech?

**01:18:02**

Aman MCT

Can you tell me? Gen AI and agentic AI. Can you tell me Information extraction? Why do we need information extraction? So as a beginner, you must be.

**01:18:10**

Aman MCT

Able to define these terms.

**01:18:13**

Aman MCT

No, no.

**01:18:14**

Aman MCT

There is no restriction for language. We have multimodal extraction and we have.

**01:18:19**

Aman MCT

Major languages supported, right?

**01:18:22**

Aman MCT

Which means most of the major languages are supported English, French, Chinese.

**01:18:27**

Aman MCT

Okay, And Espanol Spanish.

**01:18:30**

Aman MCT

Most of the major languages of the world are currently supported by the large language models.

**01:18:36**

Aman MCT

So if you have any questions regarding.

**01:18:40**

Aman MCT

These five types of artificial intelligence, you.

**01:18:43**

Aman MCT

Can let me know. We'll take your questions and then we'll take a small five minutes break because.

**01:18:49**

Aman MCT

We have come one hour long. So you can let me know your question. You can unmute or you can put it in the chat.

**01:19:17**

Aman MCT

Okay. If you have any questions or queries, you can unmute yourself or you can.

**01:19:21**

Aman MCT

Put your question in the chat. Okay? Questions are popping up. Like marriage card example for extraction. Can you give similar examples?

**01:19:29**

Aman MCT

Yes. Take a contract. Who is the, who are the two.

**01:19:34**

Aman MCT

Parties in the contract? What are the terms of the contract? Take for example an invoice.

**01:19:41**

Aman MCT

Who has raised the invoice?

**01:19:43**

Aman MCT

What is the invoice amount? Different line items in the invoice. Take for example purchase orders, whatever the information is hidden inside these documents.

**01:19:53**

Aman MCT

Can you extract them for me? Yes.

**01:19:56**

Aman MCT

So that's what's called as information extraction. Because information is written inside these documents.

**01:20:03**

Aman MCT

And they are in the PDF format, portable document format. Okay, so contracts, purchase orders, invoices, questionnaires, surveys, okay, Marriage cards, business cards, you name it.

**01:20:19**

Aman MCT

We can extract information from anything and develop a knowledge base called as a.

**01:20:24**

Aman MCT

Vector database model embeddings database which can.

**01:20:29**

Aman MCT

Be given as a knowledge to agents. Now as of now you do not need to download any software. But as you move ahead in the course, as you become a sophisticated AI engineer, programming will be required. That too in the Python, because Python is the standard of AI. So you will be learning all these.

**01:20:53**

Aman MCT

Packages as you move ahead. You will be learning text analytics package,.

**01:20:58**

Aman MCT

You will be learning image analysis package, you will be learning OpenAI package.

**01:21:04**

Aman MCT

Okay? You will be learning speech package, you'll.

**01:21:09**

Aman MCT

Be learning document intelligence package, you will be learning even more packages just to highlight.

**01:21:14**

Aman MCT

But as at a beginner level,.

**01:21:17**

Aman MCT

There is no need for you to worry too much.

**01:21:19**

Aman MCT

Azure AI agents package to create agents, right?

**01:21:25**

Aman MCT

You'll be learning this as you move ahead.

**01:21:27**

Aman MCT

You'll be learning obviously the model context protocol mcp.

**01:21:32**

Aman MCT

Because without MCP we cannot do anything.

**01:21:34**

Aman MCT

In this world, right?

**01:21:36**

Aman MCT

So you will be learning mcp.

**01:21:38**

Aman MCT

So the whole point is that Raghunandan has asked this question.

**01:21:43**

Aman MCT

Do we need to download any software at the beginner level?

**01:21:46**

Aman MCT

No.

**01:21:47**



Aman MCT

But as you get more and more sophisticated, as you become a real AI engineer, okay?

**01:21:53**

Aman MCT

You have to have proper development knowledge with these packages. Okay? From an engineering perspective, what type of math? Mathematics will not be required. So this is not data science, right? We will not need sophisticated statistics or probability. Okay, will not need those things. But yes, when we will talk about,

**01:22:21**

Aman MCT

Let us say what are vectors, what are embeddings?

**01:22:24**

Aman MCT

Right?

**01:22:25**

Aman MCT

So vectors, how to create vectors, what are the algorithms that create vectors? And from vectors, how embeddings are generated with self attention mechanism.

**01:22:35**

Aman MCT

Then there is a little bit of math involved. But obviously, because we are not doing sophisticated data science work here, there is no need of sophisticated math. You don't need to have mathematics here. Okay, can you please summarize one line of a text and language, please? All of this is called as text and language AI. Text and language AI. So if you give me, let us say, your healthcare document, right?

**01:23:04**

Aman MCT

Patient id, patient name, patient address, patient history, and various other things about the.

**01:23:11**

Aman MCT

Patient, then I can identify lot of things from this document, right?

**01:23:18**

Aman MCT

I can identify pii. I can identify fhir information which you.

**01:23:24**

Aman MCT

Will see we call as healthcare interoperability.

**01:23:28**

Aman MCT

Data of the patient.

**01:23:30**

Aman MCT

That's called a text analytics for health.

**01:23:32**

Aman MCT

It's a domain specific AI.

**01:23:35**

Aman MCT

You can see domain specific for health.

**01:23:38**

Aman MCT

Care because you know, medical professionals, they generate a lot of data, okay?

**01:23:45**

Aman MCT

So all of that can be extracted from the medical documents.

**01:23:51**

Aman MCT

Can you please tell again?

**01:23:52**

Aman MCT

Computer vision.

**01:23:53**

Aman MCT

Yeah, vision, obviously. If I give you an image, can.

**01:23:57**

Aman MCT

You describe the image for me?

**01:24:00**

Aman MCT

Give me a single sentence for an image that is called as caption. Generate a single sentence for an image.

**01:24:10**

Aman MCT

But I say, hey, in this image,.

**01:24:12**

Aman MCT

There is a dog, there is a lady, there is a laptop, there is.

**01:24:16**

Aman MCT

A kid who is playing.

**01:24:18**

Aman MCT

Generate a sentence for each of these people.

**01:24:22**

Aman MCT

Define me the image with respect to each one of them. That is called as Dance captioning.

**01:24:30**

Aman MCT

Dance caption. You gave me a single sentence, but.

**01:24:35**

Aman MCT

I want you to create four sentences. Because there are four things that I can see in this image.

**01:24:41**

Aman MCT

There is a dog, there is a lady who is sitting and working on the laptop.

**01:24:46**

Aman MCT

There is a kid who is playing.

**01:24:48**

Aman MCT

So give me four sentences. One for laptop, one for lady, one.

**01:24:53**

Aman MCT

For dog, and one for the kid who is playing.

**01:24:56**

Aman MCT

So you might say an image of a lady working on her laptop, an image of a dog playing on the floor.

**01:25:06**

Aman MCT

An image of a kid playing in the backyard.

**01:25:09**

Aman MCT

So you could give me different sentences.

**01:25:12**

Aman MCT

Because there are multiple objects. So that is called as dense captions.

**01:25:17**

Aman MCT

Caption, dance caption reading. Optical character recognition.

**01:25:23**

Aman MCT

So I gonna give you a list.

**01:25:24**

Aman MCT

Of grocery items, milk, eggs, bread, etc.

**01:25:29**

Aman MCT

And I will write it with my pen handwritten. Now you go to the grocery and the grocery person says, hey, we are using AI. What do you want to purchase, sir? So you're not gonna tell him, oh, give me eggs, bread. You will give him that slip. He will put it in front of the camera. The camera will detect the handwritten English.

**01:25:53**

Aman MCT

From it and it will automatically understand.

**01:25:56**

Aman MCT

This is what you want to purchase. So it will go and purchase for you.

**01:26:00**

Aman MCT

Optical character recognition. OCR handwritten and printed characters. Okay. And then document intelligence, invoices, questionnaire, surveys, business applications.

**01:26:15**

Aman MCT

So in the business world we have documents, right?

**01:26:19**

Aman MCT

So if you work in a CRM.

**01:26:21**

Aman MCT

Or an ERP system, then we have documents.

**01:26:24**

Aman MCT

So for documents we have document intelligence.

**01:26:27**

Aman MCT

That you extract information out of documents. Image classification and image object detection. Classify the kind of brain tumor that.

**01:26:37**

Aman MCT

Is there in the MRI image and.

**01:26:40**

Aman MCT

Also draw the rectangle where the tumor is. So that is called as classification and detection. We do it in the classroom.

