TITANIC

Marie Bai

INTRO

IMPORT-
ANT

Knn,
DA,
LR

Transfor-
mations

Missing
values

INTRO

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S

'Pclass_1',
'Pclass_2',
'Pclass_3',

'female',
'male',

'cabin_a',
...
'cabin_t'

'embarked_s',
'embarked_c',
'embarked_q'

	Survived	SibSp	Parch	Fare	age_mean	cabin_a	cabin_b	cabin_c	cabin_d	cabin_e	...	cabin_g	cabin_t	Pclass_1	Pclass_2	Pclass_3	female
0	0	1	0	7.2500	22.000000	0	0	0	0	0	...	0	0	0	0	1	0
1	1	1	0	71.2833	38.000000	0	0	1	0	0	...	0	0	1	0	0	1
2	1	0	0	7.9250	26.000000	0	0	0	0	0	...	0	0	0	0	1	1
3	1	1	0	53.1000	35.000000	0	0	1	0	0	...	0	0	1	0	0	1
4	0	0	0	8.0500	35.000000	0	0	0	0	0	...	0	0	0	0	1	0

Missing values

PassengerId	0
Survived	0
Pclass	0
Name	0
Sex	0
Age	177
SibSp	0
Parch	0
Ticket	0
Fare	0
Cabin	687
Embarked	2

AGE

EMBARKED

CABIN

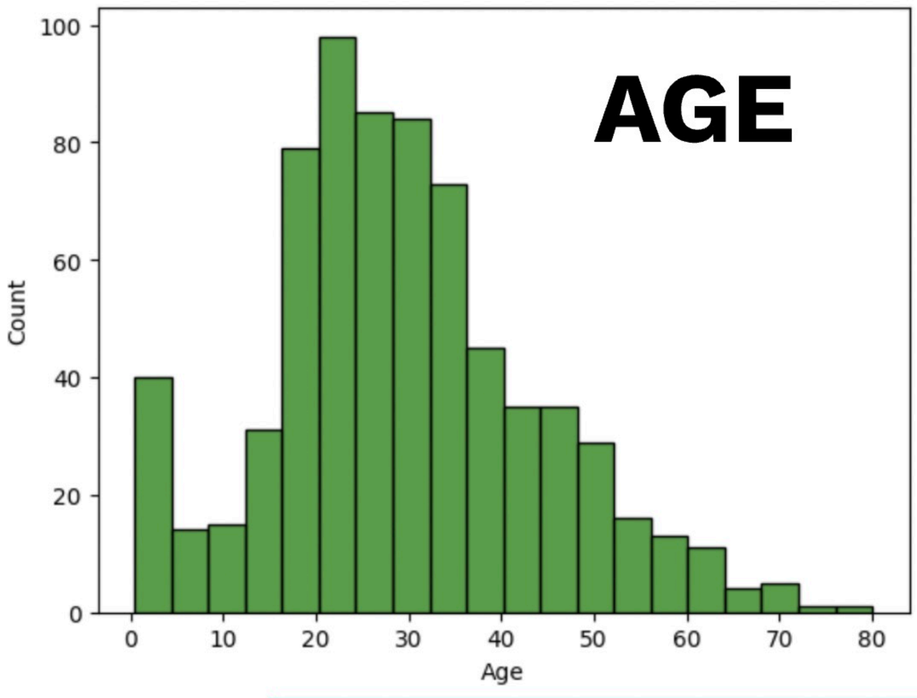
Missing values

PassengerId	0
Survived	0
Pclass	0
Name	0
Sex	0
Age	177
SibSp	0
Parch	0
Ticket	0
Fare	0
Cabin	687
Embarked	2

