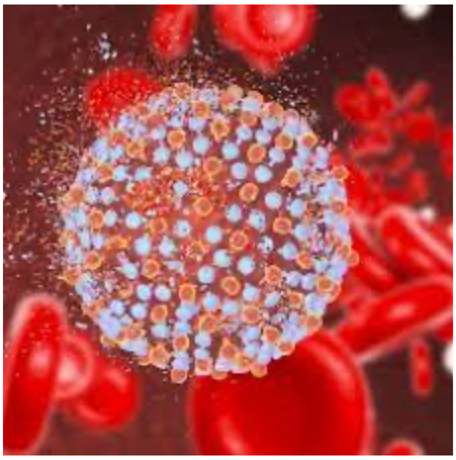
eethos ai
Ai for Decision Making

Case Study: Hepatitis C Classification

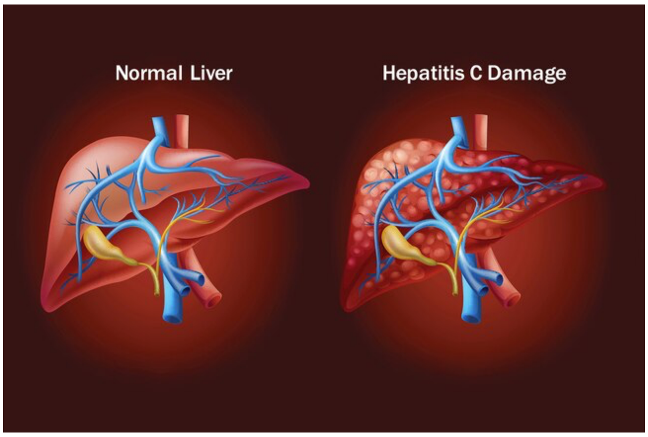
Hepatitis C Classification

Hepatitis C is a disease caused by the Hepatitis C virus which cause an inflammation of the liver. The virus can cause serious illnesses including liver cirrhosis and cancer. Hepatitis C is a bloodborne virus and transmitted from person to person through unsafe injection, unsafe blood transfusions, injection of drugs and unsafe sexual practices. According to World Health Organization estimated 58 million people worldwide have hepatitis C virus infection and 1.5 new infections occur every year.

WHO estimated that 290000 people died in 2017 due to cirrhosis and liver cancer caused by hepatitis C virus. The effective vaccine for hepatitis C virus has not been available yet. However, the proper use of antiviral medicine can cure almost all patients with hepatitis C. Machine learning approaches can be used to diagnose the hepatitis C virus. The data derived from laboratory reports of blood donor and Hepatitis C patients are used as inputs to the machine learning algorithms which can classify each sample as blood donor, suspect blood donor, hepatitis, fibrosis or cirrhosis.



