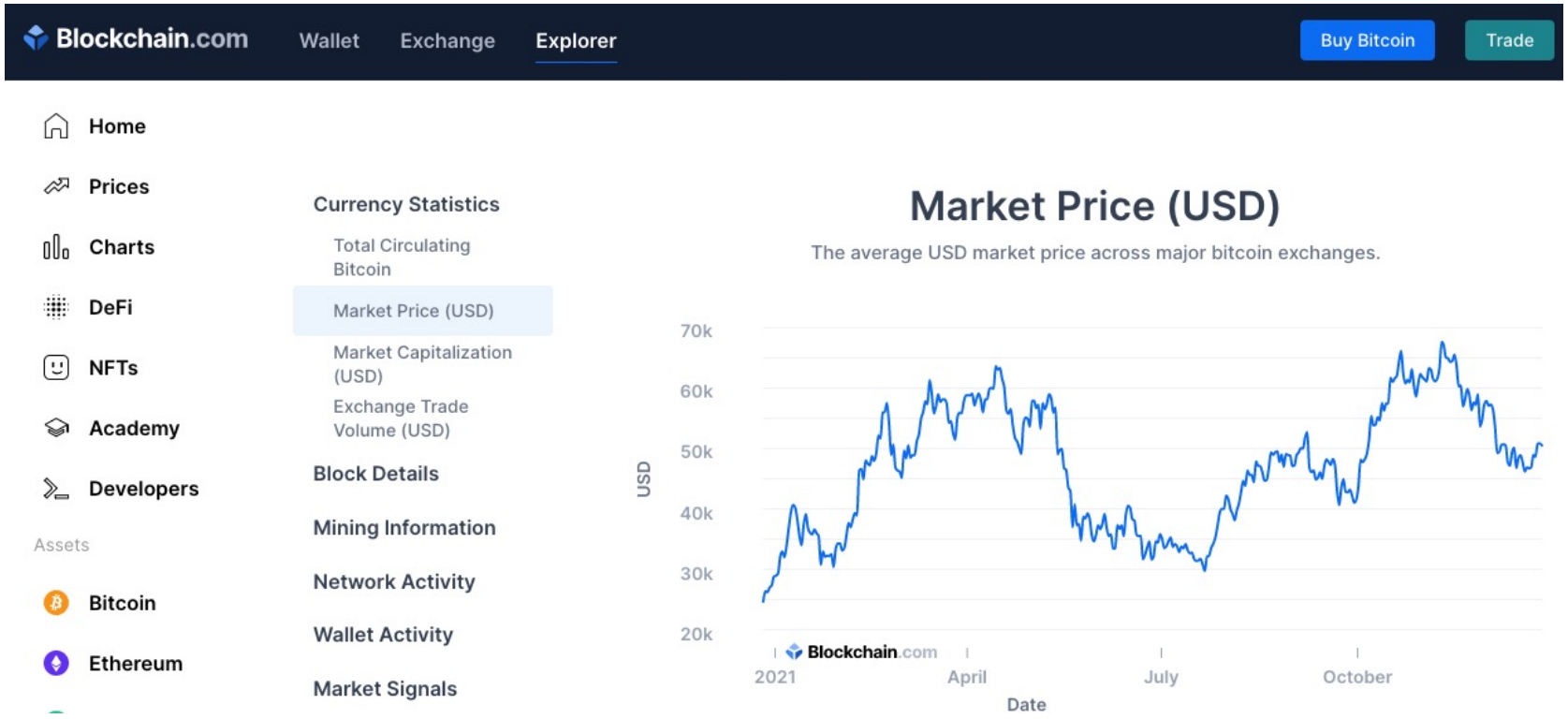
비트코인 시세 예측하기

서영진

목표

- 파이썬을 비트코인 시세 예측하기
- 데이터는 Blockchain.com 사이트에서 찾았습니다.
- https://www.blockchain.com/ko/charts/market-price?timespan=60days



