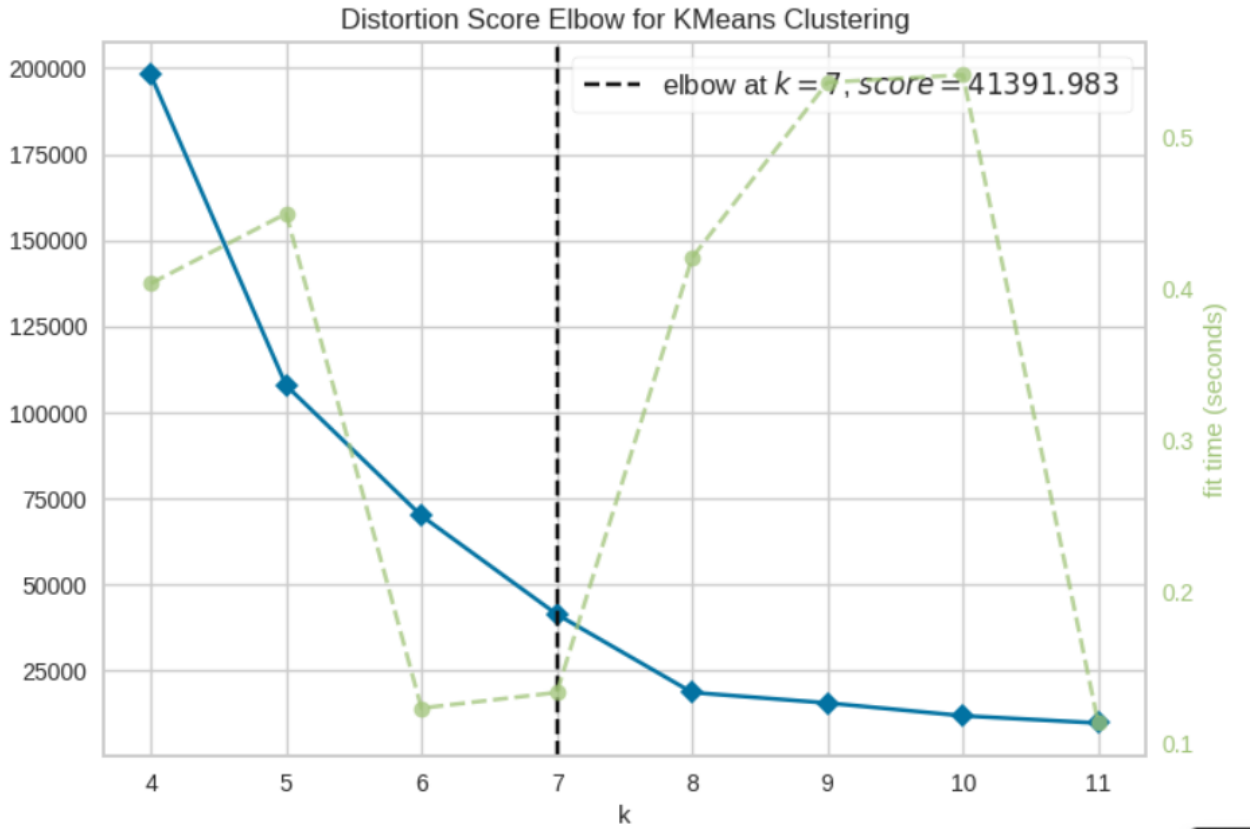
Kịch bản chia data:



Ảnh training Bayesian Gaussian Mixture:

```
[15] BGM = BayesianGaussianMixture(n_components=7,covariance_type='full',random_state=1,n_init=15)
     # fit model and predict clusters
     preds = BGM.fit_predict(X)

     #Adding the Clusters feature to the orignal dataframe.
     df["Clusters"]= preds
```