AGE

EMBARKED

CABIN


AGE
Count
Age
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60
80
100
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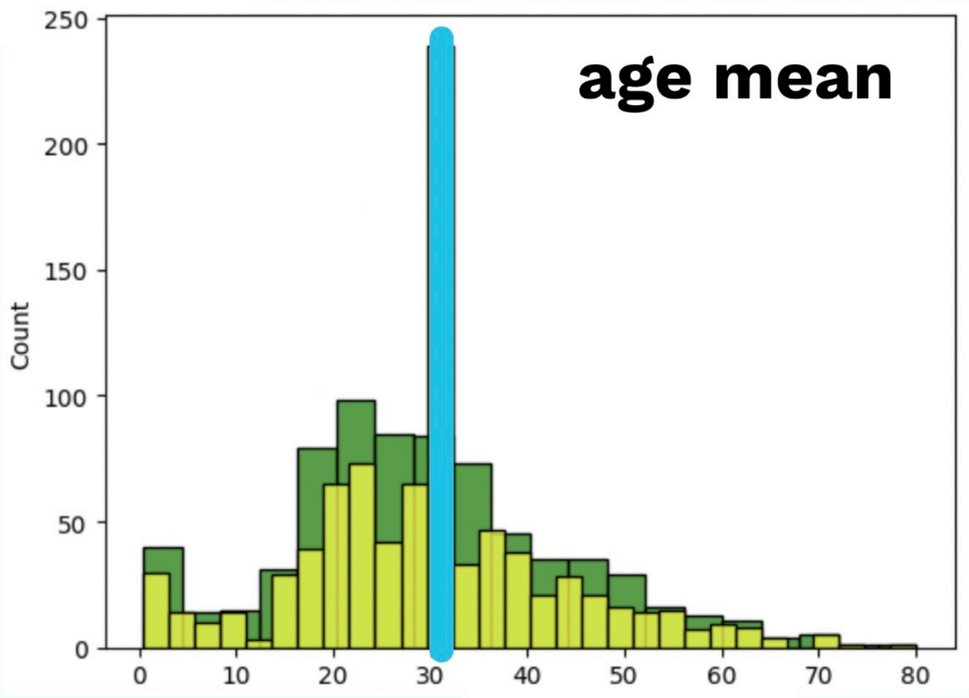
10
20
30
40
50
60
70
80


age mean
Count
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200
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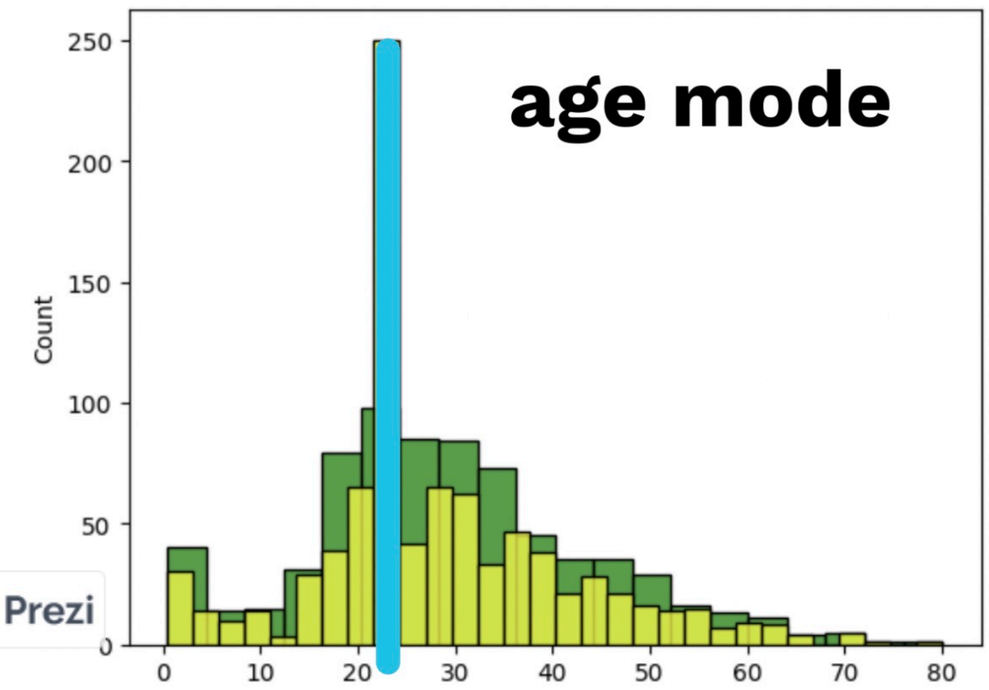
0
10
20
30
40
50
60
70
80