파이썬 라이브러리

- Pandas
- Numpy
- Matplotlib
- Statsmodels
- Facebook Prophet

```
#market-price 데이터세의 기본 정보 구하기
%matplotlib inline

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from datetime import datetime

data = "https://raw.githubusercontent.com/annsyj94/Data_Analysi
df_bitcoin = pd.read_csv(data)

print(df_bitcoin.shape)
print(df_bitcoin.info())
df_bitcoin.tail()
```

```
(366, 2)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 366 entries, 0 to 365
Data columns (total 2 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Timestamp     366 non-null    object
 1   market-price  366 non-null    float64
dtypes: float64(1), object(1)
memory usage: 5.8+ KB
None
```

	Timestamp	market-price
361	2021-12-21 00:00:00	46910.13
362	2021-12-22 00:00:00	48934.57
363	2021-12-23 00:00:00	48628.35
364	2021-12-24 00:00:00	50785.69
365	2021-12-25 00:00:00	50814.92

```
# DataFrame로 열 이름 바꾸기
bitcoin = pd.DataFrame({

    "day":df_bitcoin['Timestamp'],
    "price":df_bitcoin['market-price']
})

bitcoin.head(3)
```

	day	price
0	2020-12-25 00:00:00	23715.53
1	2020-12-26 00:00:00	24693.58
2	2020-12-27 00:00:00	26443.21

```python
#to_datetime으로 day 피처를 시계열 피처로 변환
bitcoin['day'] = pd.to_datetime(bitcoin['day'])

#day 데이터 프레임의 index로 설정
bitcoin.index = bitcoin['day']
bitcoin.set_index('day',inplace=True)

#일차별 비트코인 시세 시각함
bitcoin.plot()
plt.show()
```

```python
import statsmodels.api as sm
from statsmodels.tsa.arima_model import ARIMA

#(AR=2, 차분=1, MA=2) 파라미터로 ARIMA 모델로 학습
model = ARIMA (bitcoin.price.values, order = (2,1,2))
model_fit = model.fit(trend='c', full_output=True, disp=True)
print(model_fit.summary())
```

ARIMA Model Results

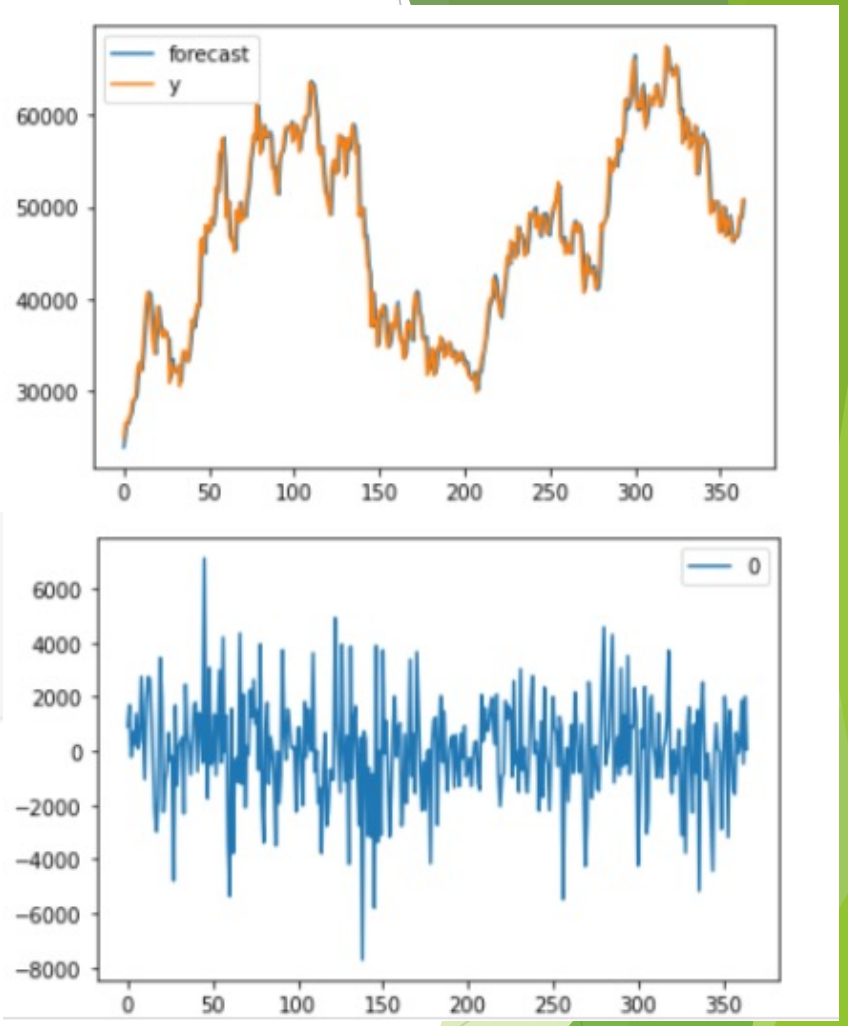
Dep. Variable:	D.y	No. Observations:	365
Model:	ARIMA(2, 1, 2)	Log Likelihood	-3275.583
Method:	css-mle	S.D. of innovations	1901.863
Date:	Sun, 26 Dec 2021	AIC	6563.166
Time:	07:55:47	BIC	6586.565
Sample:	1	HQIC	6572.465