**01:26:50**

Aman MCT

We create a full model brain tumor.

**01:26:54**

Aman MCT

Classifier and then the brain tumor detector. So if you see, I have all the data for it. Brain tumor classifier and the brain tumor detector. So these are different kinds of brain tumors. So we train the model on it.

**01:27:08**

Aman MCT

The model classifies which type of a tumor is there and then places a bounding rectangle where the tumor is. So what is that classification and detection.

**01:27:23**

Aman MCT

That classify the kind of brain tumor.

**01:27:25**

Aman MCT

That is there and where it is.

**01:27:28**

Aman MCT

In this MRI image.

**01:27:30**

Aman MCT

So that is called as classification and detection.

**01:27:35**

Aman MCT

Tagging, detection of objects. Smart cropping for thumbnail generation.

**01:27:40**

Aman MCT

So this is called as vision and speech. You know, if I am speaking in English and I wanted to convert it.

**01:27:48**

Aman MCT

To text, for example, you know we use this feature, right? A voice feature. So when you are using your tv, you're using the voice feature.

**01:27:56**

Aman MCT

Voice search, right? So that is speech to text.

**01:28:01**

Aman MCT

A speech got converted into text and then it was searched and you found your article and you started reading or you search using your voice.

**01:28:11**

Aman MCT

And what is text to speech? You have a book and you want.

**01:28:15**

Aman MCT

To convert it into a audiobook.

**01:28:19**

Aman MCT

Text to speech, right?

**01:28:22**

Aman MCT

So that is nothing but speech, computer speech. Are there packages in other programming languages available? But you know that the world of AI is heavily dependent on Python. Most of the packages are in Python. So you know you will be doing Python.

**01:28:42**

Aman MCT

I mean for the text.

**01:28:43**

Aman MCT

Like speech agents.

**01:28:44**

Aman MCT

Yes, text and language. Speech vision info extract R also Genai Gen AI means what when you generate.

**01:28:54**

Aman MCT

A human like response.

**01:28:57**

Aman MCT

So if I were to ask you,.

**01:28:59**

Aman MCT

Hey, tell me the sentiment of my review and the opinions about the camera.

**01:29:04**

Aman MCT

It's not jnai, it's called as text analytics.

**01:29:09**

Aman MCT

So I tell you my review, my.

**01:29:10**

Aman MCT

Review is this phone is awesome.

**01:29:13**

Aman MCT

The camera of this phone is wonderful. But it could better. I really like the battery backup of this phone. So now you tell me the sentiment of each of these sentences. Positive, negative, mixed, neutral.

**01:29:27**

Aman MCT

And also tell me the opinion, what is my opinion about the camera?

**01:29:34**

Aman MCT

What is my opinion about the battery.

**01:29:36**

Aman MCT

So this is not called Gen AI. This is called as analytics. Gen AI would mean generating original human like content. So there is no William Shakespeare amongst us, right? We cannot.

**01:29:52**

Aman MCT

So if I ever to ask you.

**01:29:54**

Aman MCT

Write four lines just like William Shakespeare.

**01:29:58**

Aman MCT

I don't think any one of us would be able to write. We are not William Shakespeare. But if I ask this generative AI model write four lines.

**01:30:11**

Aman MCT

Like William Shakespeare.

**01:30:17**

Aman MCT

About.

**01:30:20**

Aman MCT

The modern world of AI, I.

**01:30:23**

Aman MCT

Am also telling it the topic. It will quickly write it.

**01:30:28**

Aman MCT

Generating human like content. Here it goes. We cannot do it.

**01:30:35**

Aman MCT

I cannot do it.

**01:30:36**

Aman MCT

I am not William Shakespeare. Sorry.

**01:30:39**

Aman MCT

Oh wondrous minds of iron wrought that mimic man's most subtle thought in circuits deep new worlds arise a mirror held to mortalize.

**01:30:49**

Aman MCT

GPT5 has written it within a second.

**01:30:53**

Aman MCT

Like Shakespeare. This is generative AI because it generated human like content.

**01:31:02**

Aman MCT

Okay?

**01:31:02**

Aman MCT

This is called a generative artificial intelligence.

**01:31:05**

Aman MCT

Create an image like Pablo Picasso. Like Pablo Picasso. Of a man putting. His head under the foot of AI robot. Like Pablo Picasso.

**01:31:38**

Aman MCT

None of us is Pablo Picasso, right?

**01:31:41**

Aman MCT

I am not Pablo Picasso. I don't think any one of us is Pablo Picasso.

**01:31:45**

Aman MCT

But here it goes.

**01:31:46**

Aman MCT

So what is this human like content?

**01:31:51**

Aman MCT

It is generating something which biological intelligence has done.

**01:31:55**

Aman MCT

Human beings have done. Here it goes. This is generative AI.

**01:32:02**

Aman MCT

Anywhere where you see original human like.

**01:32:05**

Aman MCT

Content is generated, then that's called as generative artificial intelligence.

**01:32:15**

Aman MCT

That is called as Gen AI.

**01:32:17**

Aman MCT

Otherwise it's not Genai, it's analytics.

**01:32:20**

Aman MCT

Okay?

**01:32:21**

Aman MCT

Human like response has to be generated. If a human like response is generated,.

**01:32:26**

Aman MCT

That's what generative AI is.

**01:32:28**

Aman MCT

So this is Gen AI because it.

**01:32:32**

Aman MCT

Has generated original human like content. This image did not exist in this world five minutes ago. Five minutes ago, this image was not there in this world. But just in five minutes, I have created an image just like Pablo Picasso would have done it.

**01:32:48**

Aman MCT

So this is generative AI, okay?

**01:32:52**

Aman MCT

Generating original human like content. That content could be anything.

**01:32:56**

Aman MCT

It could be text.

**01:32:57**

Aman MCT

It could be image.



**01:32:58**

Aman MCT

It could be poetry. It could be prose. It could be music.

**01:33:01**

Aman MCT

It can be anything.

**01:33:03**

Aman MCT

It has to be original human like.

**01:33:05**

Aman MCT

If that is the case, generative artificial intelligence. Okay, give me. Give me the French translation.

**01:33:24**

Aman MCT

French translation.

**01:33:29**

Aman MCT

For this. What is this? Let's take this. French translation.

**01:33:44**

Aman MCT

So what is this? This is generative AI because original human like content is generated.

**01:33:51**

Aman MCT

So this part is Generative AI.

**01:33:54**

Aman MCT

Original human like content is generated. So when original human like content is.

**01:33:59**

Aman MCT

Generated, then we say it is art. Generative artificial intelligence. Otherwise we don't say it's not everything is not Genai.

**01:34:09**

Aman MCT

If I ask you what is the sentiment and opinions?

**01:34:12**

Aman MCT

That's not Jenny I, that is analytics. What type of AI is used when.

**01:34:22**

Aman MCT

A user uploads an image and the system generates a classified ad description from.

**01:34:27**

Aman MCT

It,.

**01:34:29**

Aman MCT  
Multiple AIs would be used over.

**01:34:31**

Aman MCT  
Here, first of all, we will extract what is there in your image and.

**01:34:38**

Aman MCT  
With semantic relevance of your content that.

**01:34:42**

Aman MCT  
Has been taken from the image, ads would be generated. Who generates the ad?

**01:34:48**

Aman MCT  
A model will generate the ad. So generative AI would be used.

**01:34:52**

Aman MCT  
But before generative AI, information extraction would.

**01:34:56**

Aman MCT  
Be used because you would have to extract what is there in your image.

**01:34:58**

Aman MCT  
Which you uploaded, right? So you upload an image, we extract.

**01:35:03**

Aman MCT  
What is there in the image, we create a vector out of what is.

**01:35:06**

Aman MCT  
Extracted and then similar vectors have to be seen. Semantic search and semantic relevance ads have.

**01:35:14**

Aman MCT  
To be generated with respect to that.

**01:35:17**

Aman MCT  
Multiple AIs do we get to learn.

**01:35:20**

Aman MCT  
Develop mini apps as well as in this course?

**01:35:25**

Aman MCT  
Mini app which means yes, we will be developing applications, but many if you.

**01:35:31**

Aman MCT  
Mean to say small language models. No, will not be training any language model. Mini apps would mean yes, we'll be developing apps.

**01:35:39**

Aman MCT

So you'll have apps for these,.

**01:35:41**

Aman MCT

You'll have apps for these, you will.

**01:35:43**

Aman MCT

Have apps for these, you will have.

**01:35:45**

Aman MCT

Apps for rag, you will have apps for everything. Which means.

