Questions & Answers

COMPLETE

Instructor: Applied AI Course **Duration:** 30 mins

What is a random variable?
What are the conditions for a function to be a probability mass function?
(http://www.statisticshowto.com/probability-mass-function-pmf/)
What are the conditions for a function to be a probability density function ?(Covered in our videos)
What is conditional probability?
State the Chain rule of conditional probabilities?
(https://en.wikipedia.org/wiki/Chain_rule_(probability))
What are the conditions for independence and conditional independence of two random variables?(https://math.stackexchange.com/questions/22407/independence-and-conditional-independence-between-random-variables)
What are expectation, variance and covariance?(Covered in our videos)
Compare covariance and independence?
(https://stats.stackexchange.com/questions/12842/covariance-and-independence)
What is the covariance for a vector of random variables?
(https://math.stackexchange.com/questions/2697376/find-the-covariance-matrix-of-a-vector-of-random-variables)
What is a Bernoulli distribution?
What is a normal distribution?
What is the central limit theorem?
Write the formula for Bayes rule?
If two random variables are related in a deterministic way, how are the PDFs related?
What is Kullback-Leibler (KL) divergence?
Can KL divergence be used as a distance measure?
What is Bayes' Theorem? How is it useful in a machine learning context?
Why is "Naive" Bayes naive?
What's a Fourier transform?
What is the difference between covariance and correlation?
Is it possible capture the correlation between continuous and categorical variable? If yes, how?
What is the Box-Cox transformation used for?
What does P-value signify about the statistical data?
A test has a true positive rate of 100% and false positive rate of 5%. There is a population with a 1/1000 rate of having the condition the test identifies. Considering a positive test, what is the probability of having that condition?
How you can make data normal using Box-Cox transformation?
Explain about the box cox transformation in regression models.
What is the difference between skewed and uniform distribution?
What do you understand by Hypothesis in the content of Machine Learning?
How will you find the correlation between a categorical variable and a continuous variable ?
How to sample from a Normal Distribution with known mean and variance?

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What is Dimensionality reduction?

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Saikiran Vajrapu *24 Votes*

Hi Team,

Can you please help me understand and answer this question:

A test has a true positive rate of 100% and false positive rate of 5%. There is a population with a 1/1000 rate of having the condition the test identifies. Considering a positive test, what is the probability of having that condition?

Reply *Jul 30, 2018 02:00 AM*

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"Let’s suppose you are being tested for a disease, if you have the illness the test will end up saying you have the illness. However, if you don’t have the illness- 5% of the times the test will end up saying you have the illness and 95% of the times the test will give accurate result that you don’t have the illness. Thus there is a 5% error in case you do not have the illness.
Out of 1000 people, 1 person who has the disease will get true positive result.
Out of the remaining 999 people, 5% will also get a false positive result.
Close to 50 people will get a false positive result for the disease.
This means that out of 1000 people, 51 people will be tested positive for the disease even though only one person has the illness. There is only a 2% probability of you having the disease even if your reports say that you have the disease."

Source: https://www.iteanz.com/data-science-interview-questions/

Reply *Jul 31, 2018 03:53 AM*

Saikiran Vajrapu

Thank you Sir. This is crystal clear now :)

Reply *Jul 31, 2018 23:17 PM*

K R Devipriya

I think it must be(Out of remaining 999 people,5% will get false positive result)

Reply *Aug 22, 2018 08:28 AM*

Applied AI Course

Corrected. Thank you for pointing to this error.

Reply *Aug 22, 2018 22:16 PM*

Karthik

We can use Bayes theorom right?

Reply *Nov 29, 2018 13:17 PM*

Applied_AI

@karthik: Yes that is correct

Reply *Nov 29, 2018 17:25 PM*

Sohan J

Can you please explain how you came to the number 2% ?

Reply *Sep 23, 2018 10:43 AM*

AVITEJ SINGH CHADHA

Solve it by bayes theorem.....P = (1/1000)/ ((1/1000) + (999/1000 *005)) which is appproximately 1.96 %

Reply *Feb 05, 2021 04:27 AM*

team aaic

Can you give us a detailed explanation, so that the fellow students can understand how you have solved this using the Bayes theorem? Is it 0.05 or 005 in the deoniminator?

