

DAFTAR PUSTAKA

- Arrias, Julio Césas, Diana Alvarado, and Manuel Calderón. 2019. “Perkembangan Tindak Pencurian Di Indonesia.” 2: 5–10.
- Chen, Peng, Hongyong Yuan, and Xueming Shu. 2008. “Forecasting Crime Using the ARIMA Model.” *Proceedings - 5th International Conference on Fuzzy Systems and Knowledge Discovery, FSKD 2008* 5: 627–30.
- Darman, Ridho. 2018. “Analisis Visualisasi Dan Pemetaan Data Tanaman Padi.” *Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi* 4(2): 156–62.
- Fajri, Riyadhul, and Teuku Muhammad Johan. 2017. “Implementasi Peramalan Double Exponential Smoothing Pada Kasus Kekerasan Anak Di Pusat Pelayanan Terpadu Pemberdayaan Perempuan Dan Anak.” *Jurnal ECOTIPE* 4(2): 6–13.
- Kumar, Manish et al. 2018. “Forecasting of Annual Crime Rate in India: A Case Study.” *2018 International Conference on Advances in Computing, Communications and Informatics, ICACCI 2018*: 2087–92.
- Maricar, M. Azman. 2019. “Analisa Perbandingan Nilai Akurasi Moving Average Dan Exponential Smoothing Untuk Sistem Peramalan Pendapatan Pada Perusahaan XYZ.” *Jurnal Sistem dan Informatika* 13(2): 36–45.
- Nabillah, Ida, and Indra Ranggadara. 2020. “Mean Absolute Percentage Error Untuk Evaluasi Hasil Prediksi Komoditas Laut.” *JOINS (Journal of Information System)* 5(2): 250–55.
- Rochmawati, Naim et al. 2021. “Analisa Learning Rate Dan Batch Size Pada Klasifikasi Covid Menggunakan Deep Learning Dengan Optimizer Adam.” *Journal of Information Engineering and Educational Technology* 5(2): 44–48.
- Safat, Wajiha, Soahail Asghar, and Saira Andleeb Gillani. 2021. “Empirical Analysis for Crime Prediction and Forecasting Using Machine Learning and Deep Learning Techniques.” *IEEE Access* 9: 70080–94.
- Sumari, Arwin Datumaya Wahyudi, Ricky Yulian Adi Pratama, and Odhitya Desta Triswidrananta. 2021. “Sistem Prediksi Tingkat Kriminalitas Menggunakan Metode Triple Exponential Smoothing: Studi Kasus Pada Polres Kabupaten

Probolinggo.” *Jurnal Teknik Informatika* 13(2): 171–78.

Suprayogi, Imam, Trimaijon, and Mahyudin. 2014. “Model Prediksi Liku Kalibrasi Menggunakan Pendekatan Jaringan Saraf Tiruan (ZST) (Studi Kasus : Sub DAS Siak Hulu).” *Jurnal Online Mahasiswa Fakultas Teknik Universitas Riau* 1(1): 1–18.

Wiranda, Laras, and Mujiono Sadikin. 2019. “Penerapan Long Short Term Memory Pada Data Time Series Untuk Memprediksi Penjualan Produk Pt. Metiska Farma.” *Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI)* 8(3): 184–96.

LAMPIRAN

Lampiran 1 Hasil klasterisasi daerah tingkat kriminal

Kluster	Jumlah	Curas	Curat	Curanmor	Curi Biasa	pengeroyokan	penggelapan	cabul	KDRT	Penipuan	Penganiayaan
0	55	Mgl, T.rea	Brk, Mgl, Pnk,	Brk, Pnk, Rpc,	b.ala, brk, mks, pnk, rpc, tallo	tml	-	-	-	Tbs, b.ala, brk, mgl, mks, pnk, rpc, tallo	-
1	9	Tbs	Tbs, Up	Mmj, Mrs, Tbs, up	tbs	Pnk, Tallo, Tbs, Up	tbs	-	tbs	tbs	tbs
2	36	b.ala, brk, mmj, pnk,	b.ala, brk, mmj, pnk,	Brk, Mgl, Mmj, Pnk,	Tbs, b.ala, mmj, mrs,	Pnk, tml	Brk, Mmj, Pnk, Rpc,	-	-	Tbs, b.ala, mmj, mrs,	b.ala, mgl, pnk, rpc,

Kluster	Jumlah	Curas	Curat	Curanmor	Curi Biasa	pengeroyokan	penggelapan	cabul	KDRT	Penipuan	Penganiayaan
		rpc, tallo	tallo	Rpc,	tallo, up		t.rea, tallo, tml			pnk, tallo, tbs, up	tallo, tml
3	60	-	-	-	Mgl, Rpc, t.rea, tml	-	-	-	-	-	-
4	19	Tbs b.ala mks mmj mrs up	Mks, Mmj mrs	Mks Mmj Mrs up	tbs	b.ala mks pnk tallo	Tbs Mks Mrs up	-	Tbs b.ala brk mgl mks pnk tallo	tbs	b.ala brk mgl mks mrs pnk rpc tallo
5	14	Mmj, Mrs,	Mmj, Mrs,	b.ala, pnk,	tbs	Brk, Rpc,	b.ala, mmj,	-	b.ala, brk,	tbs	b.ala, mrs,