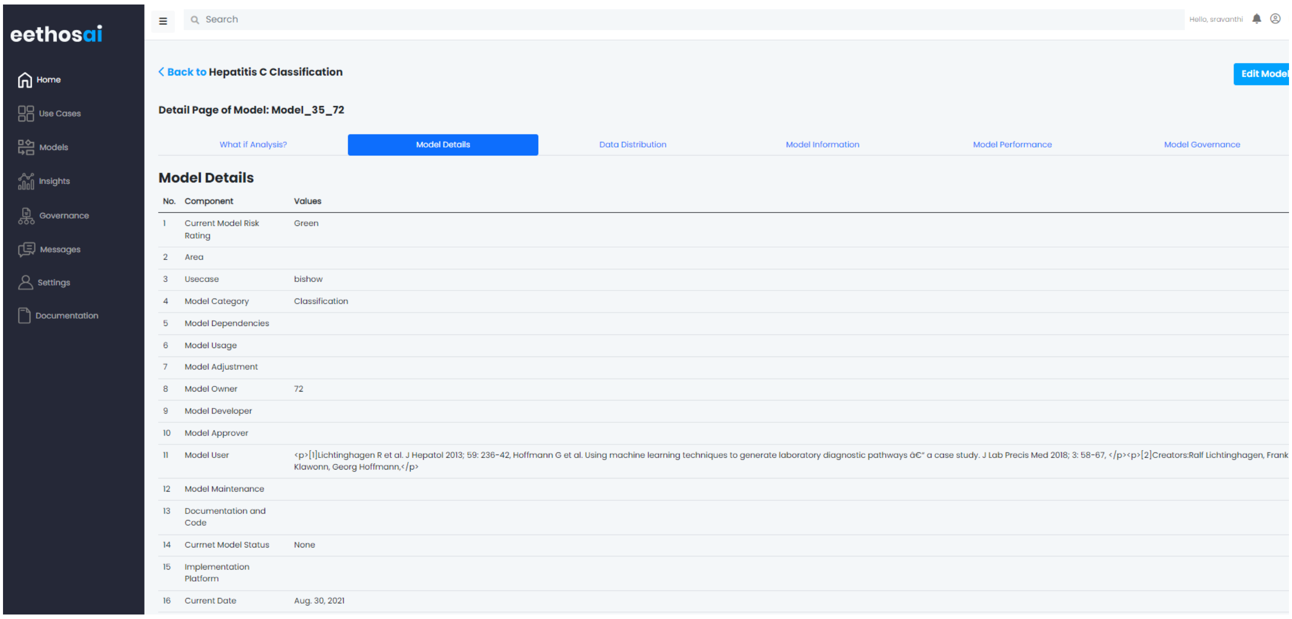
Source: https://medlineplus.gov



Source: https://www.gandhimedicos.in

Model Details

Model developer information and all details needed for governance



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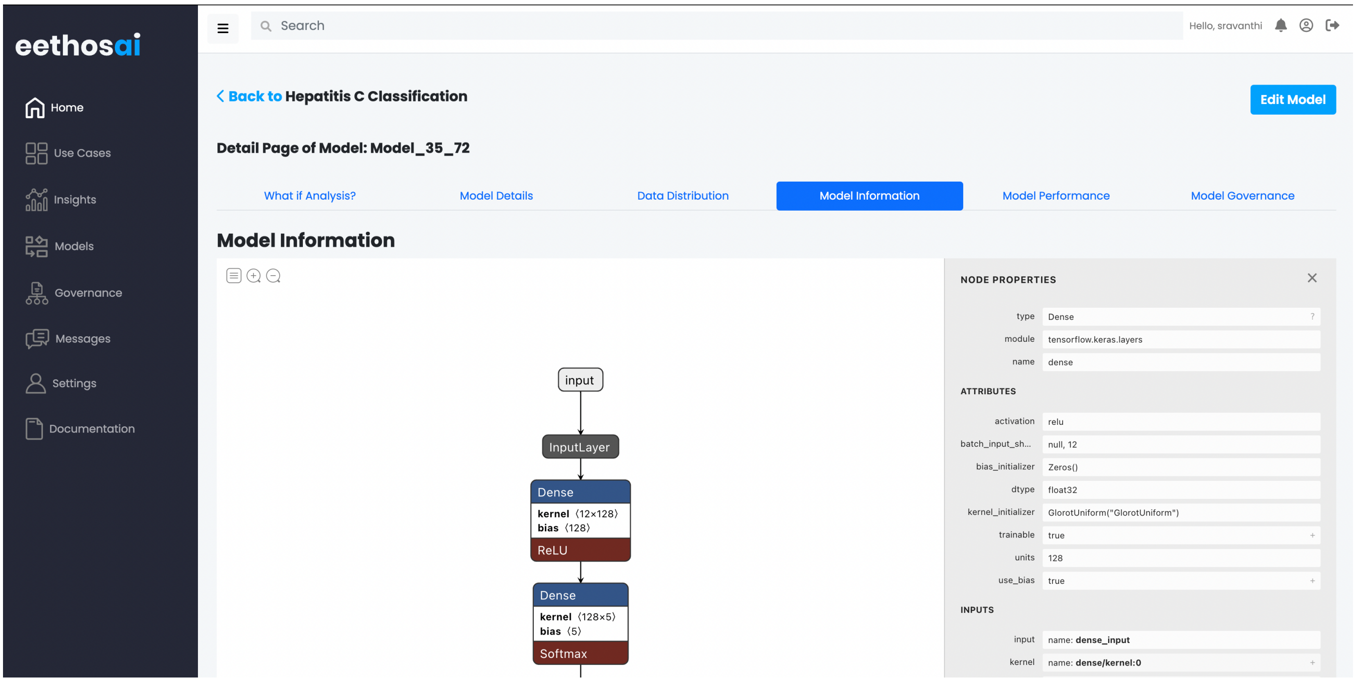
Model Details

No.	Component	Values
1	Current Model Risk Rating	Green
2	Area	
3	Usecase	bishow
4	Model Category	Classification
5	Model Dependencies	
6	Model Usage	
7	Model Adjustment	
8	Model Owner	72
9	Model Developer	
10	Model Approver	
11	Model User	[1]Lichtinghagen R et al. J Hepatol 2013; 59: 236-42, Hoffmann G et al. Using machine learning techniques to generate laboratory diagnostic pathways â€" a case study. J Lab Precis Med 2018; 3: 58-67, [2]Creators:Ralf Lichtinghagen, Frank Klawonn, Georg Hoffmann,
12	Model Maintenance	
13	Documentation and Code	
14	Curmet Model Status	None
15	Implementation Platform	
16	Current Date	Aug. 30, 2021