	coef	std err	z	P>|z|	[0.025	0.975]
const	73.6148	99.670	0.739	0.461	-121.735	268.965
ar.L1.D.y	0.9187	0.019	49.350	0.000	0.882	0.955
ar.L2.D.y	-0.9612	0.019	-51.517	0.000	-0.998	-0.925
ma.L1.D.y	-0.9560	0.016	-58.233	0.000	-0.988	-0.924
ma.L2.D.y	0.9998	0.025	40.556	0.000	0.952	1.048

Roots

	Real	Imaginary	Modulus	Frequency
AR.1	0.4779	-0.9011j	1.0200	-0.1724

```
fig = model_fit.plot_predict()#학습 데이터에 대한 예측 결과 (첫 번째 그래프)
residuals = pd.DataFrame(model_fit.resid) #잔차의 변동을 시각 (두 번째 그래프 )

residuals.plot()
```



* 두 번째 그래프는 실제값과 예측값 사이의 오차 변동을 나타내는 그래프입니다.
  하지만 실행 결과에서는 오차 변동이 매우 불안정한 것으로 보임

FaceBook Prophet이란?

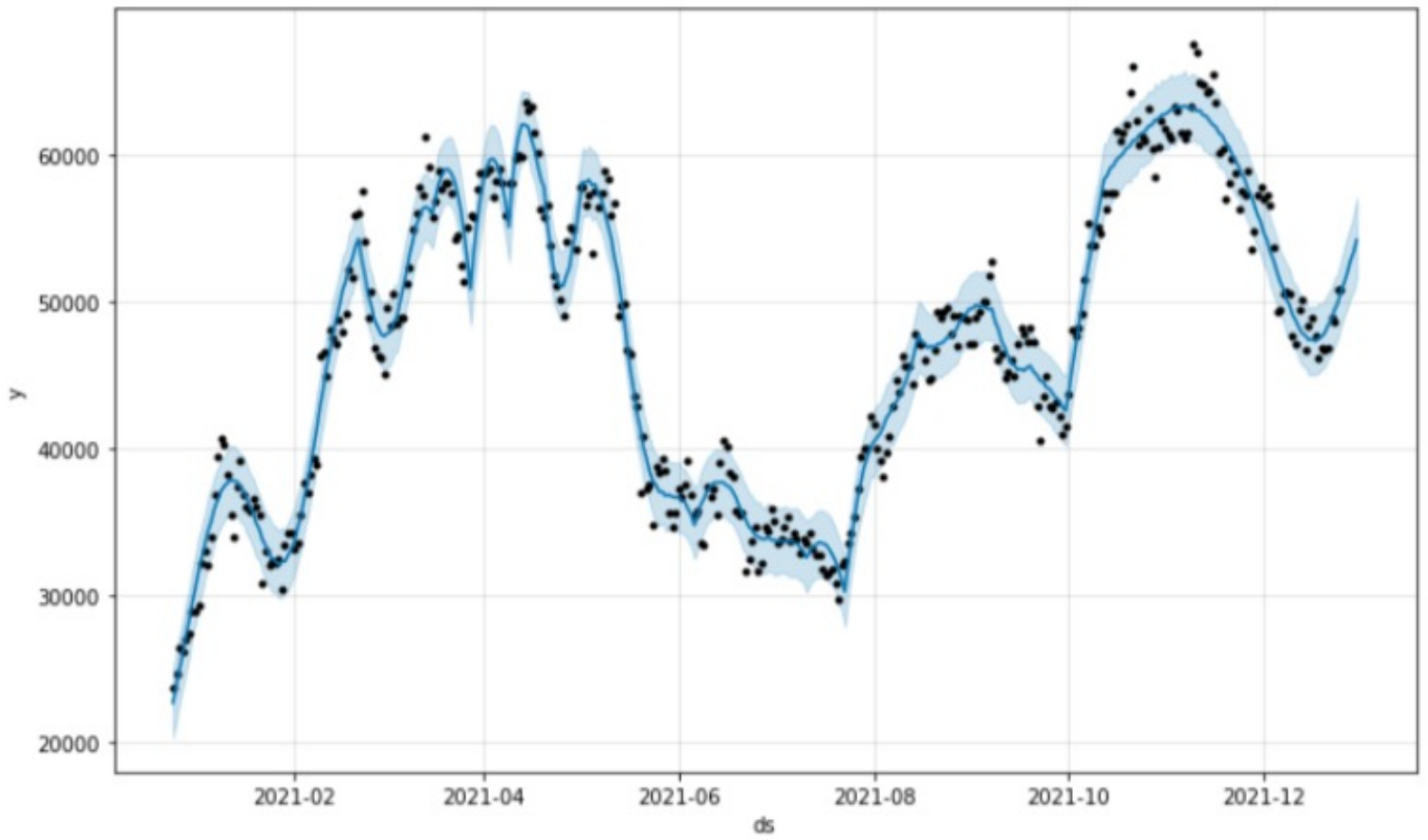
- FaceBook Prophet은 FaceBook Core Data Science 팀에서 출시한 오픈 소스 소프트웨어 입니다.