age mode
Count
0
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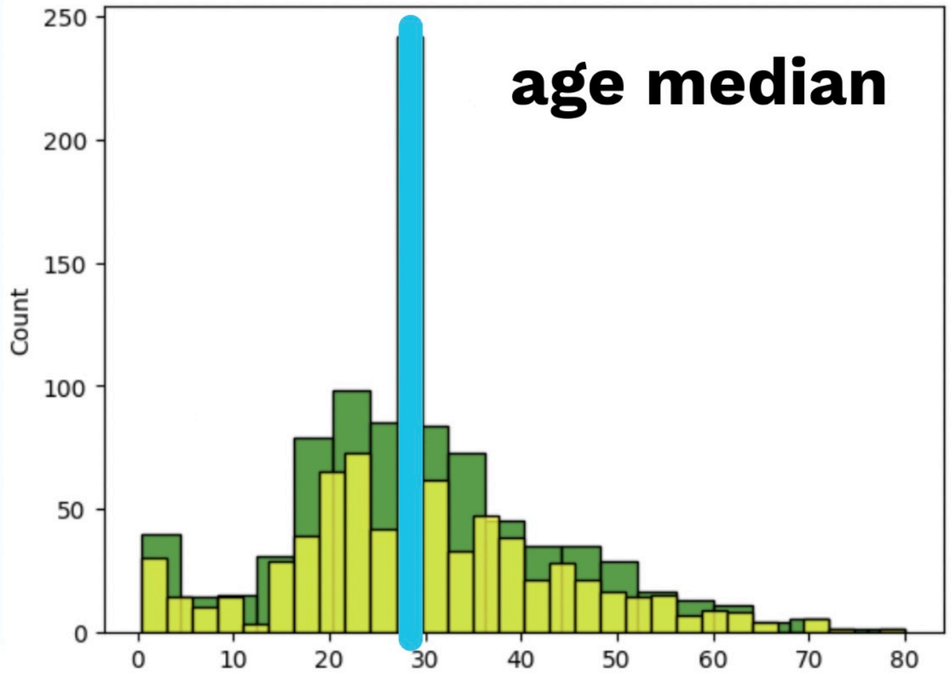
100
150
200
250
0
10
20
30
40
50
60
70
80


