

Stock_Kelly_Arithmetic_Fraction_Chart

September 29, 2021

1 Stock Kelly Arithmetic Chart

```
[1]: # Library
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")

from pandas_datareader import data as pdr
import yfinance as yf
yf.pdr_override()
```

```
[2]: start = '2019-01-01' #input
end = '2020-07-01' #input
symbol = 'AMD' #input
```

```
[3]: stocks = yf.download(symbol, start=start, end=end)['Adj Close']
```

```
[*****100%*****] 1 of 1 completed
```

```
[4]: stocks_returns = stocks.pct_change().dropna()
```

```
[5]: def kelly_fraction(stock_returns):
    # returns = np.array(stock_returns)
    wins = stock_returns[stock_returns > 0]
    losses = stock_returns[stock_returns <= 0]
    W = len(wins) / len(stock_returns)
    R = np.mean(wins) / np.abs(np.mean(losses))
    kelly_f = W - ( (1 - W) / R )
    return kelly_f

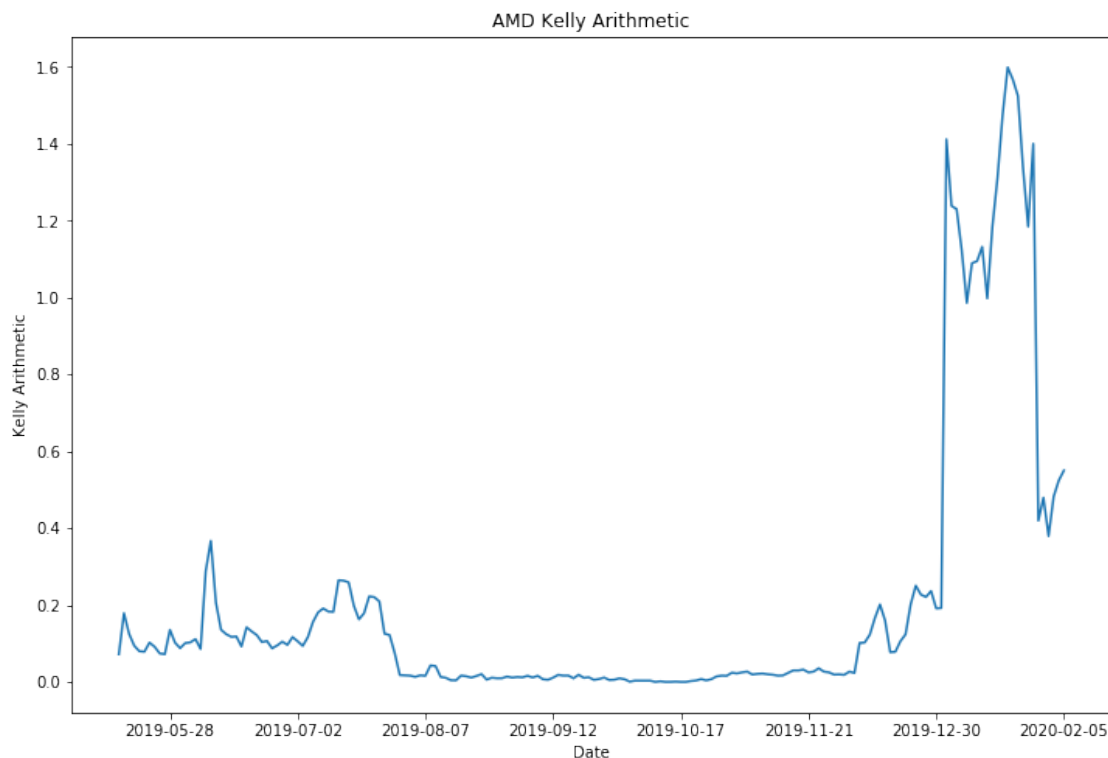
def expected_arith(stock_returns):
    expected_arith = np.mean(stock_returns)
    return expected_arith
```

```
def kelly_arithmetic(stock_returns):
    bounded_rets = stock_returns / np.abs(np.min(stock_returns))
    kelly_f = kelly_fraction(bounded_rets) / np.abs(np.min(stock_returns))
    exp_arith_kelly = expected_arith(bounded_rets * kelly_f)
    return exp_arith_kelly
```

```
[6]: # Compute the running Kelly Arithmetic
running = [kelly_arithmetic(stocks_returns[i-90:i]) for i in range(90,
    ↪len(stocks_returns))]

# Plot running Kelly Arithmetic up to 100 days before the end of the data set
_, ax1 = plt.subplots(figsize=(12,8))
ax1.plot(range(90, len(stocks_returns)-100), running[:-100])
ticks = ax1.get_xticks()
ax1.set_xticklabels([stocks.index[int(i)].date() for i in ticks[:-1]]) # Label
    ↪x-axis with dates
plt.title(symbol + ' Kelly Arithmetic')
plt.xlabel('Date')
plt.ylabel('Kelly Arithmetic')
```

```
[6]: Text(0, 0.5, 'Kelly Arithmetic')
```



```
[7]: ka = kelly_arithmetic(stocks_returns)
      ka
```

```
[7]: 0.020292436157276394
```

```
[8]: running
```

```
[8]: [0.07195786408206359,
      0.1786418583151776,
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```

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```

```
[9]: print('Expected Value (Arithmetic): {}'.format(np.  
      ↳round(kelly_arithmetic(stocks_returns) * 100, 5)))
```

Expected Value (Arithmetic): 2.02924%