Model Visualization

Details of the Models



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Model Information

NODE PROPERTIES

type	Dense
module	tensorflow.keras.layers
name	dense

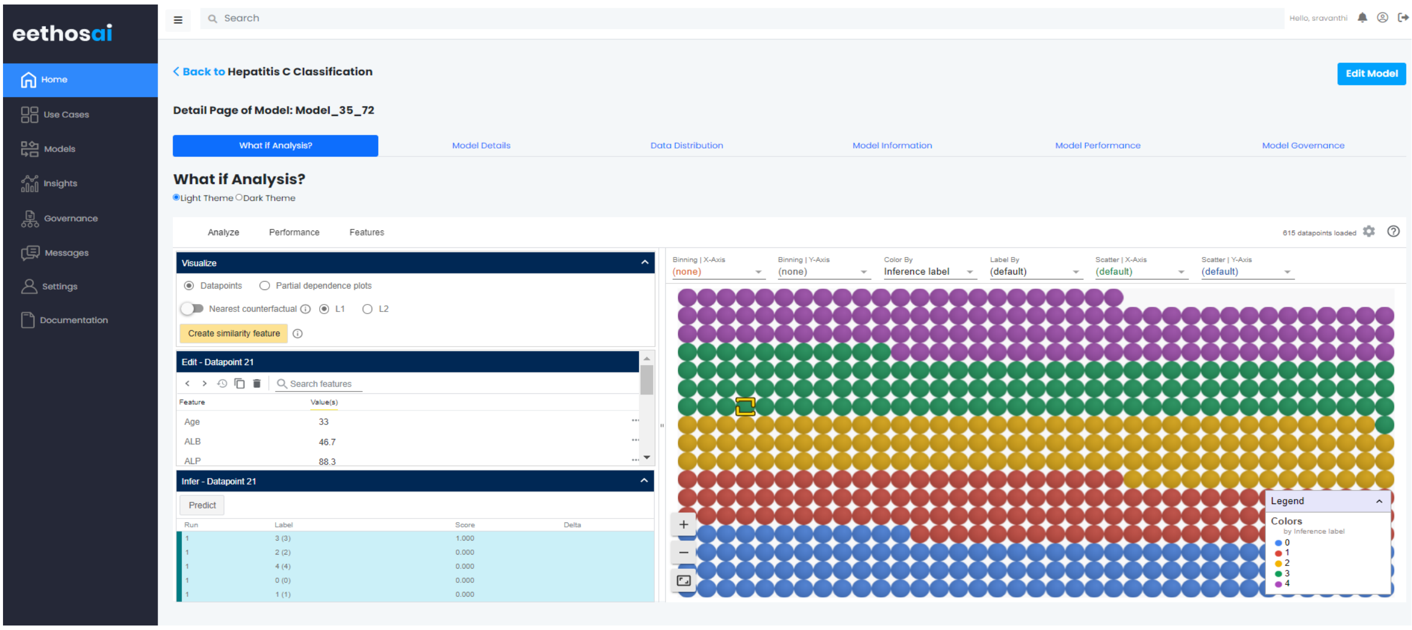
ATTRIBUTES

activation	relu
batch_input_sh...	null, 12
bias_initializer	Zeros()
dtype	float32
kernel_initializer	GlorotUniform("GlorotUniform")
trainable	true
units	128
use_bias	true

INPUTS

input	name: **dense_input**
kernel	name: **dense/kernel:0**

Analyzing Predictions



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What if Analysis?