- 장점은 다른 시계열모델에 비해 더 간단하게 모델을 만들수 있습니다.

```python
#Facebook Prophet 활용하기
from fbprophet import Prophet

file = pd.read_csv(data)

#prophet을 사용하기 위해서는 다음과 같이 피처명을 변경해야 함: 'ds','y'
bitcoin_df = pd.DataFrame ({
    "ds":file['Timestamp'],
    "y":file['market-price']
})

model = Prophet(seasonality_mode = "multiplicative",
                yearly_seasonality=True,
                weekly_seasonality=True, daily_seasonality=True,
                changepoint_prior_scale=0.5)

model.fit(bitcoin_df)
```

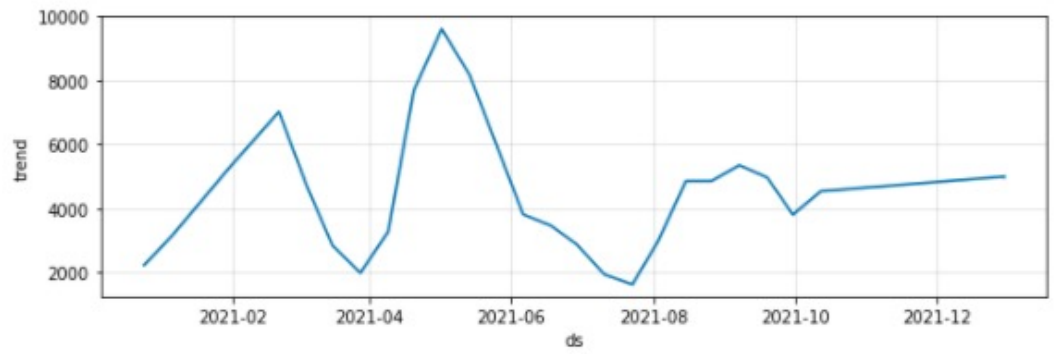
```python
#5일을 내다보며 예측합니다.

future_data= model.make_future_dataframe(periods=5, freq='d')
forecast_data = model.predict(future_data)
forecast_data[['ds','yhat','yhat_lower','yhat_upper']].tail(5)
```