Kluster	Jumlah	Curas	Curat	Curanmor	Curi Biasa	pengeroyokan	penggelapan	cabul	KDRT	Penipuan	Penganiayaan
		up	up	tallo		tml	mrs, tallo, tbs, up		mgl, mmj, pnk, rpc, t.rea		tbs, up
6	50	Brk Mgl Pnk Rpc t.rea tallo tml	b.ala brk, pnk, rpc, tallo	b.ala, mgl, mmj, pnk, tallo, tml	Tbs, Mks, Mrs, Pnk, Tallo, up	Brk, Rpc, Tml	b.ala brk pnk rpc tallo	-	-	Tbs Brk pnk	t.rea tml
7	47	-	Mgl Tml t.rea	Mgl rpc	Brk mgl	-	-	-	-	Brk Mgl Pnk tml	-
8	5	tbs	Tbs Mrs	tbs	tbs	Tbs Mks	tbs	tbs	tbs	tbs	tbs

Kluster	Jumlah	Curas	Curat	Curanmor	Curi Biasa	pengeroyokan	penggelapan	cabul	KDRT	Penipuan	Penganiayaan
			up			mrs					

Lampiran 2 link Dataset

<https://www.kaggle.com/datasets/andipriska/datacrime>

Lampiran 3 Listing Program

- Import Libraries

```
#import the libraries
import math
import pandas as pd
import numpy as np
from sklearn.preprocessing import MinMaxScaler
from keras.models import Sequential
from keras.layers import Dense, LSTM
from sklearn.metrics import mean_squared_error
from tensorflow.keras.optimizers import Adam
import tensorflow as tf
import matplotlib.pyplot as plt
```

- Groupby date and sum the crime item

```
# groupby date and sum the sales item
df_monthly = df_temp.copy()
df_monthly = df_monthly.groupby('Date').Curas.sum().reset_index()
df_monthly.rename(columns={'Curas':'monthly_curas'}, inplace=True)

# print all rows in dataframe
pd.set_option("display.max_rows", None, "display.max_columns", None)
print(df_monthly)
```

- Convert an array of values into a dataset matrix

```
# convert an array of values into a dataset matrix
def create_dataset(dataset, look_back=1):
    dataX, dataY = [], []
    for i in range(len(dataset)-look_back-1):
        a = dataset[i:(i+look_back), 0]
        dataX.append(a)
        dataY.append(dataset[i + look_back, 0])
    return np.array(dataX), np.array(dataY)
```

- Normalization data

```
scaler = MinMaxScaler(feature_range=(0, 1))
dataset = scaler.fit_transform(dataset)
print(dataset)
```

- Split Data Training dan Data Testing

```
train_size = int(len(dataset) * 0.8)
test_size = len(dataset) - train_size
train, test = dataset[0:train_size,:], dataset[train_size:len(dataset),:]
print(len(train), len(test))
```

- Create and fit the LSTM network

```
# create and fit the LSTM network

model = Sequential()
model.add(LSTM(64, input_shape=(1, look_back)))
model.add(Dense(1))
model.compile(loss='mean_squared_error',
              optimizer=Adam(0.0001))
model.fit(trainX,
          trainY,
          epochs=200,
          batch_size=16,
          verbose=2,
          shuffle=False)
```

- Make Prediction

```
pred_shape = 6
pred_data = np.array(x_data_transformed[-6:])
pred_input = pred_data.reshape(pred_shape,)
pred_input = pred_input.reshape((1, n_steps_in, n_features))
yhat = model.predict(pred_input, verbose=0)

# invert difference
y_hat = np.array(yhat[0]).reshape(-1,1)
x_inverted = x_transformer.inverse_transform(yhat)
x_inverted = x_inverted.reshape(pred_shape)
pred_output = [math.ceil(i) for i in x_inverted]

print("predicted next 6 months: ", pred_output)
```

```
import dateutil

last_month = df_location["Date"][-1:].values[0]
last_month = np.datetime64(last_month)
last_month = pd.to_datetime(last_month)
date = last_month.date()

delta = dateutil.relativedelta.relativedelta(months=7)
next_6_months = date + delta

print(next_6_months)
```



```
months = np.arange(date, next_6_months, dtype='datetime64[M]')
next_6_months = []

for i in months:
    next_6_months.append(str(i)+'-01')
next_6_months = next_6_months[1:]
print(next_6_months)
```

```
get_pred_months = np.array(next_6_months)
create_df_pred = {"Date": get_pred_months, "Lokasi_manggala": pred_output}
df_pred_result = pd.DataFrame(create_df_pred)
df_pred_result["Date"] = pd.to_datetime(df_pred_result["Date"])
df_pred_result.head(12)
```

LEMBAR PERBAIKAN SKRIPSI

"PREDIKSI TINGKAT KRIMINAL MENGGUNAKAN LONG SHORT

TERM MEMORY DI KOTA MAKASSAR

(STUDI KASUS : POLRESTABES MAKASSAR)"




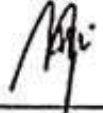
OLEH:

ANDI PRISKA SASKIA


D121171319

Skripsi ini telah dipertahankan pada Ujian Akhir Sarjana tanggal 25 November 2022.
Telah dilakukan perbaikan penulisan dan isi skripsi berdasarkan usulan dari penguji dan pembimbing skripsi.

Persetujuan perbaikan oleh tim penguji:

	Nama	Tanda Tangan
Ketua	Dr. Ir. Zahir Zainuddin, M.Sc.	
Sekretaris	Elly Warni, S.T., M.T.	
Anggota	Dr. Indrabayu, S.T., M.T., M.Bus.sys.	
	Dr. Ir. Ingrid Nurtanio, MT.	

Persetujuan Perbaikan oleh pembimbing:

Pembimbing	Nama	Tanda Tangan
I	Dr. Ir. Zahir Zainuddin, M.Sc.	
II	Elly Warni, S.T., M.T.	