**01:35:47**

Aman MCT

Okay, Okay, let me take more questions. Captions alive Python will not be taught from scratch in a sense that how.

**01:36:03**

Aman MCT

We teach it in the programming course. But yes, there will be a small primer on Python, right?

**01:36:11**

Aman MCT

That Python is I think the easiest.

**01:36:14**

Aman MCT

Language that is out there in the sense until you don't go into data structures, until you don't see complex object oriented programming.

**01:36:23**

Aman MCT

Python is very easy to understand.

**01:36:25**

Aman MCT

Yes, there will be a small little.

**01:36:28**

Aman MCT

Track when you will see that. Okay.

**01:36:31**

Aman MCT

Vision and extraction. Information extraction is an applied use case of vision.

**01:36:36**

Aman MCT

Because what is information extraction?

**01:36:39**

Aman MCT

Document intelligence. And what is document intelligence?

**01:36:42**

Aman MCT

Read, read and what is read? You can see it says read vision read and in read it says if.

**01:36:52**

Aman MCT

You want to read from PDF Office.

**01:36:54**

Aman MCT

HTML documents then you go for document intelligence.

**01:36:58**

Aman MCT

That's nothing but information extraction.

**01:37:01**

Aman MCT

Okay, did Jenny I went and read Shakespeare style from net.

**01:37:06**

Aman MCT

No, it was trained on it by the training process. So the Sam Altman and the team in the GPT5, they have it in the training data Shakespeare's work because there is no copyright on Shakespeare work, right?

**01:37:20**

Aman MCT

Shakespeare work is non copyright. So you can take the Shakespeare work and train your gen AI model on the Shakespeare's work. It can write in any style which.

**01:37:33**

Aman MCT

There is no copyright. Suppose you write a book and the book has a copyright.

**01:37:37**

Aman MCT

Then because it is a copyrighted content,.

**01:37:40**

Aman MCT

They will not use it for training.

**01:37:43**

Aman MCT

So it will.

**01:37:43**

Aman MCT

It does not know your style. But if I were to say that, hey, for example, write four lines instead of William Shakespeare, let's say I say.

**01:37:55**

Aman MCT

Some of the popular writer, let's say Fyodor Dostoevowski, which is one of the.

**01:38:03**

Aman MCT

Favorites of many people.

**01:38:10**

Aman MCT

Here it comes in circuits hums the.

**01:38:13**

Aman MCT

Echoes of man's despair. A mirror forged from reason's cold affair. We seek the soul within the cold maze and find our freedom lost in data's gaze. It is a part of the training. It has to be.

**01:38:24**

Aman MCT

It knows Fyodor Dostoevsky's text, write Crime.

**01:38:29**

Aman MCT

And Punishment, Karamazo Brothers, etc. It has been trained on that.

**01:38:34**

Aman MCT

But if I were to give it some random author, it would say, I.

**01:38:39**

Aman MCT

Don't know which author are you talking about?

**01:38:42**

Aman MCT

Okay? Yes. Generative See Biological intelligence.

**01:38:52**

Aman MCT

We as human beings, we celebrate people who can generate original creative content.

**01:39:01**

Aman MCT

Because creativity is God's character.

**01:39:08**

Aman MCT

Everyone cannot be creative.

**01:39:10**

Aman MCT

I am not creative.

**01:39:13**

Aman MCT

Let me tell you the truth.

**01:39:14**

Aman MCT

I am not creative.

**01:39:16**

Aman MCT

I do not even. I do not have an ounce of art in me. I have no music in me.

**01:39:23**

Aman MCT

I have no paintings in me.

**01:39:26**

Aman MCT

I cannot write essays or novels or all these things.

**01:39:30**

Aman MCT

I am a simple technology person who.

**01:39:33**

Aman MCT

Can write formal languages, Python and all.

**01:39:35**

Aman MCT

Of this because I've been trained to do it.

**01:39:37**

Aman MCT

But I do not even have an.

**01:39:39**

Aman MCT

Ounce of creativity in me.

**01:39:41**

Aman MCT

But then you see a lot of people amongst us who are very creative. They can create original content, something that.

**01:39:51**

Aman MCT

Did not exist in the world,.

**01:39:55**

Aman MCT

And that is Godly feature.

**01:39:58**

Aman MCT

Because creativity is something which cannot be. It's a God's gift.

**01:40:03**

Aman MCT

Creativity and people who are very creative, we celebrate them.

**01:40:08**

Aman MCT

We do not see everyone as Isaac Newton. We do not see everyone as Shakespeare. Everyone is not Pablo Picasso. Everyone is not Mozart, right? Everyone is not Beethoven. They're celebrated people because they invented or they created original content which did not exist. So that's what generative AI can do. It can generate original human like content.

**01:40:36**

Aman MCT

I ask it create a small symphony.

**01:40:44**

Aman MCT

Just like.

**01:40:47**

Aman MCT  
Mozart's.

**01:40:50**

Aman MCT  
Night music.

**01:40:56**

Aman MCT  
Okay?

**01:40:57**

Aman MCT  
It cannot do. It can write it. It can write it. See, it is writing it.

**01:41:04**

Aman MCT  
Night music which you hear everywhere when you go to the hotels, right? And it wrote it within few seconds.  
So this is generative artificial intelligence.

**01:41:21**

Aman MCT  
Himanshu has a very important question that you are very specific for the Packages.

**01:41:24**

Aman MCT  
From Microsoft because obviously you will be learning these packages.

**01:41:29**

Aman MCT  
Although there are other packages from other vendors also. But the packages from Microsoft are what is covered in the AZ901 and AZ103 course where which you will be learning.

**01:41:41**

Aman MCT  
As you move ahead.

**01:41:46**

Aman MCT  
I used GPT5, so my copilot is currently leveraging GPT5.

**01:41:52**

Aman MCT  
So I'm leveraging GPT5 over here.

**01:41:54**

Aman MCT  
Which model are you using? It will tell us which model are you.

**01:42:02**

Aman MCT  
Using?

**01:42:08**

Aman MCT  
It is not telling.

**01:42:09**

Aman MCT  
It is GPT5 as you know, right?

**01:42:10**

Aman MCT  
Microsoft has upgraded the copilot to GPT5.

**01:42:16**

Aman MCT  
Yes, that's. That's creativity.

**01:42:18**

Aman MCT  
And you know, we control creativity using.

**01:42:20**

Aman MCT  
Temperature and top underscore P. How do I control. Control your creativity in responses. Are there any hyper parameters which I can tune and if you are slightly aware, they are called as temperature and top P that we will discuss tomorrow. Tokens and all of that.

**01:42:53**

Aman MCT  
It's not telling.

**01:42:56**

Aman MCT  
We have.

**01:42:56**

Aman MCT  
Yeah, hyperparameters, temperature or top.

**01:43:00**

Aman MCT  
So temperature and top underscore P are.

**01:43:03**

Aman MCT  
Two hyper parameters which we will discuss tomorrow. They are used to control the creativity.

**01:43:10**

Aman MCT  
Suppose you create a chatbot for office work. Do you want it to be creative or consistent?

**01:43:20**

Aman MCT  
Repetitive and boring. So when you go to any kind.

**01:43:24**

Aman MCT  
Of a government office, how do you.

**01:43:26**

Aman MCT  
Find people talking over there?

**01:43:29**

Aman MCT



Boring, Same repetitive response. Not creative, consistent. Which means same time, same response, same kind of words.

**01:43:39**

Aman MCT

Boring.

**01:43:41**

Aman MCT

But when you go to some, let us say some art store, you will.

**01:43:47**

Aman MCT

Find people talking creatively with you. Their responses will not be boring.

**01:43:51**

Aman MCT

They will not be using the same.

**01:43:53**

Aman MCT

Words again and again.

**01:43:55**

Aman MCT

They will be creating creative content.

**01:43:59**

Aman MCT

There is a content writer and there is a creative content writer. What is the difference?

**01:44:04**

Aman MCT

Content writer, boring, consistent, same response, same words, same kind of sentences. Creative content, non boring, original. So that's called as temperature or top T, Right? Okay. Right.

**01:44:25**

Aman MCT

So let's.

**01:44:26**

Aman MCT

I think the questions are taken.

**01:44:28**

Aman MCT

Have you shared any class document?

**01:44:30**

Aman MCT

The topics were mentioned in the agenda of the meeting.

**01:44:33**

Aman MCT

So I am delivering the slide presentation.

**01:44:36**

Aman MCT

Which is getting recorded. So this is the content of the.

