In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn import preprocessing,svm
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

In [19]:
```
df=pd.read_csv(r"C:\Users\manasa\Downloads\fiat500_VehicleSelection_Dataset (3).csv")
df
```

Out[19]:

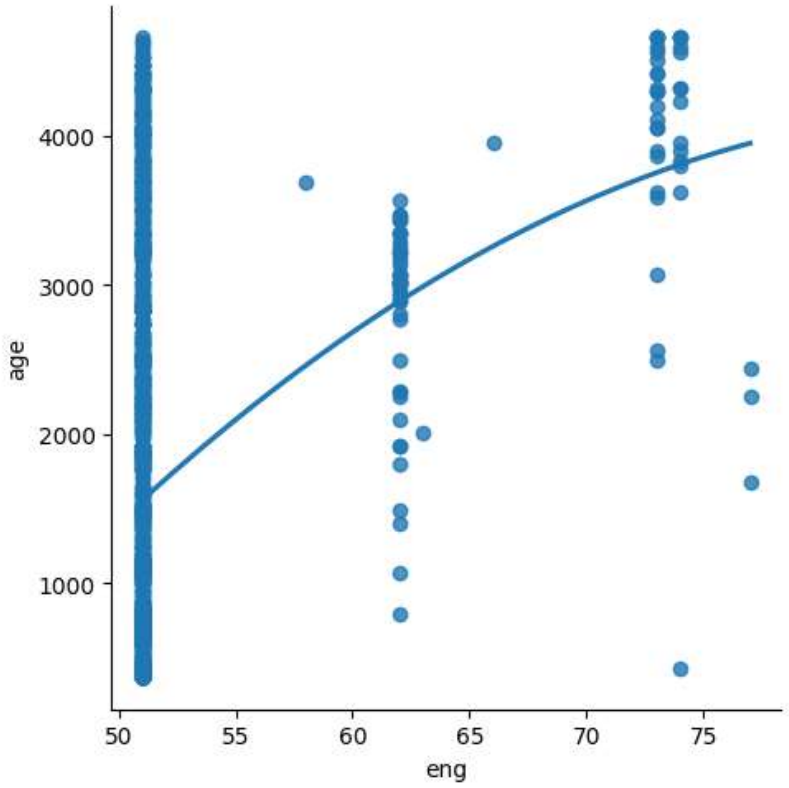
	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
0	1	lounge	51	882	25000	1	44.907242	8.611560	8900
1	2	pop	51	1186	32500	1	45.666359	12.241890	8800
2	3	sport	74	4658	142228	1	45.503300	11.417840	4200
3	4	lounge	51	2739	160000	1	40.633171	17.634609	6000
4	5	pop	73	3074	106880	1	41.903221	12.495650	5700
...	...	...	...	...	...	...	...	...	...
1533	1534	sport	51	3712	115280	1	45.069679	7.704920	5200
1534	1535	lounge	74	3835	112000	1	45.845692	8.666870	4600
1535	1536	pop	51	2223	60457	1	45.481541	9.413480	7500
1536	1537	lounge	51	2557	80750	1	45.000702	7.682270	5990
1537	1538	pop	51	1766	54276	1	40.323410	17.568270	7900

1538 rows × 9 columns

In [20]:
```
df=df[['engine_power','age_in_days']]
df.columns=['eng','age']
```

In [21]:
```
sns.lmplot(x="eng",y="age",data=df,order=2,ci=None)
```

Out[21]:
```
<seaborn.axisgrid.FacetGrid at 0x16917519350>
```



In [22]:
```
df.describe()
```

Out[22]:

	eng	age
count	1538.000000	1538.000000
mean	51.904421	1650.980494
std	3.988023	1289.522278
min	51.000000	366.000000
25%	51.000000	670.000000
50%	51.000000	1035.000000
75%	51.000000	2616.000000
max	77.000000	4658.000000

In [23]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1538 entries, 0 to 1537
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   eng     1538 non-null   int64
 1   age     1538 non-null   int64
dtypes: int64(2)
memory usage: 24.2 KB
```

In [24]:
```
df.fillna(method='ffill',inplace=True)
```