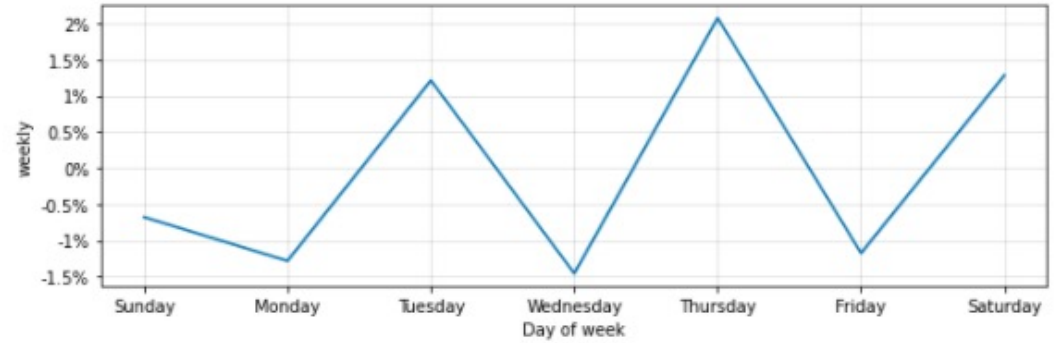
	ds	yhat	yhat_lower	yhat_upper
366	2021-12-26	51217.012797	49003.959584	53613.453159
367	2021-12-27	51904.879989	49588.510644	54431.475571
368	2021-12-28	52752.021633	50248.971232	55056.708102
369	2021-12-29	53327.971784	50709.428456	55938.836815
370	2021-12-30	54180.123832	51614.168952	57045.372302

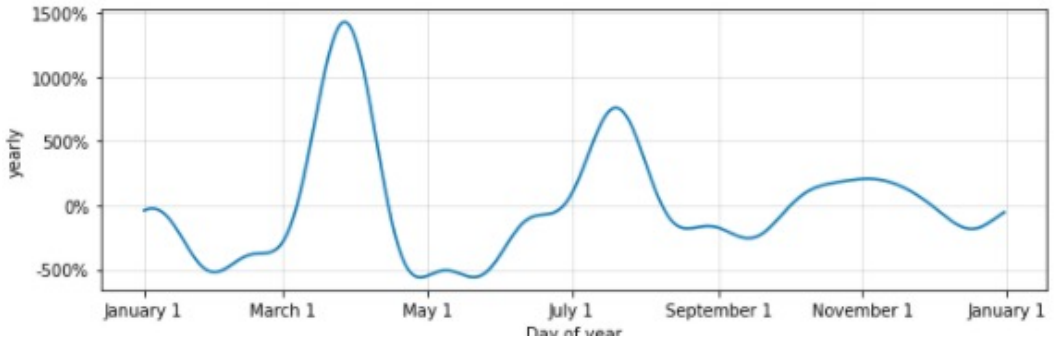
```
fig1= model.plot(forecast_data)
```

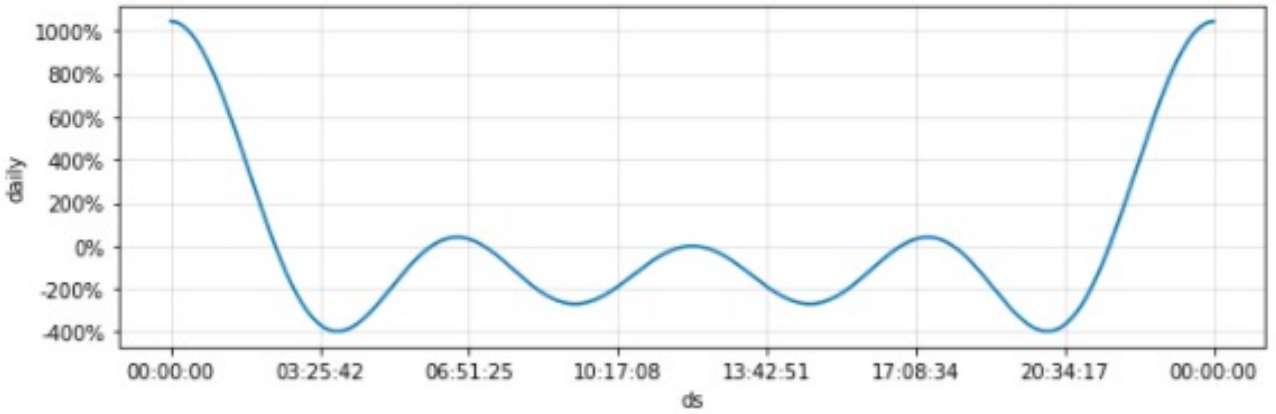


```
fig2 = model.plot_components(forecast_data)
```