● Light Theme ○ Dark Theme

● Datapoints ○ Partial dependence plots

Nearest counterfactual ● L1 ○ L2

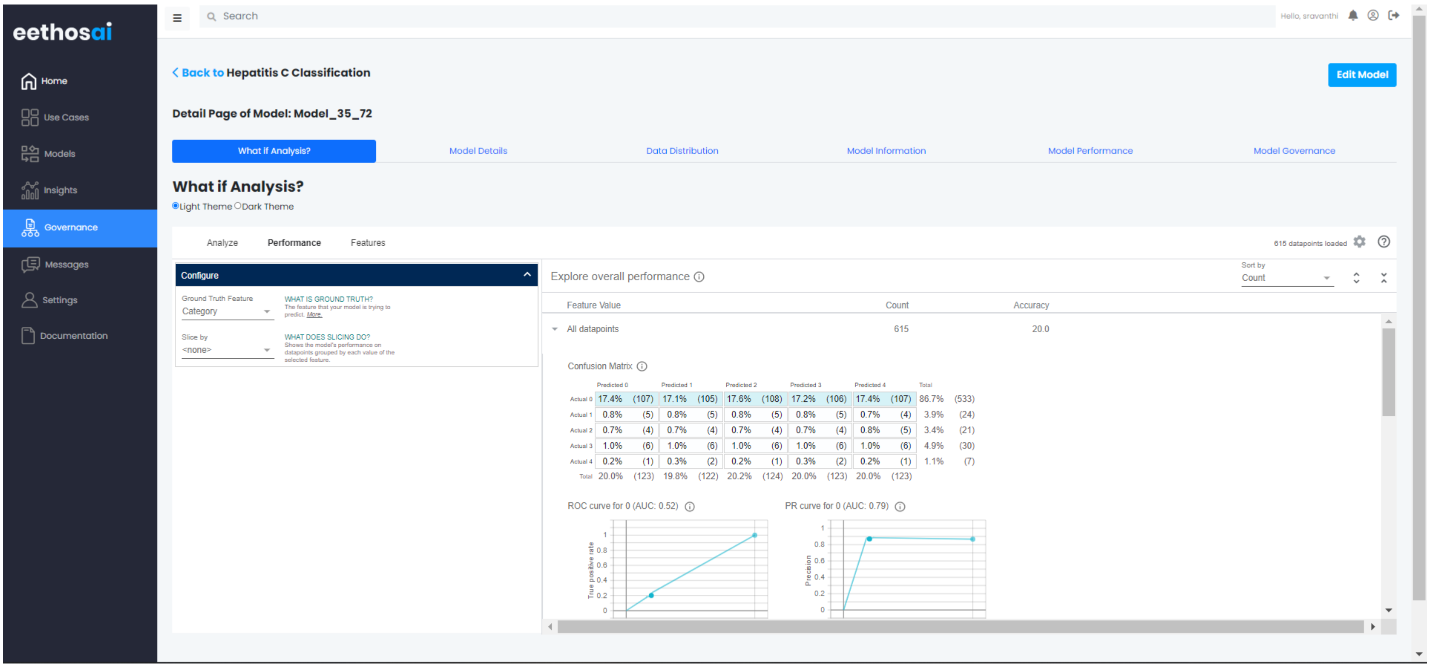
Binning | X-Axis (none)
Binning | Y-Axis (none)
Color By Inference label
Label By (default)
Scatter | X-Axis (default)
Scatter | Y-Axis (default)

Edit - Datapoint 21

Feature	Value(s)
Age	33
ALB	46.7
ALP	88.3

Infer - Datapoint 21

Run	Label	Score	Delta
1	3 (3)	1.000	
1	2 (2)	0.000	
1	4 (4)	0.000	
1	0 (0)	0.000	
1	1 (1)	0.000	



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What if Analysis?

● Light Theme ○ Dark Theme

Ground Truth Feature Category

WHAT IS GROUND TRUTH? The feature that your model is trying to predict. More.

Slice by <none>

WHAT DOES SLICING DO? Shows the model's performance on datapoints grouped by each value of the selected feature.

