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LAMPIRAN

Lampiran 1. Sampel data bintang variabel dengan normalisasi *Z-score*

raj2000	dej2000	mEn_vmag	Amplitude	Periode	phot_g_mEn _mag	phot_pb_mEn _mag	phot_rb_mEn _mag	parallax	Variable Type
-0,046021761	0,005509	-2,84645	0,179354	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021762	0,005509	0,915653	4,392751	-1,6E+15	-0,35496	-0,37661	3,419522	-0,57027	C
-0,046021762	0,005509	1,125758	2,265989	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021733	0,005509	0,594317	1,664075	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021753	0,005509	0,668471	2,145606	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021749	0,005509	0,334776	-0,30218	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021735	0,005509	-2,81926	1,102289	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021742	0,005509	0,216128	2,105478	-1,6E+15	2,638216	-0,37661	2,892418	-0,57027	C
-0,04602174	0,005509	0,831611	2,426499	-1,6E+15	-0,35496	3,027764	-0,31812	-0,57027	C
-0,046021723	0,005509	0,725323	4,713771	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021732	0,005509	1,059019	-0,74358	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021732	0,005509	0,349607	-0,82384	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,046021732	0,005509	0,73521	0,179354	-1,6E+15	-0,35496	-0,37661	-0,31812	4,978678	C
-0,046021759	0,005509	1,044188	1,262799	-1,6E+15	-0,35496	3,167125	-0,31812	-0,57027	C
-0,046021732	0,005509	0,611619	-0,6232	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	C
-0,04602173	0,005509	-0,00881	1,302927	-1,6E+15	-0,35496	-0,37661	2,652826	-0,57027	E
-0,046021758	0,005509	-0,03105	0,139227	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021743	0,005509	0,040629	0,660885	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021726	0,005509	-2,86623	5,275558	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021728	0,005509	0,423761	0,58063	-1,6E+15	-0,35496	-0,37661	3,108052	-0,57027	E
-0,046021728	0,005509	0,065347	0,821396	-1,6E+15	-0,35496	2,291144	-0,31812	-0,57027	E
-0,046021734	0,005509	0,228487	6,198492	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021749	0,005509	0,280396	-0,58307	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021731	0,005509	-0,26588	0,540503	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021756	0,005509	0,146917	-0,02128	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021732	0,005509	0,450951	0,861523	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021751	0,005509	0,006024	-0,10154	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021727	0,005509	0,559711	-0,70345	-1,6E+15	-0,35496	2,709226	-0,31812	-0,57027	E
-0,046021732	0,005509	0,423761	7,001044	-1,6E+15	-0,35496	2,549957	-0,31812	-0,57027	E
-0,046021727	0,005509	-0,15959	0,219482	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021724	0,005509	-0,3252	-0,26205	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,04602173	0,005509	-0,08296	0,179354	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021726	0,005509	0,102425	0,701013	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021732	0,005509	0,248262	-0,90409	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E

-0,046021739	0,005509	-0,26588	-0,86396	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021746	0,005509	-0,03105	-1,0646	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	E
-0,046021737	0,005509	0,40893	-0,70345	-1,6E+15	-0,35496	-0,37661	-0,31812	2,557465	R
-0,046021741	0,005509	0,379268	-0,22192	-1,6E+15	-0,35496	-0,37661	2,988255	-0,57027	R
-0,04602176	0,005509	0,423761	-0,50281	-1,6E+15	-0,35496	2,609683	3,012215	-0,57027	R
-0,046021735	0,005509	0,24579	-0,90409	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021735	0,005509	-2,81926	0,219482	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021745	0,005509	-2,86376	-0,90409	-1,6E+15	-0,35496	-0,37661	3,012215	-0,57027	R
-0,04602173	0,005509	-2,86129	-0,78371	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021757	0,005509	0,176579	-0,90409	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021734	0,005509	0,24579	-0,78371	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021731	0,005509	-2,84151	-0,78371	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,04602174	0,005509	-2,85387	-0,70345	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021752	0,005509	0,238375	-0,90409	-1,6E+15	2,595457	2,410596	-0,31812	-0,57027	R
-0,046021729	0,005509	-2,90083	-0,90409	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021737	0,005509	0,366909	-0,70345	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021761	0,005509	0,337247	-0,82384	-1,6E+15	-0,35496	2,689317	-0,31812	-0,57027	R
-0,046021747	0,005509	0,097481	-1,22511	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021738	0,005509	-0,00881	-0,90409	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	R
-0,046021729	0,005509	0,339719	-0,90409	-1,6E+15	-0,35496	-0,37661	3,060133	-0,57027	R
-0,046021736	0,005509	0,359494	-0,78371	-1,6E+15	-0,35496	2,689317	-0,31812	-0,57027	R
-0,046021757	0,005509	-3,1628	-1,24598	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021741	0,005509	-3,1629	-1,24517	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021761	0,005509	-3,16307	-1,25079	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021735	0,005509	-3,16309	-1,2524	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021736	0,005509	-3,16433	-1,25681	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021723	0,005509	-3,16421	-1,252	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021761	0,005509	-3,16319	-1,24317	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021755	0,005509	-3,16544	-1,25802	-1,6E+15	2,858518	2,619837	-0,31812	-0,57027	P
-0,046021756	0,005509	-3,16534	-1,25681	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021734	0,005509	-3,16908	-1,26123	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021744	0,005509	-3,16213	-1,24317	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021762	0,005509	-3,16695	-1,26123	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,04602174	0,005509	-3,17335	-1,26243	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021732	0,005509	-3,16277	-1,24638	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021743	0,005509	-3,16151	-1,24798	-1,6E+15	3,193405	2,93028	-0,31812	-0,57027	P
-0,046021738	0,005509	-3,16693	-1,26163	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021758	0,005509	-3,17083	-1,26203	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P
-0,046021734	0,005509	-3,1623	-1,24357	-1,6E+15	-0,35496	-0,37661	-0,31812	-0,57027	P

Lampiran 2. Syntax Simulasi dengan library Python

```
# import library awal
Import numpy as np
Import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn import neighbors

 # Load Dataset
R = pd.read_excel('Bintang Variabel.xlsx')

#membagi variabel X dan y
X=R [['raj2000', 'dej2000', 'mEn_vmag',        'Amplitude', 'Periode',
'phot_g_mEn_mag','phot_pb_mEn_mag', 'phot_rb_mEn_mag',        'parallax']]
y=R [['Variable Type']]

# Split data menjadi 90% data Train dan 10% data Test
X_Train, X_Test, y_Train, y_Test = Train_Test_split(X, y, Test_size=0.10,
random_state=3)

#memanggil fungsi KNN dari Sklearn
from sklearn.neighbors import KneighborsClassifier
#untuk minskowski distance
classifier = KNeighborsClassifier(n_neighbors=9, metric='manhattan', p=1)
#untuk euclidean distance
classifier = KNeighborsClassifier(n_neighbors=9, metric='euclidean', p=2)
#untuk manhattan distance
classifier = KNeighborsClassifier(n_neighbors=9, metric='minkowski', p=1.5)
classifier.fit(X_Train, y_Train)
```

```
# menampilkan klasifikasi score
y_pred = classifier.predict(X_Test)
classifier.score(X_Test, y_Test)

# memanggil fungsi confusion matrix dan laporan klasifikasi
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_Test, y_pred)
print(cm)
from sklearn.metrics import classification_report
akurasi = classification_report(y_Test,y_pred)
print(akurasi)
```