Ảnh kết quả Bayesian Gaussian Mixture:

```
[200]   valid_0's multi_logloss: 0.000151038
[400]   valid_0's multi_logloss: 0.000151038
[200]   valid_0's multi_logloss: 0.000151576
[400]   valid_0's multi_logloss: 0.000151576
[200]   valid_0's multi_logloss: 0.00015433
[400]   valid_0's multi_logloss: 0.00015433
[200]   valid_0's multi_logloss: 0.000155486
[400]   valid_0's multi_logloss: 0.000155486
[200]   valid_0's multi_logloss: 0.000153559
[400]   valid_0's multi_logloss: 0.000153559
[200]   valid_0's multi_logloss: 0.000155711
[400]   valid_0's multi_logloss: 0.000155711
[200]   valid_0's multi_logloss: 8.58365e-06
[400]   valid_0's multi_logloss: 8.48634e-06
[600]   valid_0's multi_logloss: 8.42158e-06
[800]   valid_0's multi_logloss: 8.37546e-06
[1000]  valid_0's multi_logloss: 8.34101e-06
[1200]  valid_0's multi_logloss: 8.3143e-06
[1400]  valid_0's multi_logloss: 8.29302e-06
[1600]  valid_0's multi_logloss: 8.27566e-06
[1800]  valid_0's multi_logloss: 8.26123e-06
[2000]  valid_0's multi_logloss: 8.24906e-06
[2200]  valid_0's multi_logloss: 8.23866e-06
[2400]  valid_0's multi_logloss: 8.22966e-06
[2600]  valid_0's multi_logloss: 8.2218e-06
[2800]  valid_0's multi_logloss: 8.21489e-06
[3000]  valid_0's multi_logloss: 8.20875e-06
[3200]  valid_0's multi_logloss: 8.20327e-06
[3400]  valid_0's multi_logloss: 8.19834e-06
[3600]  valid_0's multi_logloss: 8.19389e-06
[3800]  valid_0's multi_logloss: 8.18985e-06
[4000]  valid_0's multi_logloss: 8.18617e-06
[4200]  valid_0's multi_logloss: 8.1828e-06
[4400]  valid_0's multi_logloss: 8.1797e-06
[4600]  valid_0's multi_logloss: 8.17684e-06
[4800]  valid_0's multi_logloss: 8.1742e-06
[5000]  valid_0's multi_logloss: 8.17175e-06
[200]   valid_0's multi_logloss: 0.000220707
[400]   valid_0's multi_logloss: 0.000220707
[200]   valid_0's multi_logloss: 0.000156024
[400]   valid_0's multi_logloss: 0.000156024
[200]   valid_0's multi_logloss: 0.0120099
[400]   valid_0's multi_logloss: 0.0120099
[200]   valid_0's multi_logloss: 0.0238626
```

Ảnh training Arima:

```
[24] from statsmodels.tsa.arima.model import ARIMA

     # Khởi tạo và phù hợp với mô hình ARIMA
     model_arima = ARIMA(r_t, order=(2, 0, 2))
     model_fit = model_arima.fit()

     # In ra tóm tắt của mô hình
     print(model_fit.summary())
```

Ảnh kết quả Arima:

```
                               SARIMAX Results
==============================================================================
Dep. Variable:                      y   No. Observations:                  365
Model:                 ARIMA(2, 0, 2)   Log Likelihood                 563.223
Date:                Tue, 07 May 2024   AIC                          -1114.446
Time:                        03:41:01   BIC                          -1091.047
Sample:                             0   HQIC                         -1105.147
                                  - 365
Covariance Type:                  opg
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const      -4.829e-06      0.001     -0.006      0.995      -0.002       0.002
ar.L1         -0.1328      0.059     -2.233      0.026      -0.249      -0.016
ar.L2          0.5723      0.054     10.593      0.000       0.466       0.678
ma.L1         -0.0099      0.040     -0.249      0.804      -0.087       0.068
ma.L2         -0.8488      0.043    -19.543      0.000      -0.934      -0.764
sigma2         0.0027      0.000     25.500      0.000       0.002       0.003
===================================================================================
Ljung-Box (L1) (Q):                   0.26   Jarque-Bera (JB):               665.01
Prob(Q):                              0.61   Prob(JB):                         0.00
Heteroskedasticity (H):               1.72   Skew:                             0.50
Prob(H) (two-sided):                  0.00   Kurtosis:                         9.54
===================================================================================
```

Link github:

[CuongNgD203/TH1_TimeSeries (github.com)]