**01:44:39**

Aman MCT

Session which is getting recorded. Let's take a five minutes break and after that I will quickly complete machine learning.

**01:44:47**

Aman MCT

Let's take a small break.

**01:44:48**

Aman MCT

We'll quickly come back after the break. After that we'll quickly discuss what is machine learning. Let's take a small break.

**01:50:11**

Aman MCT

Alright, so we are back after the short little break. Let's continue from where we have covered the different types of artificial intelligence.

**01:50:20**

Aman MCT

Now they are all based on machine learning.

**01:50:24**

Aman MCT

So let us shed some light on.

**01:50:27**

Aman MCT

What Is machine learning.

**01:50:29**

Aman MCT

Machine learning is to solve a prediction problem. If I give you some input and.

**01:50:36**

Aman MCT

I ask you predict some output, that's.

**01:50:40**

Aman MCT

Called as machine learning.

**01:50:43**

Aman MCT

For example.

**01:50:44**

Aman MCT

Let's look at some examples.

**01:50:46**

Aman MCT

I give you an incoming email that you receive on your inbox. For example, here is an email that.

**01:50:54**

Aman MCT

We have received in our inbox. And now I ask you that you.

**01:51:00**

Aman MCT

Tell me whether this is a spam.

**01:51:02**

Aman MCT

Or it is not a spam. So what is this? You have to predict by looking at.

**01:51:08**

Aman MCT

This email, you have to tell me that whether it is a spam or not.

**01:51:14**

Aman MCT

So which type of machine learning problem is this? It is called as a binary classification.

**01:51:20**

Aman MCT

Because there are only two classes, spam and not spam.

**01:51:23**

Aman MCT

These are the two classes.

**01:51:25**

Aman MCT

So that's called as binary because only two possible outputs are there. And this can be done using.

**01:51:34**

Aman MCT

Custom text classification.

**01:51:36**

Aman MCT

So if you see over here there.

**01:51:38**

Aman MCT

Is a thing called as custom text classification. Using this we can complete this requirement.

**01:51:48**

Aman MCT

That you give me what is inside.

**01:51:52**

Aman MCT

The email and my model which is.

**01:51:55**

Aman MCT

A custom text classifier will tell you whether this content which is there in.

**01:51:59**

Aman MCT

The email is a spam or not. We develop this in the AI103, that is in the Associate level.

**01:52:07**

Aman MCT

So in the associate level courseware you will be training a custom text classifier which will tell you whether an email.

**01:52:16**

Aman MCT

Is a spam or not.

**01:52:19**

Aman MCT

In the training data, you will give.

**01:52:20**

Aman MCT

It to read your emails.

**01:52:22**

Aman MCT

Training data. Take another example in the medical domain. Take another example in the healthcare domain.

**01:52:32**

Aman MCT

As an input I give you the symptoms that a patient is observing.

**01:52:39**

Aman MCT

So the patient comes to you and the patient tells you I'm having fever, I'm having cough, I'm having fast breathing, shaking, nausea, etc.

**01:52:48**

Aman MCT

You have to tell what is the.

**01:52:52**

Aman MCT

Diagnosis of this patient. Is the patient having pneumonia, flu, common cold, bronchitis, etc. What kind of a problem is this?

**01:53:03**

Aman MCT

It is multi classification because we will have to tell what is called.

**01:53:10**

Aman MCT

As probability classification or soft classification. I could say my model will say, looking at the symptoms that you have.

**01:53:20**

Aman MCT

Told me, I can say that 70%.

**01:53:25**

Aman MCT

I am confident that you have pneumonia.

**01:53:28**

Aman MCT

20% I think that you may have flu, rest 10% I think you have viral fever.

**01:53:36**

Aman MCT

70% Pneumonia. So I will trust the model and see if this person has pneumonia.

**01:53:42**

Aman MCT

So this is what kind of a machine learning problem. This is called as soft classification, probabilistic classification. Because you can see you are giving what is called as probability density.

**01:53:56**

Aman MCT

And if you are slightly familiar with Scikit Learn package right Scientific Kit package in Python.

**01:54:05**

Aman MCT

There is a method in Scikit Learn which is called as predict underscore proba which does this. And just what? Just to give you the context, predict proba. This.

**01:54:18**

Aman MCT

This is what does this all predict.

**01:54:21**

Aman MCT

Proba sklearn in logistic regression classification.

**01:54:25**

Aman MCT

Don't worry too much, okay? Don't worry about this. Just as an background, I am telling.

**01:54:32**

Aman MCT

You, you might be asking who generates these probabilities. This predict underscore proba method generates the probabilities.

**01:54:40**

Aman MCT

Predict proba. Okay, Predict underscore proba that generates the probabilities.

**01:54:45**

Aman MCT

It says by looking at your symptoms.

**01:54:49**

Aman MCT

I can tell you 80% I think you have viral fever, but 20% I.

**01:54:53**

Aman MCT

Think you may have Covid. So please go and isolate yourself.

**01:55:00**

Aman MCT

I developed a conversational bot for an.

**01:55:03**

Aman MCT

Airline in the COVID in the March of 2020.

**01:55:08**

Aman MCT

So when Covid has just started, if.

**01:55:11**

Aman MCT

You remember, in the March of 2020 when the COVID had to.

**01:55:14**

Aman MCT

Covid had just started, people were booking.

**01:55:18**

Aman MCT

The tickets and people had to travel. But then travel restrictions came and this and that. If you have Covid like symptoms, don't.

**01:55:27**

Aman MCT

Travel, don't book your ticket, blah blah.

**01:55:30**

Aman MCT

So the airline operators came to me.

**01:55:33**

Aman MCT

And they told us that, hey, we need to quickly develop a bot in.

**01:55:38**

Aman MCT

Which the individual, before booking the ticket, they can tell the symptoms if they.

**01:55:43**

Aman MCT

Are observing any symptoms before they fly.

**01:55:45**

Aman MCT

And if the bot uses this kind.

**01:55:48**

Aman MCT

Of a classification model which we develop, if the bot says 30% and above, if the model says that the probability of having Covid is higher than 30%, then that person will not be allowed.

**01:56:04**

Aman MCT

To book the ticket.

**01:56:05**

Aman MCT

Rather we will tell that person to isolate.

**01:56:11**

Aman MCT

So this is the specific use case which I did. So that's why I have written it.

**01:56:15**

Aman MCT

Over here, okay, that you do soft classification.

**01:56:18**

Aman MCT

Again, this can be very easily done using this thing.

**01:56:22**

Aman MCT

So we can do this using this custom text classification.

**01:56:27**

Aman MCT

This is again a custom text classification problem.

**01:56:29**

Aman MCT

We can do it using this custom text classification approach.

**01:56:34**

Aman MCT

Take another.

**01:56:35**

Aman MCT

Predicting a stock price, which every individual is very.

**01:56:43**

Aman MCT

Which means this is something which everyone.

**01:56:45**

Aman MCT

Wants to do, right?

**01:56:46**

Aman MCT

They want to tell what will be.

**01:56:47**

Aman MCT

The price of this stock tomorrow or one week from now, one month from.

**01:56:51**

Aman MCT

Now, so that people can invest. So that is nothing. But I give you as an input the history of the stocks prices in the past. And now I ask you what will.

**01:57:02**

Aman MCT

Be the price of this stock at close of the next day so that you can make profit out of this prediction.

**01:57:10**

Aman MCT

So what kind of a problem is this?

**01:57:12**

Aman MCT

It's A regression problem, because the output will be a numerical number that the price of this stock tomorrow at the close will be this.

**01:57:21**

Aman MCT  
So if today it is lower than.

**01:57:23**

Aman MCT  
What is the prediction tomorrow, buy the stock.

**01:57:25**

Aman MCT  
If it is lower, sell the stock today. So you can do what is called as bstt, buy today, sell tomorrow.

**01:57:32**

Aman MCT  
Or you can do STBT sell today, buy tomorrow. Right? All these people who do it right with algorithmic trading.

**01:57:41**

Aman MCT  
So this is what's called as regression problem. So these are some examples of what.

**01:57:47**

Aman MCT  
Is really machine learning.

**01:57:48**

Aman MCT  
You give an input and you want prediction.

**01:57:52**

Aman MCT  
You want a prediction of the output.

**01:57:54**

Aman MCT  
That's what machine learning is.

**01:57:57**

Aman MCT  
So what is prediction function?

**01:58:02**

Aman MCT  
Prediction function is what takes the input.

**01:58:04**

Aman MCT  
And gives you the output prediction, which we loosely call as model. It's a loose term.