age median
Count
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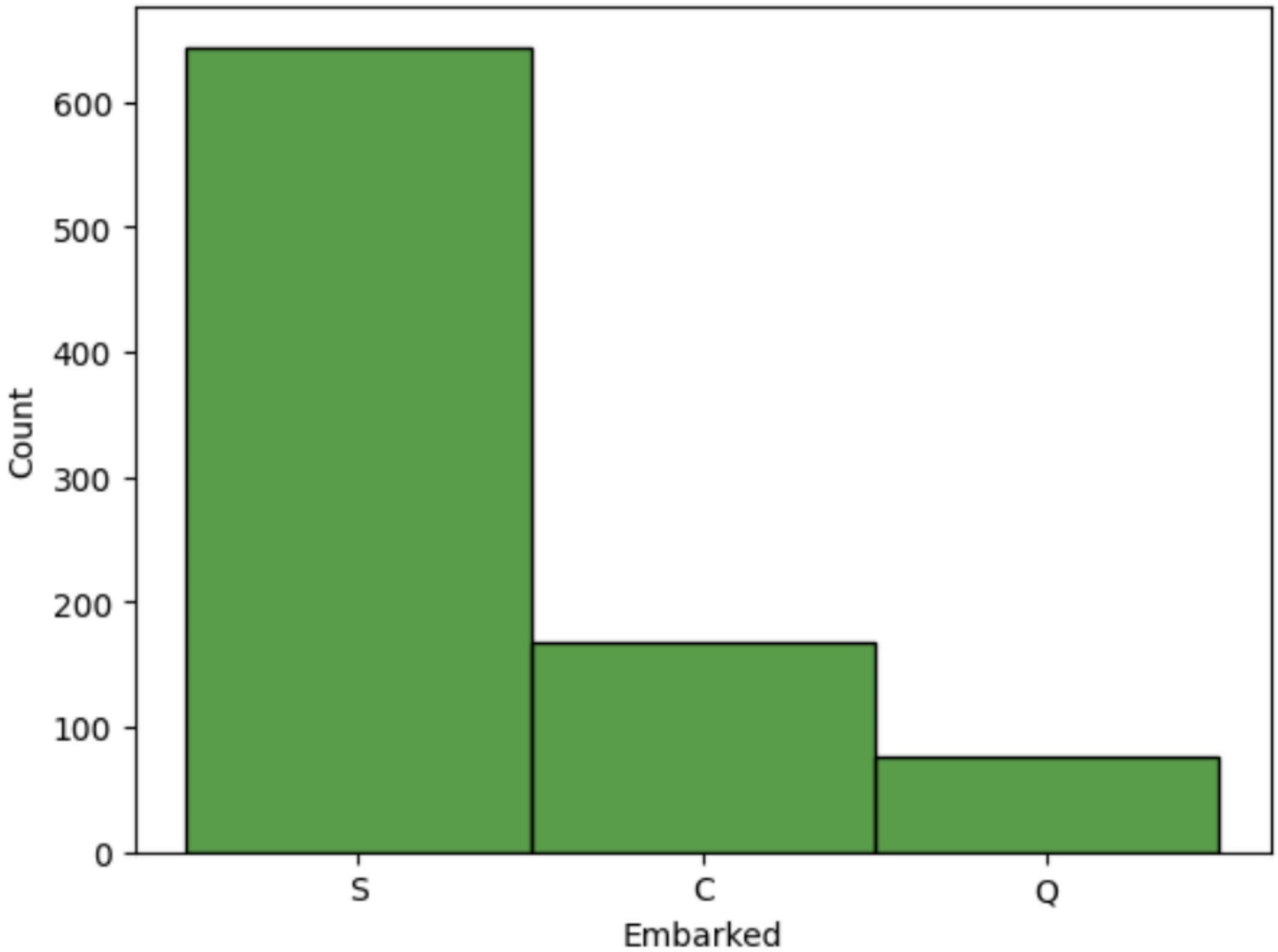