Reply *Feb 05, 2021 08:22 AM*

Shivanshu Dhawan

Please explain how you computed that 2%?

Reply *Oct 17, 2018 05:23 AM*

Shivanshu Dhawan

Yeah I got the answer now. Thanks :)

Reply *Oct 17, 2018 05:36 AM*

AppliedAICourse

please check this out:

```
you have data with 1000 people

1000 = (1 having cancer + 999 not having cancer)


P|O |   T    |  F    |
---------------------
T   |   TP   |  FP   |
---------------------
F   |   FN   |  TN   |
---------------------

out of 999 people we predict that 999*0.05 = 49.95~50
out model predicted 50+1(100% TP)  = 51 people as having cancer

P|O |   T   |   F    |
---------------------
T   |   1   |  50    |
---------------------
F   |   0   |  949   |
---------------------


therefore out of 51 people predicted we have 1 one true case who is having cancer =  1/51 ~ 1.96 ~ 2%
```

http://i.imgur.com/ehia4OV.jpg

Reply *Oct 17, 2018 13:58 PM*

saishivap

super explanation sir

Reply *May 29, 2020 17:15 PM*

vishal suryavanshi

how you calculated 2% .. because 50% will get the false result so (50/1000)*100=5% then how is it 2 .?

Reply *Nov 10, 2018 13:40 PM*

AppliedAI

Because out of 51 true predicted outcomes only 1 time we get the true positive and rest of 50 time false positive so 1/51 ~ 2%

Reply *Nov 10, 2018 15:59 PM*

Sarthak Vajpayee

I think this can be helpful: https://www.youtube.com/watch?v=R13BD8qKeTg

Reply *Jan 13, 2020 18:31 PM*

AppliedAI Course

Thanks for sharing!

Reply *Jan 13, 2020 20:21 PM*

Monisankar Baruah

@Applied AI, Is this correct?
https://imgur.com/VRrlyIm

Reply *Aug 22, 2020 18:27 PM*

team aaic

Yes,correct.

Reply *Aug 22, 2020 19:09 PM*

Love Agarwal *5 Votes*

Although i checked through comments for answer for question 14 but i didn't get it. Will you please explain it

Reply *Dec 25, 2018 17:19 PM*

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can you write a simple code snippet in which you create two related variables and check their pdf's.

Reply *Dec 26, 2018 12:20 PM*

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Q. If two random variables are related in a deterministic way, how are the PDFs related?
Ans. It depends on the type of relationship.
a. If X and Y are two r.v, such that X=Y+c where c is a constant, then, the PDF of X and Y are of the same shape but with a displacement or gap of c between these plots.
b. If X=c*Y, then, the shape of PDF of X will a squished or stretched version of the PDF of Y
c. If X=f(Y) like log-normal is a log-function on normal, the shape of PDFs could differ significantly.

Reply *Dec 26, 2018 12:31 PM*

Sumit

What do we mean by deterministic in this question?

Reply *Nov 16, 2020 17:46 PM*

team aaic

If the relationship between variables is not changing and fixed then we say they

are related in deterministic way.

Reply

Nov 16, 2020 21:02 PM

Kirandeep Marala

Hi Team, Nice explanation..I am not able to understand 2nd property of when X = c*Y..Will you please elaborate...Thank you..

Reply

Feb 04, 2021 20:11 PM

team aaic

Please check this video for more detail.

Reply

Feb 04, 2021 23:19 PM

Dhawal Singh

4 Votes

Hi team,
I have a very generic question, not related to the above questions. As a ML engineer/Data Scientist, is a person expected to able to write down the mathematical formulae and proofs behind these theorems and concepts, or he/she just needs to have enough knowledge regarding a theorem to be able to identify a situation or task where he/she just needs to programmatically apply such a theorem.