**01:58:11**

Aman MCT  
If you ask any machine learning engineer,

**01:58:14**

Aman MCT  
They don't say model, they say prediction function.

**01:58:17**

Aman MCT  
We have to generate a prediction function.

**01:58:20**



Aman MCT

So the prediction function is called as.

**01:58:22**

Aman MCT

Predictive model in the loose terminology. So if I don't want to sound like some kind of a professor in.

**01:58:31**

Aman MCT

The college or in the university, I would say model. But if I want to sound very sophisticated, I would say prediction function.

**01:58:42**

Aman MCT

Because in mathematics we say prediction function.

**01:58:44**

Aman MCT

So the prediction function takes the input.

**01:58:46**

Aman MCT

Act and produces an output Y.

**01:58:50**

Aman MCT

That's what we are finding.

**01:58:52**

Aman MCT

So the basic idea about machine learning is that in machine learning we want.

**01:58:57**

Aman MCT

To find the best prediction function, the prediction function which knows the future.

**01:59:04**

Aman MCT

But is it possible? Is it possible that you can always.

**01:59:10**

Aman MCT

Predict correctly in the future?

**01:59:13**

Aman MCT

Answer is no.

**01:59:16**

Aman MCT

We are living in the universe where.

**01:59:18**

Aman MCT

There is a concept of time. And the time has an arrow, right?

**01:59:23**

Aman MCT

We all know that time always flows.

**01:59:26**

Aman MCT

From past to the future.

**01:59:28**

Aman MCT

Past, present and future.

**01:59:30**

Aman MCT

You cannot go back in time.

**01:59:32**

Aman MCT

Okay?

**01:59:33**

Aman MCT

And we cannot know the future.

**01:59:37**

Aman MCT

We cannot hundred percent know about the future.

**01:59:42**

Aman MCT

There are certain events which are hundred percent to happen.

**01:59:45**

Aman MCT

For example, I will die hundred percent sure event, hundred percent.

**01:59:52**

Aman MCT

I will die in the next seven days. Now that I can do a probability, I can create what is called as.

**01:59:59**

Aman MCT

A time forecasting regression model that predicts the probability of someone dying in the next seven days.

**02:00:07**

Aman MCT

I am 31 years old, so I don't think that I will die in the next seven days. But if I go to some individual which is 90 years old, highly likely that person may die in the next seven days.

**02:00:17**

Aman MCT

High probability.

**02:00:19**

Aman MCT

So future can only be known with a certain probability. Hundred percent sure event no one can predict.

**02:00:29**

Aman MCT

It's not possible.

**02:00:30**

Aman MCT

So when we find a prediction function, we always give the probability also that this is my prediction and this is.

**02:00:38**

Aman MCT

My probability that this is what can happen in the future. And I am 90% confident. I am 80% confident. They will always give probability because no one knows about the future. Okay,.

**02:00:54**

Aman MCT

So what is machine learning?

**02:00:55**

Aman MCT

So this is nothing but machine learning. Machine learning is not rule based. If you look into 1980s and 1990s,.

**02:01:03**

Aman MCT

There was something called as expert systems, right?

**02:01:07**

Aman MCT

If you did your engineering in 2000s,.

**02:01:12**

Aman MCT

1990S, there used to be a topic called as expert systems.

**02:01:17**

Aman MCT

Expert systems means we will consult human experts.

**02:01:21**

Aman MCT

They will write the rules and the algorithm will consult the rules to give the prediction. Rule based systems.

**02:01:30**

Aman MCT

Expert systems.

**02:01:33**

Aman MCT

Okay, Expert systems have been out of use.

**02:01:38**

Aman MCT

We don't use expert systems now. Instead we use machine learning.

**02:01:44**

Aman MCT

This is called as rule based approach. Study the problem, ask an expert to write the rules. Evaluate the rules by testing the rules in the real world. If you are happy, launch the expert system. Otherwise, analyze the errors and ask the expert again. So this is called as rule based.

**02:02:01**

Aman MCT

Approach, which we used to do in 1990s, 2000s. Expert systems. Expert systems, right?

**02:02:09**

Aman MCT  
Experts used to write the rules.

**02:02:11**

Aman MCT  
But instead what we did, we replaced the expert rules with data supervised by experts. For example, I want to know if.

**02:02:27**

Aman MCT  
There is a brain tumor in the.

**02:02:29**

Aman MCT  
Brain image and if yes, which type.

**02:02:31**

Aman MCT  
Of a brain tumor and where it is. I want to know this.

**02:02:37**

Aman MCT  
So instead of writing the rules of how to detect the brain tumor, where it is, etc.

**02:02:44**

Aman MCT  
I can give 1000 images of brain scan to some neurologist. Ask that person that tell me out.

**02:02:56**

Aman MCT  
Of these thousand images whether there is.

**02:02:59**

Aman MCT  
A brain tumor or not in these images and put them in the buckets,.

**02:03:04**

Aman MCT  
Create two buckets whether there is a.

**02:03:06**

Aman MCT  
Brain tumor or not in the image.

**02:03:08**

Aman MCT  
So that neurologist goes ahead, he.

**02:03:12**

Aman MCT  
Puts the images into two buckets, 600 images.

**02:03:15**

Aman MCT  
He says that highly likely there is.

**02:03:18**

Aman MCT  
A brain tumor in these images and 400 of these. There is no brain tumor in these images.

**02:03:22**

Aman MCT

I ask another doctor, is he right?

**02:03:24**

Aman MCT

This is called as review.

**02:03:26**

Aman MCT

So another doctor says he has almost.

**02:03:28**

Aman MCT

Right and review has been done.

**02:03:32**

Aman MCT

Then I take those 600 images in which he says and reviewer also says.

**02:03:37**

Aman MCT

That there is a brain tumor.

**02:03:39**

Aman MCT

Which type of a brain tumor is this?

**02:03:41**

Aman MCT

Because you are doctors, right?

**02:03:43**

Aman MCT

So they label it that this is.

**02:03:44**

Aman MCT

The type of the brain tumor in these 600 images. And then I also tell them, kindly draw a bounding rectangle in this image where is the brain tumor?

**02:03:55**

Aman MCT

So those doctors draw a bounding rectangle.

**02:03:58**

Aman MCT

Surrounding that brain tumor.

**02:04:00**

Aman MCT

So what did they do?

**02:04:01**

Aman MCT

They did not tell me the rules that how to detect a brain tumor and where it is the brain tumor and which type of a brain tumor, etc.

**02:04:10**

Aman MCT  
I just told them. Here is all the images.

**02:04:13**  
Aman MCT  
You first tell me whether there is.

**02:04:15**  
Aman MCT  
A brain tumor or not. If there is a brain tumor, you tell me which type it is. Label it.

**02:04:21**  
Aman MCT  
Label the image that this is the type of the brain tumor, pituitary, a.

**02:04:25**  
Aman MCT  
Cortex, whatever and draw the bounding rectangle where it is.

**02:04:28**  
Aman MCT  
Because you are doctors, experts, I take that data and I train my classification model on it. Custom vision AI.  
This is where we train that model.

**02:04:43**  
Aman MCT  
So we upload those images with labeling. Experts have done that labeling and the bounding rectangle.

**02:04:50**  
Aman MCT  
Then we train and we get the.

**02:04:52**  
Aman MCT  
Model and the model then tells.

**02:04:54**  
Aman MCT  
I give an image of a brain scan to that model and the model says there is no tumor in this image with 95% confidence.

**02:05:04**  
Aman MCT  
It will also give us confidence.

**02:05:08**  
Aman MCT  
So this is something which you do.

**02:05:10**  
Aman MCT  
As you move ahead. So machine learning is not expert system, right?

**02:05:16**  
Aman MCT  
This is a question which is asked interviews that compare expert systems and machine learning.

**02:05:22**  
Aman MCT  
How do you differentiate differentiation?

**02:05:26**

Aman MCT

Is this example which I quoted you.

**02:05:28**

Aman MCT

That experts will label the data rather.

**02:05:32**

Aman MCT

Than giving you the rules. Rules we used to give in 1980s, 1990s. This is rule based.

**02:05:38**

Aman MCT

Instead what we do is that we have training data.

**02:05:44**

Aman MCT

We don't reverse engineer an expert's decision process. We don't want to learn. How does an expert take a decision that whether there is a brain tumor.

**02:05:53**

Aman MCT

Or not, don't tell us the rule,.

**02:05:55**

Aman MCT

You give us the data with labeling.

**02:05:57**

Aman MCT

That there is a certain thing in.