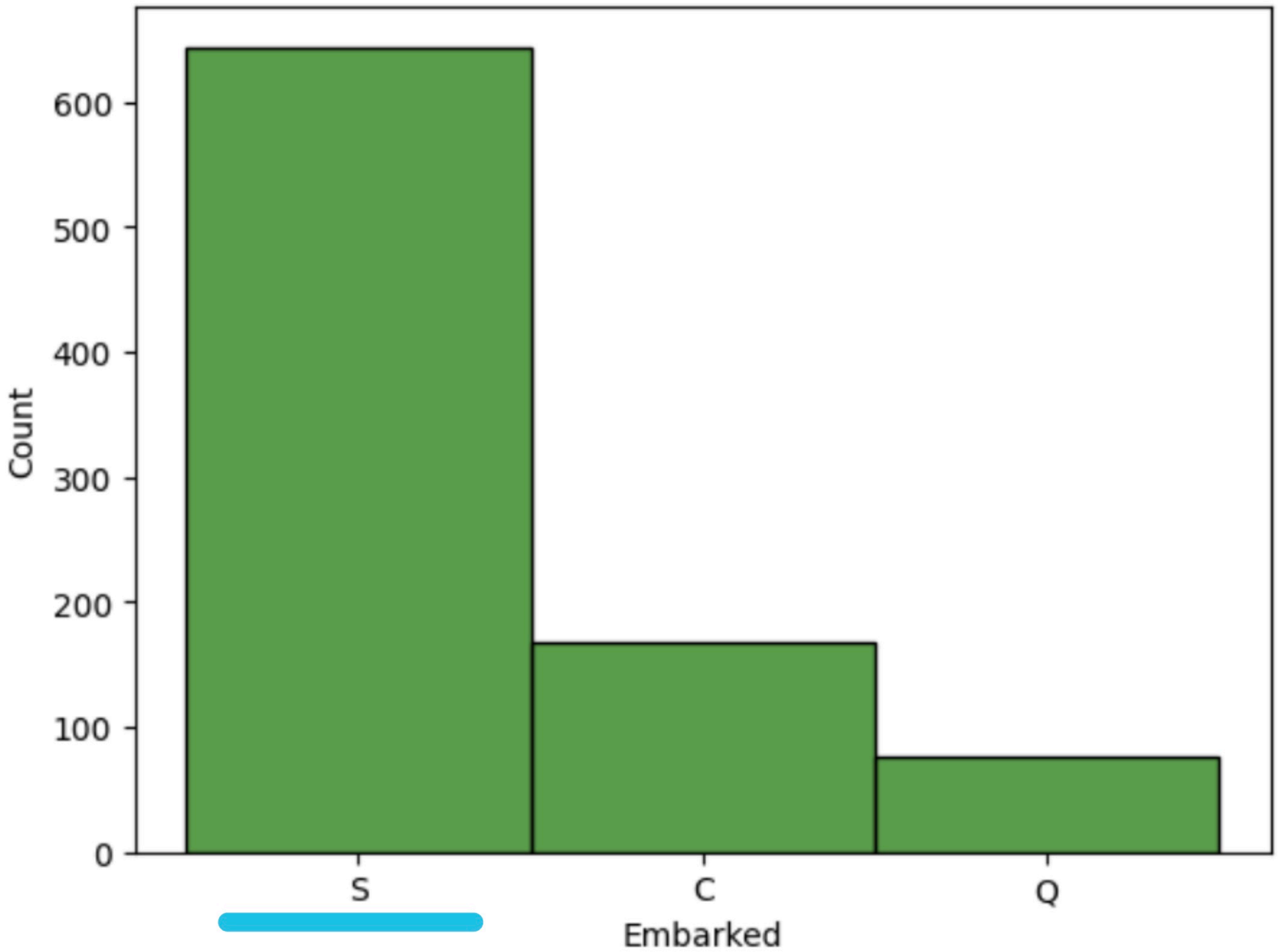
50
100
150
200
250
0
10
20
30
40
50
60
70
80