Reply

Mar 07, 2019 08:01 AM

Applied AI Course

Audio reply: https://soundcloud.com/applied-ai-course/math-equations/s-7SNj5

Reply

Mar 07, 2019 17:30 PM

Dhawal Singh

I got your point sir, thanks a lot.

Reply

Mar 07, 2019 18:17 PM

Jitendra Dash

The above link is not working

Reply

Aug 17, 2019 11:05 AM

AppliedAI Course

Please try again.

Reply

Aug 17, 2019 11:23 AM

Kirandeep Marala

Sir, Is the mathematical foundation taught at Appliedai course enough or we need to learn more, Will you please give some information regarding This..If more needed how can I get to know which areas or algorithms mathematical parts to know..Thank you team for all your support, I have learnt a lot from You..

Reply

Feb 04, 2021 20:05 PM

team aaic

For most of the interviews and role, the mathematical foundation that we're teaching is enough. However, if you want to dig deeper, there's no best place other than wikipedia and original research papers to learn more from.

Reply

Feb 04, 2021 21:19 PM

Abhijeet sengar

3 Votes

For question what is hypothesis in machine learning ? acc to me --
Hypothesis is an mutually exclusive assumption that depends upon the data . (in context of hypothesis testing)

Reply *Sep 17, 2020 17:58 PM*

team aaic

Yes, you are right. A statistical **hypothesis** is an explanation about the relationship between data populations that is interpreted probabilistically. A machine learning **hypothesis** is a candidate model that approximates a target function for mapping inputs to outputs.

Reply *Sep 17, 2020 18:02 PM*

Amit Palve *3 Votes*

Hello Sir,
In the question of chain rule of conditional probabilities, I have gone through the provided link, but could you elaborate the same using a simple example?

Reply *May 08, 2019 18:04 PM*

AppliedAICourse Team

Have you gone through this simple example:-
Suppose

Urn 1 has 1 black ball and 2 white balls and Urn 2 has 1 black ball and 3 white balls. Suppose we pick an urn at random and then select a ball from that urn. Let event A be choosing the first urn: $P(A) = P(\overline{A}) = 1/2$. Let event B be the chance we choose a white ball. The chance of choosing a white ball, given that we have chosen the first urn, is $P(B|A) = 2/3$. Event $A \cap B$ would be their intersection: choosing the first urn and a white ball from it. The probability can be found by the chain rule for probability:

$$\mathrm{P}(A \cap B) = \mathrm{P}(B \mid A)\mathrm{P}(A) = 2/3 \times 1/2 = 1/3.$$

Reply *May 08, 2019 23:45 PM*

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subrayhegde *3 Votes*

Hi sir,

can you please explain the answer for below question.
How will you find the correlation between a categorical variable and a continuous variable ?

Thank you

Reply *Sep 16, 2018 16:28 PM*

AppliedAICourse

1. to find the correlation between two continuous variables, you can use a covariance matrix.
2. it doesn't really make sense of finding the correlation between the categorical variable, you will find the relation between two categorical variables with the help of analysis ex: bar plots, box plots etc

Reply *Sep 17, 2018 12:02 PM*

ADHIYAMAAN PON

Sir he is actually asking how to find correlation between categorical and continuous variable.... not between 2 categorical or 2 continuous variable

Reply *Jan 28, 2020 10:44 AM*

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we can use ANOVA for that. refer to 'moorissa' comment here

Reply *Jan 28, 2020 11:28 AM*

Yogeeshwari Sathyamurthy

we can also use logistic regression.
The idea behind using logistic regression to understand correlation between variables is actually quite straightforward and follows as such: If there is a relationship between the categorical and continuous variable, we should be able to construct an accurate predictor of the categorical variable from the continuous variable. If the resulting classifier has a high degree of fit, is accurate, sensitive, and specific we can conclude the two variables share a relationship and are indeed correlated.
https://medium.com/@outside2SDs/an-overview-of-correlation-measures-between-categorical-and-continuous-variables-4c7f85610365

Reply *Feb 26, 2020 19:13 PM*

team aaic

Thanks for sharing.