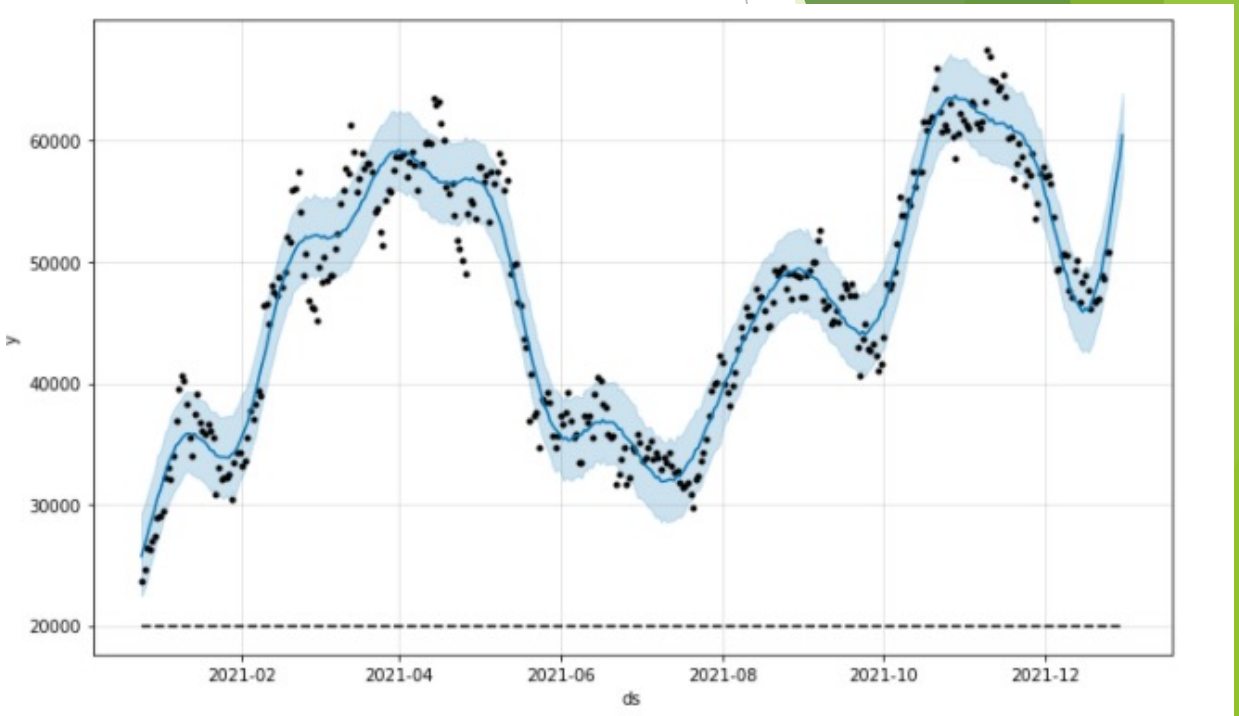






In [100…

```
#상한가 및 하한가 설정하기

#상한가 설정합니다
bitcoin_df['cap'] = 20000

#상한가 적용을 위한 파라미터를 다음과 같이 설정
prophet = Prophet(seasonality_mode ="multiplicative",
                  growth = 'logistic',
                  yearly_seasonality=True,
                  weekly_seasonality = True, daily_seasonality = True,
                  changepoint_prior_scale=0.5)
prophet.fit(bitcoin_df)

#5일을 내다보며 예측
future_data = prophet.make_future_dataframe(periods=5,freq='d')

#상한가를 설정
future_data['cap'] = 20000
forecast_data = prophet.predict(future_data)

fig = prophet.plot(forecast_data)
```



감사합니다 (Thank You)