600
500
400
300
200
100
0
Count
S
C
Q
Embarked


600
500
400
300
200
100
0
Count
S
C
Q
Embarked

Cabin
687 missing values

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'C118', nan, 'D7', nan, nan, nan, nan, nan, nan, nan, nan, 'A19',
```

Embarked

embarked_s	embarked_c	embarked_q
1	0	0
0	1	0
1	0	0
1	0	0
1	0	0

PClass

Cabin

PClass, Sex

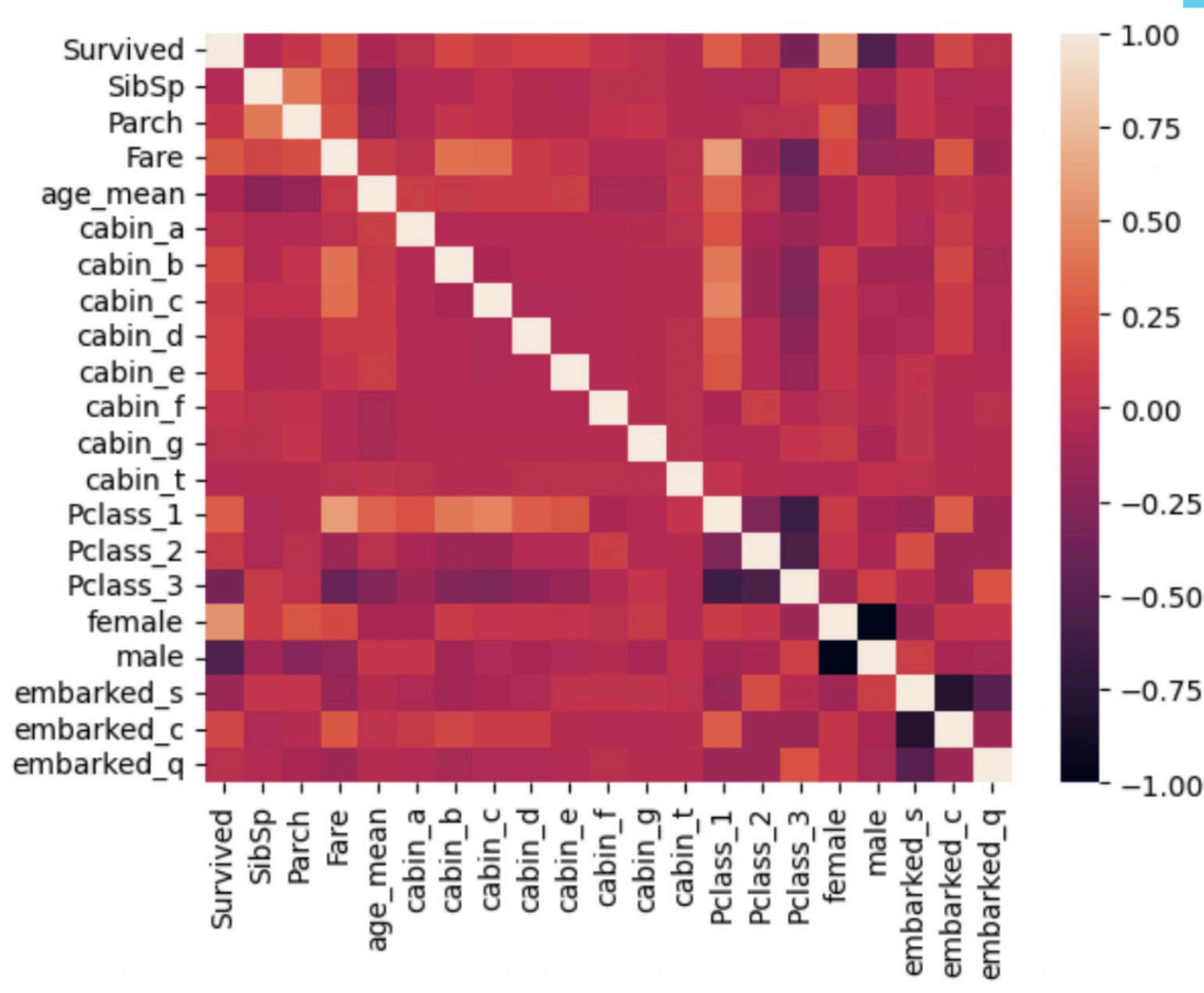
Pclass_1	Pclass_2	Pclass_3	female	male
0	0	1	0	1
1	0	0	1	0
0	0	1	1	0
1	0	0	1	0
0	0	1	0	1

Cabin

cabin_a	cabin_b	cabin_c	cabin_d	cabin_e	cabin_f	cabin_g	cabin_t
0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0

Correlation between all and survived

Survived	1.000000
female	0.543351
Pclass_1	0.285904
Fare	0.257307
cabin_b	0.175095
embarked_c	0.168240
cabin_d	0.150716
cabin_e	0.145321
cabin_c	0.114652
Pclass_2	0.093349
Parch	0.081629
cabin_f	0.057935
cabin_a	0.022287
cabin_g	0.016040
embarked_q	0.003650
cabin_t	-0.026456
SibSp	-0.035322
age_mean	-0.069809
embarked_s	-0.149683
Pclass_3	-0.322308
male	-0.543351



PREPARATION

	SibSp	Parch	Fare	age_mean	cabin_a	cabin_b	cabin_c	cabin_d	cabin_e	cabin_f	cabin_g	cabin_t	I
0	0.125	0.000000	0.014151	0.271174	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	0.125	0.000000	0.139136	0.472229	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	