**02:05:59**

Aman MCT

This that is called a supervised learning. So that is the job of a.

**02:06:06**

Aman MCT

Machine learning algorithm to learn from the data given by the experts. Experts will not tell the rules. Expert will only give labels to the data that yes, in this image there is a tumor.

**02:06:22**

Aman MCT

Yes, the type of the tumor is this.

**02:06:25**

Aman MCT

And this is the bounding rectangle surrounding the tumor. Now you have this information, learn through it. No one will tell you. The rules will not tell you. The rules will tell you the data. So you have the input as the training data. You have to learn from this training data which has been labeled by the expert.

**02:06:45**

Aman MCT

And you must give us a prediction.

**02:06:47**

Aman MCT

Function which is called as a model. That's the job of the machine learning algorithm.

**02:06:55**

Aman MCT

And this is the machine learning approach.

**02:06:59**

Aman MCT

Instead of rules given by the expert, you are given the data labeled by the expert.

**02:07:06**

Aman MCT

You are given the data labeled by.

**02:07:08**

Aman MCT

The expert and obviously the experts will.

**02:07:11**

Aman MCT

Review it many times.

**02:07:13**

Aman MCT

So that they don't give you wrong data.

**02:07:16**

Aman MCT

They will not say that this is.

**02:07:17**

Aman MCT

An image in which there is no tumor and by mistake they say there.

**02:07:20**

Aman MCT

Is a tumor in this.

**02:07:23**

Aman MCT

They will be very precise, right?

**02:07:25**

Aman MCT

They will make sure through proper review.

**02:07:27**

Aman MCT

That they have rightly labeled it.

**02:07:30**

Aman MCT

So instead of getting rules from the.

**02:07:33**

Aman MCT

Experts, you will get data from them which is labeled properly.

**02:07:39**

Aman MCT

You take that data and use what's called as a learning algorithm. Now there are different kinds of algorithms,



right? You have logistic regression, support vector machines, stochastic gradient descent, gradient boosting, random forest, etc.

**02:07:58**

Aman MCT

You have lot of algorithms which can be used. These algorithms produce what's called as a.

**02:08:04**

Aman MCT

Prediction function, which is a model which we evaluate.

**02:08:07**

Aman MCT

If we are happy, we launch it. Otherwise we analyze errors and study the.

**02:08:11**

Aman MCT

Problem again and train the algorithm again.

**02:08:14**

Aman MCT

So this is how these two approaches differ. This is a rule based approach.

**02:08:19**

Aman MCT

This is machine learning approach. A machine will learn through the data. Okay, machine learning.

**02:08:31**

Aman MCT

So what is the basic machine learning workflow which is also called as machine learning pipeline. You split the labeled data given to you by the experts into training, which.

**02:08:43**

Aman MCT

You will use for training.

**02:08:45**

Aman MCT

Third, for validation, which is called as validation and testing.

**02:08:49**

Aman MCT

To see the performance right of the.

**02:08:51**

Aman MCT

Model, repeat until you are happy with.

**02:08:54**

Aman MCT

The performance on the validation testing data.

**02:08:58**

Aman MCT

Okay?

**02:08:59**

Aman MCT

Build and revise your feature extraction. Choose some another machine learning algorithm.

**02:09:04**

Aman MCT

Train the hyper parameters.

**02:09:06**

Aman MCT

What are hyper parameters?

**02:09:09**

Aman MCT

Hyper parameters are inputs that affect the model performance. Although they are not the part of the data, they're hyper parameters.

**02:09:20**

Aman MCT

Don't worry too much.

**02:09:21**

Aman MCT

As you will move ahead, you will be using various hyper parameter techniques.

**02:09:25**

Aman MCT

Evaluate prediction functions on the validation, retrain the model on train and validation and.

**02:09:31**

Aman MCT

Evaluate the performance on the test.

**02:09:34**

Aman MCT

Report this number to your product manager.

**02:09:36**

Aman MCT

That I achieved this performance on the test set.

**02:09:40**

Aman MCT

Retrain on all the label data and.

**02:09:42**

Aman MCT

Then deploy the prediction function.

**02:09:44**

Aman MCT

This is what we do in organizations. Professors will tell you train it on training, test it on validation, deploy to production.

**02:09:54**

Aman MCT

No, it is first trained on training, tested on validation, then trained on training.

**02:10:01**

Aman MCT

Plus validation, tested on test, then trained.

**02:10:04**

Aman MCT

On training, validation test and then deployed to production. This is how the organizations do.

**02:10:11**

Aman MCT

Okay, so machine learning is not an expert system.

**02:10:15**

Aman MCT

Machine learning is learning using the data that has been labeled supervised by human experts.

**02:10:24**

Aman MCT

Okay?

**02:10:27**

Aman MCT

Most common types of machine learning problems.

**02:10:29**

Aman MCT

Are classification, hard or soft, probabilistic, multi.

**02:10:34**

Aman MCT

Class classifications, regression problems in which we.

**02:10:38**

Aman MCT

Have to do a prediction function, Training data and supervised algorithms have to be used.

**02:10:45**

Aman MCT

We have some discussion on deep learning, which obviously we will do.

**02:10:48**

Aman MCT

Tomorrow, not today. Okay, so deep learning discussions we will do tomorrow.

**02:10:54**

Aman MCT

So when you look at machine learning,.

**02:10:57**

Aman MCT

Machine learning is a different discipline.

**02:11:01**

Aman MCT

It does not follow expert system.

**02:11:03**

Aman MCT

It follows data and learning through the data.

**02:11:07**

Aman MCT

Okay.

**02:11:08**

Aman MCT

Machine learning algorithms are statistical algorithms.

**02:11:12**

Aman MCT

They learn through the data vectors, the feature vectors.

**02:11:15**

Aman MCT

Obviously in this course we will not.

**02:11:17**

Aman MCT

Be writing any machine learning algorithm. Rather we will be learning how to use them. How to use them.

**02:11:23**

Aman MCT

Tomorrow I will show you.

**02:11:25**

Aman MCT

Okay, Tomorrow I will show you the machine learning algorithms. When I will do a small demonstration. You will see that we'll be discussing that tomorrow.

**02:11:35**

Aman MCT

Now let's take more and more questions. So if you have any questions, queries,.

**02:11:39**

Aman MCT

You can let me know.

**02:11:40**

Aman MCT

We'll now take your questions. Okay, so let us take the questions now.

**02:11:44**

Aman MCT

This is the machine learning model life cycle.

**02:11:47**

Aman MCT

The model is generated and then it.

**02:11:50**

Aman MCT

Is deployed to production.

**02:11:53**

Aman MCT

I will be sharing this slide with you.

**02:12:00**

Aman MCT

Will there be separate LLM training rep each domain like literature, medical.

**02:12:07**

Aman MCT

The course fair which you have is.

**02:12:09**

Aman MCT

Properly oriented towards organizational use cases. So the kind of conversational AI, the kind of agents that you will be creating are for organizations. For example, create an agent to assist the employees of an organization in raising their expense claims.

**02:12:32**

Aman MCT

Okay? Create an agent which summarizes the customer.

**02:12:37**

Aman MCT

Case service call records.

**02:12:41**

Aman MCT

And take an.

**02:12:42**

Aman MCT

Appropriate action that is to generate a quote or a purchase order or invoice.

**02:12:48**

Aman MCT

Create an agent which basically does organizational processes.

**02:12:53**

Aman MCT

Enterprise AI.

**02:12:55**

Aman MCT

We will not create an agent which.

**02:12:57**

Aman MCT

Generates, let us say, some kind of.

**02:12:59**

Aman MCT

A poem or some kind of.

**02:13:03**

Aman MCT

Short story.

**02:13:04**

Aman MCT

That may not be required because that is not for enterprise AI. Enterprises want these use cases, business process applications, expense policies, etc. They want all those things, right?

**02:13:22**

Aman MCT

Yeah.

**02:13:23**

Aman MCT

Can you please explain more on machine learning workflow?

**02:13:27**

Aman MCT

Machine learning workflow.

**02:13:29**

Aman MCT

Now machine learning workflow is not at.

**02:13:32**

Aman MCT

All different from what used to happen in the school.

**02:13:36**

Aman MCT

When I was in a school, we used to go to school and our.

**02:13:40**

Aman MCT

Teacher used to teach us lessons and problems.

**02:13:45**

Aman MCT

But when we used to go to.

**02:13:47**

Aman MCT

Exam, what used to come in the exam paper? The same problems that the teacher had solved us in the classroom. Do you think that is learning?