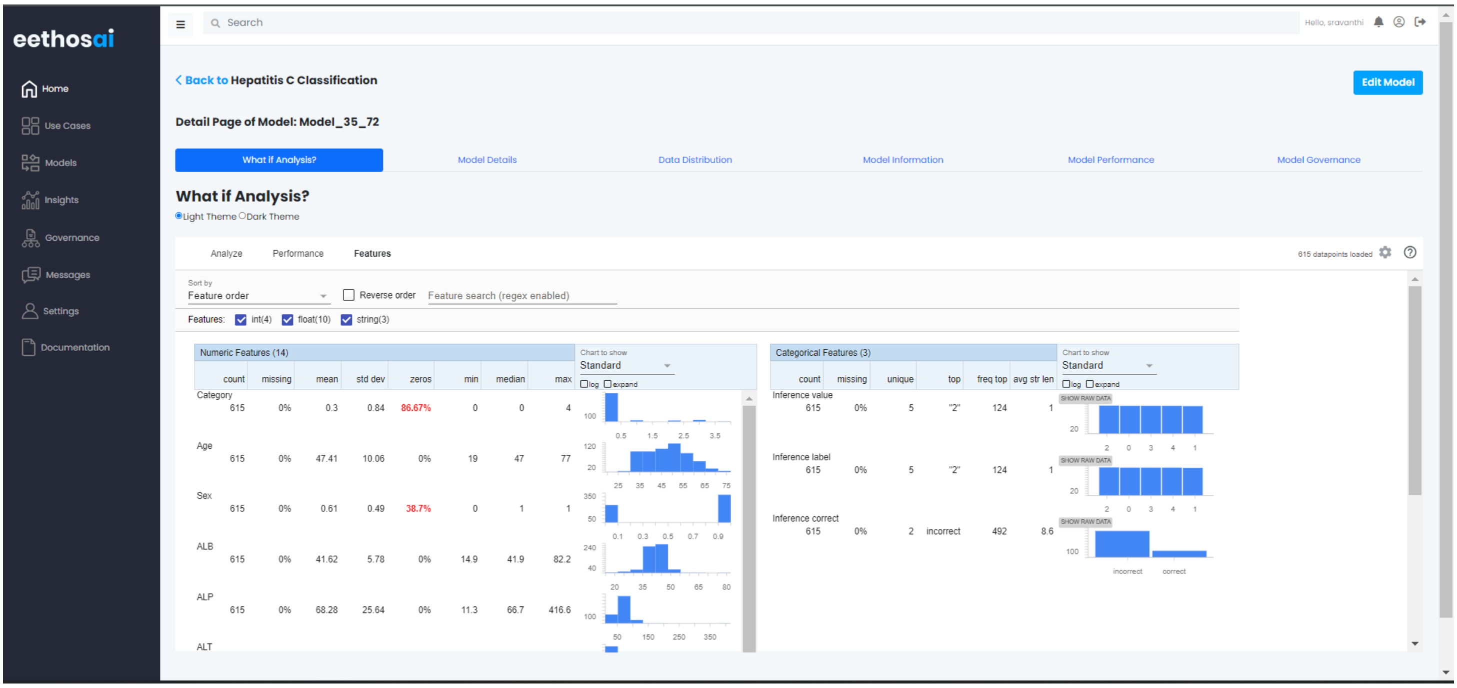
Explore overall performance

Sort by Count

Feature Value	Count	Accuracy
All datapoints	615	20.0

Confusion Matrix

	Predicted 0		Predicted 1		Predicted 2		Predicted 3		Predicted 4		Total	
Actual 0	17.4%	(107)	17.1%	(105)	17.6%	(108)	17.2%	(106)	17.4%	(107)	86.7%	(533)
Actual 1	0.8%	(5)	0.8%	(5)	0.8%	(5)	0.8%	(5)	0.7%	(4)	3.9%	(24)
Actual 2	0.7%	(4)	0.7%	(4)	0.7%	(4)	0.7%	(4)	0.8%	(5)	3.4%	(21)
Actual 3	1.0%	(6)	1.0%	(6)	1.0%	(6)	1.0%	(6)	1.0%	(6)	4.9%	(30)
Actual 4	0.2%	(1)	0.3%	(2)	0.2%	(1)	0.3%	(2)	0.2%	(1)	1.1%	(7)
Total	20.0%	(123)	19.8%	(122)	20.2%	(124)	20.0%	(123)	20.0%	(123)		



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What if Analysis?

● Light Theme ○ Dark Theme

Sort by: Feature order

☐ Reverse order

Feature search (regex enabled)

Features: ☑ int(4) ☑ float(10) ☑ string(3)

Numeric Features (14)

Chart to show: Standard ☐ log ☐ expand

	count	missing	mean	std dev	zeros	min	median	max
Category	615	0%	0.3	0.84	86.67%	0	0	4
Age	615	0%	47.41	10.06	0%	19	47	77
Sex	615	0%	0.61	0.49	38.7%	0	1	1
ALB	615	0%	41.62	5.78	0%	14.9	41.9	82.2
ALP	615	0%	68.28	25.64	0%	11.3	66.7	416.6
ALT								

Categorical Features (3)

Chart to show: Standard ☐ log ☐ expand

	count	missing	unique	top	freq top	avg str len
Inference value	615	0%	5	"2"	124	1
Inference label	615	0%	5	"2"	124	1
Inference correct	615	0%	2	incorrect	492	8.6

References

[1]Lichtinghagen R et al. J Hepatol 2013; 59: 236-42, Hoffmann G et al. Using machine learning techniques to generate laboratory diagnostic pathways â€“ a case study. J Lab Precis Med 2018; 3: 58-67,

[2] https://www.gandhimedicos.in

[3] https://medlineplus.gov