2	0.000	0.000000	0.015469	0.321438	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.125	0.000000	0.103644	0.434531	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	
4	0.000	0.000000	0.015713	0.434531	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

$$X_{new} = \frac{X_i - \min(X)}{\max(x) - \min(X)}$$

F1 score, accuracy

Compare

F1 Score

The F1 score is a popular performance measure for classification and often preferred over

$$F_1 = 2 \cdot \frac{\text{precision} \cdot \text{recall}}{\text{precision} + \text{recall}} = \frac{\text{TP}}{\text{TP} + \frac{1}{2}(\text{FP} + \text{FN})}$$

TP = number of true positives

FP = number of false positives

FN = number of false negatives

1st N

K VALUE

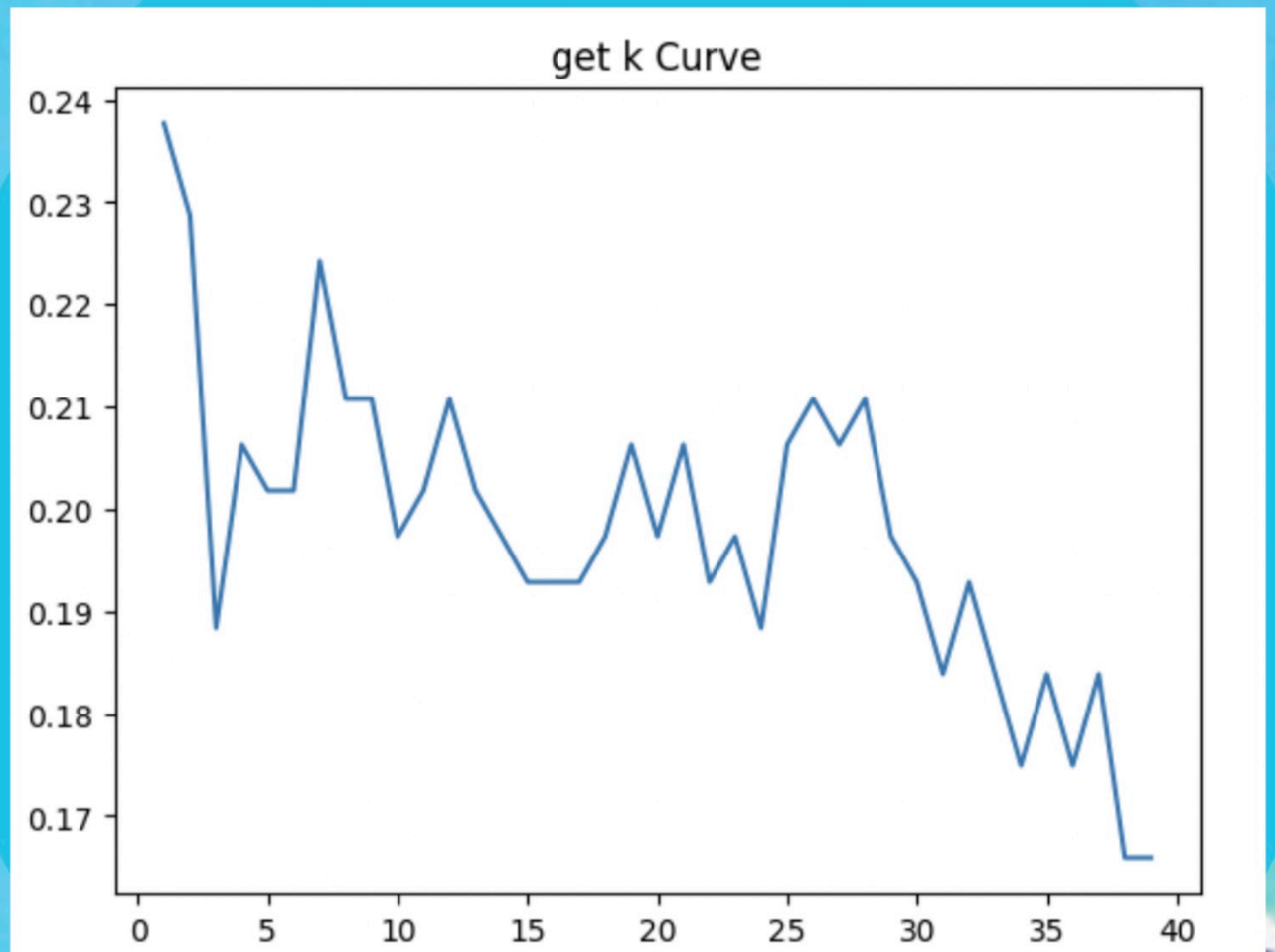
ACC, MSE

N = 10,
F1 Score = 0.713

F1 score Interpretation

> 0.9	Very good
0.8-0.9	Good
0.5-0.8	OK
< 0.5	Not good

K VALUE



N = 36,
F1 Score = 0.719

Accuracy Score

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{TN} + \text{FP} + \text{FN}}$$

Mean squared error

$$\text{MSE} = \frac{1}{n}\sum_{i=1}^{n}(Y_i - \hat{Y}_i)^2$$

MSE = mean squared error

n = number of data points

Y_i = observed values

$\hat{Y}_i$ = predicted values

KNN Accuracy = 0.825

KNN MSE = 0.175

COMPARE

Accuracy KNN = 0.834
Accuracy LDA = 0.807
Accuracy LR = 0.780

KNN mean_squared_error = 0.175
LDA mean_squared_error = 0.193
LR mean_squared_error = 0.2197