**02:13:58**

Aman MCT

No, that is not learning.

**02:14:02**

Aman MCT

Same questions on which were taught. You cannot ask the same questions in the testing. Testing questions have to be different as compared to training.

**02:14:14**

Aman MCT

So there are certain exams in this.

**02:14:16**

Aman MCT

World where no question will come from the past questions, right?

**02:14:23**

Aman MCT

There are certain examinations where you'll see.

**02:14:25**

Aman MCT

Question will never be repeated.

**02:14:28**

Aman MCT

For example, one of the exam in.

**02:14:30**

Aman MCT

India is joint entrance examination for engineering colleges. Jee. As you know, Jee Advanced.

**02:14:37**

Aman MCT

That's one of the exams where questions.

**02:14:40**

Aman MCT

Are not repeated from the past.

**02:14:44**

Aman MCT

So lot of exam aspirants, what do they do?

**02:14:47**

Aman MCT

They solve past year papers.

**02:14:50**

Aman MCT

They train themselves on the past year papers.

**02:14:53**

Aman MCT

They mock themselves on the past year.

**02:14:55**

Aman MCT

Papers so that they can learn the.

**02:14:58**

Aman MCT

Kinds of questions that they are going to be asked. They learn the patterns of the questions. They understand the kinds of questions.

**02:15:06**

Aman MCT

They know the same question will not.

**02:15:08**

Aman MCT

Come in the exam. That's cheating.

**02:15:11**

Aman MCT

Because the question will come fresh questions.

**02:15:14**

Aman MCT

No past question will ever come.

**02:15:16**

Aman MCT

But then why do they solve the past year paper? Because they are training themselves.

**02:15:21**

Aman MCT

So similar to this, what do we.

**02:15:23**

Aman MCT

Do is we take the training data, we train the model with the training.

**02:15:27**

Aman MCT

Data so that the model learns. But we cannot cheat. We cannot give the same training data and tested whether it is working that cheating. So we have another data set which.

**02:15:37**

Aman MCT

Is called as validation.

**02:15:39**

Aman MCT

So we use the validation data and.

**02:15:40**

Aman MCT

See if the model is learning something or not.

**02:15:44**

Aman MCT

Then we evaluate the model, you know, precision, recall, root mean square errors, etc. We see all those numbers. Those numbers do not come out as expected.

**02:15:54**

Aman MCT

Which means the model failed in validation. So we have to repeat its training. We have to do the epochs of training until the validation is successful.

**02:16:05**

Aman MCT

Once the validation is successful, which means.

**02:16:07**

Aman MCT

A model has learned sufficiently well, it is generalized. Then we train it on training and validation.

**02:16:14**

Aman MCT

Then after it is trained on training.

**02:16:17**

Aman MCT

And validation, we test it on test.

**02:16:20**

Aman MCT

If it is successful on test, then.

**02:16:22**

Aman MCT

We train it on training, validation and.

**02:16:24**

Aman MCT

Test and deploy to production. This is what is written over here.



**02:16:29**

Aman MCT

Split the label data into training, validation and test. Repeat until you are happy with the performance on validation. Repeat what?

**02:16:37**

Aman MCT

Repeat these four steps.

**02:16:39**

Aman MCT

Build, Revise your feature extractions.

**02:16:41**

Aman MCT

Choose some machine learning algorithm. Train the model with various hyper parameters.

**02:16:46**

Aman MCT

Evaluate it on validation until you are happy on validation. Then you retrain it on validation and training.

**02:16:54**

Aman MCT

Evaluate the performance on test, retrain it.

**02:16:58**

Aman MCT

On training, validation and test.

**02:17:00**

Aman MCT

If you are happy on test and deploy the model to production. Three step process.

**02:17:06**

Aman MCT

This is what organizations do.

**02:17:08**

Aman MCT

This is called as epochs, right? So they train it, validate it, test.

**02:17:13**

Aman MCT

It and then productionalize it. Train, validate test. Production lies, Right? So that's how machine learning models are. Production lies.

**02:17:24**

Aman MCT

We do not need machine learning knowledge.

**02:17:26**

Aman MCT

You do not need to be a machine learning engineer.

**02:17:28**

Aman MCT

Because most of the modern artificial intelligence,.

**02:17:32**

Aman MCT

As you all know, is black box. How many of us really know the transformer architecture?

**02:17:39**

Aman MCT

Yeah, we know the basics of what is a transformer architecture. What is self attention, what is Multi headed attention.

**02:17:47**

Aman MCT

What is encoder? What is decoder?

**02:17:50**

Aman MCT

But how is it really implemented with.

**02:17:52**

Aman MCT

The deep learning networks?

**02:17:56**

Aman MCT

We don't know it, right?

**02:17:58**

Aman MCT

None of us need to know it.

**02:18:00**

Aman MCT

Okay?

**02:18:01**

Aman MCT

Because if you, if any one of us already knew the transform architecture, we would be in OpenAI or in Facebook somewhere, right? So obviously we need not know the transform architecture. We need to know how to use these models. Large language models.

**02:18:19**

Aman MCT

This is just for basic understanding that yes, they are all developed on top.

**02:18:23**

Aman MCT

Of machine learning and deep learning.

**02:18:26**

Aman MCT

Let's take few more questions. So when the model is ready to be used, does it mean that it has done enough learning? Yes, it is generalized.

**02:18:35**

Aman MCT

It is generalized to the data set. It has learned the data set. How do we know it has generalized itself to the data set? By looking at various evaluation metrics. You might heard of, you might have heard about for classification problems. Evaluation metrics are accuracy, precision, recall, mean average precision lift curve, precision curve, receiver operating characteristic curve, area under the curve.

**02:19:02**

Aman MCT

These are the numbers which we see. If these numbers are good then we say this has learned well for regression problems.

**02:19:09**

Aman MCT

Root mean square error, RMSE error, mean average error.

**02:19:13**

Aman MCT

Right. So we study lot of numbers and.

**02:19:17**

Aman MCT

Curves as a data scientist to see, oh, this model has learned sufficiently well in this, in the training and validation.

**02:19:24**

Aman MCT

If we are happy, we production lies.

**02:19:27**

Aman MCT

Where is model trained? Is it a default location?

**02:19:30**

Aman MCT

Yes. Where is the model trained?

**02:19:32**

Aman MCT

Wonderful question.

**02:19:33**

Aman MCT

This is a practical question.

**02:19:35**

Aman MCT

ML.azure.com this is where the model is trained. I need to sign in with my account.

**02:19:45**

Aman MCT

Okay.

**02:19:49**

Aman MCT

This is where the model is trained. This is a wonderful question. Where do you train the model? Let me just sign in, just give me a second.

**02:20:18**

Aman MCT

This is where the models are trained.

**02:20:22**

Aman MCT

Look at this.

**02:20:22**

Aman MCT

I have two machine learning workspaces where.

**02:20:27**

Aman MCT

The models are trained.

**02:20:28**

Aman MCT

This is where we train the models.

**02:20:31**

Aman MCT

So you see you can write notebooks.

**02:20:34**

Aman MCT

Automated machine learning designer machine learning.

**02:20:37**

Aman MCT

So you can do the training here. Obviously as of now I will not.

**02:20:41**

Aman MCT

Be able to create this for you.

**02:20:43**

Aman MCT

Because it takes a lot of time.

**02:20:44**

Aman MCT

Say I think I have regression pipeline here, regression training algorithm.

**02:20:50**

Aman MCT

You see here.

**02:20:51**

Aman MCT

This is the full machine learning process. Here it is trains two different models. One using boosted decision tree and another one using decision forest regression.

**02:21:07**

Aman MCT

And this is my data set automobile price raw. And these are the pre processing steps that I have. So this is. Don't worry too much. This is the pro. This is the machine learning pipeline which generates the model.

**02:21:25**

Aman MCT

Maybe I have evaluation metrics which I.

**02:21:28**

Aman MCT

Can show to you.

**02:21:30**

Aman MCT

Evaluate.

**02:21:31**

Aman MCT

So they would have run as A pipeline. Let me see.

**02:21:37**

Aman MCT

Here you see Labeling experiment, weekly fall regression regressor. A lot of things are there.

**02:21:45**

Aman MCT

So this is where the machine learning models are trained.

**02:21:49**

Aman MCT

Okay.

**02:21:51**

Aman MCT

Do you have resources that will help.

**02:21:53**

Aman MCT

Python programming that our team will share with you? Dominic, do organizations develop separate ML model for each domain?

**02:22:02**

Aman MCT

This is a wonderful question.