Reply *Feb 26, 2020 22:41 PM*

Satishkumar Moparthi

https://qphs.fs.quoracdn.net/main-qimg-ad9bac208569acc09f57f25c648657af

Can we make use the matrix for calculation ?

Reply *Jun 22, 2020 12:52 PM*

AppliedAI Course

Yes, you can.

Reply *Jun 22, 2020 18:46 PM*

SHIVA KALYAN *2 Votes*

refer:
https://www.eecs.qmul.ac.uk/~norman/BBNs/Independence_and_conditional_independence.htm
for independent and conditional independence.

Reply *Mar 11, 2020 14:11 PM*

AppliedAI Course

Thanks for sharing!

Reply *Mar 11, 2020 15:01 PM*

Prithvi Kommula *2 Votes*

Sir, why conditional probability, chain rule, etc are not covered?

Reply *Dec 02, 2019 16:36 PM*

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conditional probability we covered in Naive Bayes and chain rule we covered in deep learning chapter introduction

Reply

Dec 02, 2019 17:37 PM

ankit rahaman

2 Votes

Conditions for a valid probability density function:
Let X be the continuous random variable with a density function f (x). Therefore,
f(x) >= 0 for all x
Integration f(x) dx from -infinity to infinity is 1

Is my answer correct?

Reply

May 06, 2019 16:48 PM

Applied AI Course Team1

Yes it is correct.

Reply

May 06, 2019 20:11 PM

bablu

Hi sir, what is density function mean?

Reply

Aug 20, 2020 18:33 PM

team

In probability theory, a probability density function (PDF), or density of a continuous random variable, is a function whose value at any given sample (or point) in the sample space (the set of possible values taken by the random variable) can be interpreted as providing a relative likelihood that the value of the random variable would equal that sample.

Reply

Aug 20, 2020 18:43 PM

bablu

1. Sir, sorry to point it out, I can get that same definition from wikipedia, I'm asking the doubt because I want to understand that in layman terms.

2. Also is density function & probability density function are same?

Reply

Aug 22, 2020 15:41 PM

team

1. The PDF tells us the same that the histogram tells us. However pdf curve has few advantages over histogram, like approximation of the likelihood for an unseen sample from an experiment. Another advantage is that the curve is not limited by the width of the bins to calculate the probability values for PDF curve. For mpore information on this please watch this video.

2. Yes, by density function ankit meant pdf only.

Reply

Aug 22, 2020 16:15 PM

kasturi

2 Votes

Hi,

Can you share some articles which help to answer below question:

Explain about the box cox transformation in regression models.

Reply

Mar 17, 2019 06:06 AM

Applied_AI

Actually, you are wrong here. Box-Cox transformation is used to turn any random variable into a normally distributed variable. This means you are basically telling that for linear regression the variables have to be normally distributed. But this is actually wrong. The residuals are normally distributed but not the predictor variables. It's actually a big myth that for linear regression, predictor variables need to be normally distributed.

Reply *Mar 17, 2019 18:27 PM*

Jatin Gandhi

can you elaborate

Reply *Jul 17, 2019 23:27 PM*

Applied_AI

We don't need to convert our independent variables to normal distribution for regression models. Regression models do not make any assumptions about the distribution of independent variables. Please refer this

Reply *Jul 18, 2019 20:18 PM*

Kirandeep Marala

So Team, The main thing you were saying is that, The basic assumptions in linear regression is there exists linear relationship between features and not in linear regression the variables have to be normally distributed..Am I right?If not please correct Me..

Reply *Feb 04, 2021 20:26 PM*

team aaic

Basic assumption: dependent variable(y) depends linearly on independent variables.

Yes, the other one is not assumption of linear regression.

Reply *Feb 04, 2021 21:10 PM*

Kirandeep Marala

So, Team if Interviewer asked this question what should be the exact answer

Explain about the box cox transformation in regression models...Please explain...Thank you.

Reply *Feb 04, 2021 20:27 PM*

team aaic

This question itself is incomplete or wrong as it doesn't make sense. So, can't give the answer for this.

Reply *Feb 04, 2021 21:11 PM*

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