**02:22:04**

Aman MCT

Every organization will invest according to their requirement. So if I am a bank, I.

**02:22:10**

Aman MCT

Would like to create a model for credit risk evaluation of retail customers and.

**02:22:16**

Aman MCT

Corporate customers and that will be in.

**02:22:19**

Aman MCT

The financial regression domain.

**02:22:22**

Aman MCT

If I am a health care entity, I would like to invest into understanding health insurance, understanding patient bad optimization, etc. So it depends on the organization to organization.

**02:22:38**

Aman MCT

Okay,.

**02:22:42**

Aman MCT

Can you explain on ML workflow?

**02:22:44**

Aman MCT

Yeah, we.

**02:22:45**

Aman MCT

We discussed the ML workflow that ML workflow essentially means that we need to.

**02:22:50**

Aman MCT

See if you have learned sufficiently well.

**02:22:53**

Aman MCT

Right.

**02:22:54**

Aman MCT

I think I answered this training two.

**02:22:56**

Aman MCT

Different models and take the.

**02:22:58**

Aman MCT

Absolutely.

**02:22:58**

Aman MCT

This is called as hypothesis testing.

**02:23:01**

Aman MCT

This is called as hypothesis testing.

**02:23:03**

Aman MCT

Let me show you again.

**02:23:06**

Aman MCT

One of my colleague came to me.

**02:23:07**

Aman MCT

And he said that the kind of.

**02:23:10**

Aman MCT

Problem that has been given to you, my hypothesis is that you will get a better model with boosted decision tree algorithm rather than decision forest. So I said, how do you know this? Who told you this?

**02:23:25**

Aman MCT

That decision forest regression will be poorer.

**02:23:30**

Aman MCT

As compared to boosted decision tree. He said, I am a data scientist, I do experiments.

**02:23:36**

Aman MCT

As a scientist, I have already done.

**02:23:40**

Aman MCT

These experiments multiple times. I have seen that decision forest is poorer as compared to boosted decision tree on the kind of data that you are having. So I say, okay, I will not trust your hypothesis until I do an experiment.

**02:23:58**

Aman MCT

So that is called as data science, right?

**02:24:00**

Aman MCT

So here I did the same thing, I took the hypothesis testing.

**02:24:04**

Aman MCT

So my colleague came to me and he said that this data set which.

**02:24:08**

Aman MCT

You have, you will get a better.

**02:24:10**

Aman MCT

Model with this algorithm. So I said, okay, let me use this algorithm, get a model. I will use this algorithm also get a model and at the end you.

**02:24:22**

Aman MCT

Will see it will say this model.

**02:24:24**

Aman MCT

Is better as compared to this.

**02:24:27**

Aman MCT

I cannot run it. It will take time. Maybe I can run it today for.

**02:24:30**

Aman MCT

You and show you the results tomorrow.

**02:24:32**

Aman MCT

It will take up to 20 minutes obviously to run, but tomorrow I can show you this and you will yourself see that yes, this comes out to.

**02:24:40**

Aman MCT

Be better and this comes out to be poorer.

**02:24:42**

Aman MCT

So what is this? This is called hypothesis testing.

**02:24:45**

Aman MCT

That you tested a hypothesis that yes, this algorithm is better as compared to this one.

**02:24:52**

Aman MCT

This is all the work of a.

**02:24:53**

Aman MCT

Data scientist, not a machine learning engineer. Data scientist does all of These hypothesis.

**02:24:58**

Aman MCT

Testing and blah, blah.

**02:25:00**

Aman MCT

As a scientist means that you.

**02:25:02**

Aman MCT

Have to do experiments, someone gives you a hypothesis and as a scientist, you.

**02:25:07**

Aman MCT

Have to either prove or disprove the hypothesis using your experiments.

**02:25:11**

Aman MCT

So you have to do experiments, jobs and experiments. Submit this as an experiment.

**02:25:20**

Aman MCT

Okay.

**02:25:23**

Aman MCT

Right.

**02:25:24**

Aman MCT

I think how to select the model.

**02:25:26**

Aman MCT

For each use case that we will.

**02:25:27**

Aman MCT

Understand as we move ahead. Okay, as we move ahead, there is.

**02:25:33**

Aman MCT

A cheat sheet given by Microsoft in.

**02:25:35**

Aman MCT

Which it is written how to get started, with which kind of a problem, which type of algorithm. But I will discuss that tomorrow with you.



**02:25:45**

Aman MCT

So today was this two hour session.

**02:25:48**

Aman MCT

And I think I have answered all the questions that are there in the chat. You can ask more questions in the.

**02:25:53**

Aman MCT

WhatsApp chat also I will share this.

**02:25:56**

Aman MCT

Slide deck with our team and they can share it with you and you.

**02:25:59**

Aman MCT

Can refer to this slide deck which.

**02:26:01**

Aman MCT

I will be having over here.

**02:26:03**

Aman MCT

Okay, so today what we Tomorrow is.

**02:26:08**

Aman MCT

One more session on AI for beginners.

**02:26:12**

Aman MCT

So today what we wanted to convey.

**02:26:14**

Aman MCT

To all the learners is that if.

**02:26:16**

Aman MCT

Someone comes to you and tells you.

**02:26:20**

Aman MCT

What is AI and what many types.

**02:26:22**

Aman MCT

Of AI are there, you should be in a position to answer it.

**02:26:26**

Aman MCT

Then someone may ask, hey, is this.

**02:26:29**

Aman MCT

Some kind of a magic or is this some kind of technology?

**02:26:32**

Aman MCT

Obviously it's machine learning.

**02:26:35**

Aman MCT

So can you describe machine learning process? Why do we do machine learning?

**02:26:39**

Aman MCT

What is the workflow of machine learning? And a very practical question, where is it really done? It's done in Azure machine learning workspace like this. Okay. And these are different kinds of AIs,.

**02:26:54**

Aman MCT

Text and language, image analysis, gen, AI and assistants, agents, document intelligence, speech.

**02:27:04**

Aman MCT

Okay.

**02:27:05**

Aman MCT

Agents, MCP, etc.

**02:27:08**

Aman MCT

These are essentially things that you have.

**02:27:12**

Aman MCT

So if you have any queries or questions, you can let me know in the chat window. And I think I have answered all your questions. Okay, if you have any questions more, you can let me know. We have two more minutes.

**02:27:25**

Aman MCT

I'm in Himanshu this side. Yes, I just noticed that it is being opened so I took an opportunity to talk. Yes, since you have mentioned for Microsoft Foundry, I am aware also. But my understanding is that either it's Microsoft or it is aws. Typically we are using their product to train the models. So is these. Is this the only two platforms or there are other platforms also where the models are getting trained in general?

**02:28:00**

Aman MCT

Wonderful question. The point is that currently the leaders in the AI domain are the three, I can say four, but the fourth one does not have the cloud platform. So the four leaders, as you know, are Microsoft aws, Google and Facebook, the Meta, they don't have their cloud offering. So we are left with only three vendors. We are left with Microsoft, we are left with aws and we are left with Google. Now you know that Microsoft is the.

**02:28:34**

Aman MCT

Biggest investor in OpenAI.

**02:28:37**

Aman MCT

You can say the OpenAI is the child of Microsoft and OpenAI and Microsoft has partnership. So if you look at generative AI domain, generative AI space, then the combination of Azure and OpenAI is natural. Microsoft and OpenAI are partners, right?

**02:28:57**

Aman MCT  
Buddies.

**02:28:58**

Aman MCT  
So that's why when we talk about.

**02:29:01**

Aman MCT  
AZ 901 or when we talk about Azure related certifications, you will see that.

**02:29:07**

Aman MCT  
Azure Public Cloud platform Foundry is the preferred approach.

**02:29:14**

Aman MCT  
Aws.

**02:29:15**

Aman MCT  
I have not yet gone into the AWS domain because a natural. See, you know that OpenAI came with Microsoft first, right? So in the AWS I will let you know. Right? Models are trained on all these three platforms. Azure, AWS and Google. But in the Foundry, everything is available in the Azure and OpenAI collaboration. Regarding AWS, I will have to check it. Just a second.

**02:29:44**

Aman MCT  
Okay.

**02:30:05**

Aman MCT  
How many sessions is this? We have one more session tomorrow on beginners AI for beginners. All right.

**02:30:12**

Aman MCT  
So this is where we will be.

**02:30:14**

Aman MCT  
Stopping today and we will continue tomorrow afterwards. Thanks a lot.

**02:30:27**

Aman MCT  
The recording has stopped.