```
C:\Users\manasa\AppData\Local\Temp\ipykernel_24456\4116506308.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df.fillna(method='ffill',inplace=True)
```

In [25]:
```
x=np.array(df['eng']).reshape(-1,1)
y=np.array(df['age']).reshape(-1,1)
```

In [26]:
```
df.dropna(inplace=True)
```

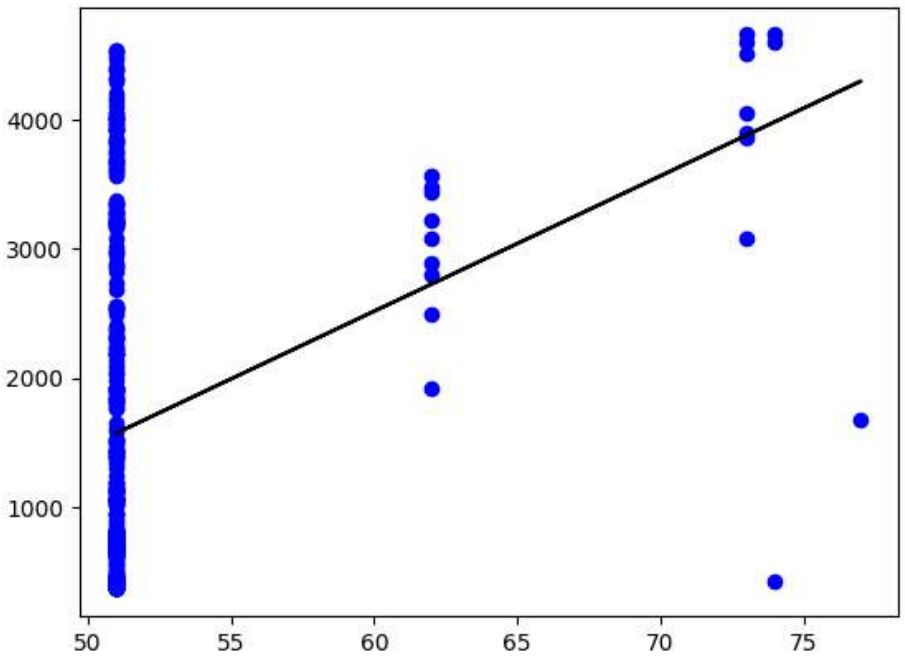
```
C:\Users\manasa\AppData\Local\Temp\ipykernel_24456\1379821321.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df.dropna(inplace=True)
```

In [27]:
```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25)
regr=LinearRegression()
regr.fit(x_train,y_train)
print(regr.score(x_test,y_test))
```

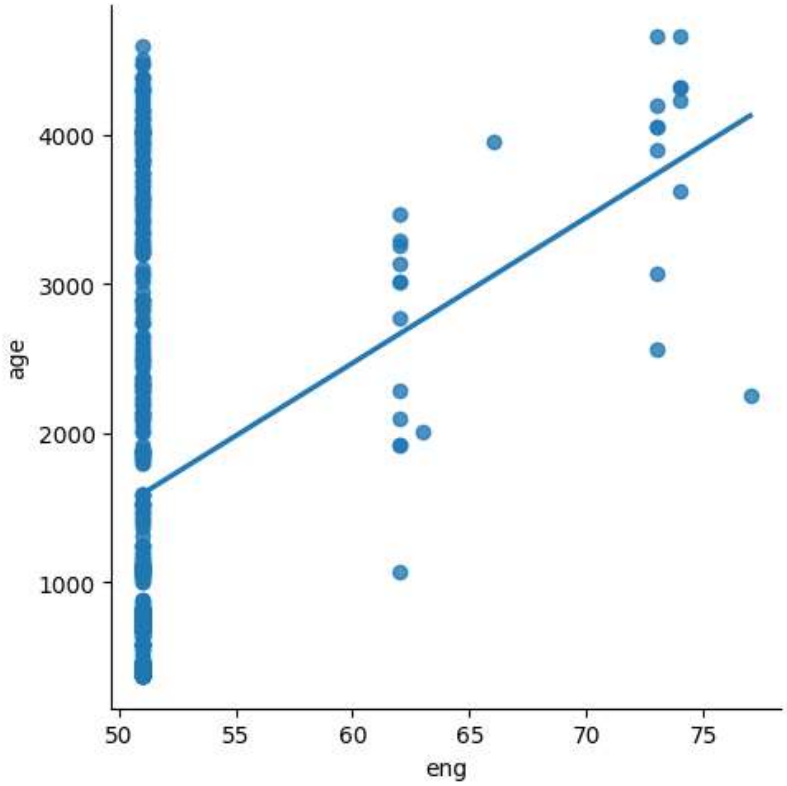
```
0.09511507783533979
```

In [28]:
```
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```



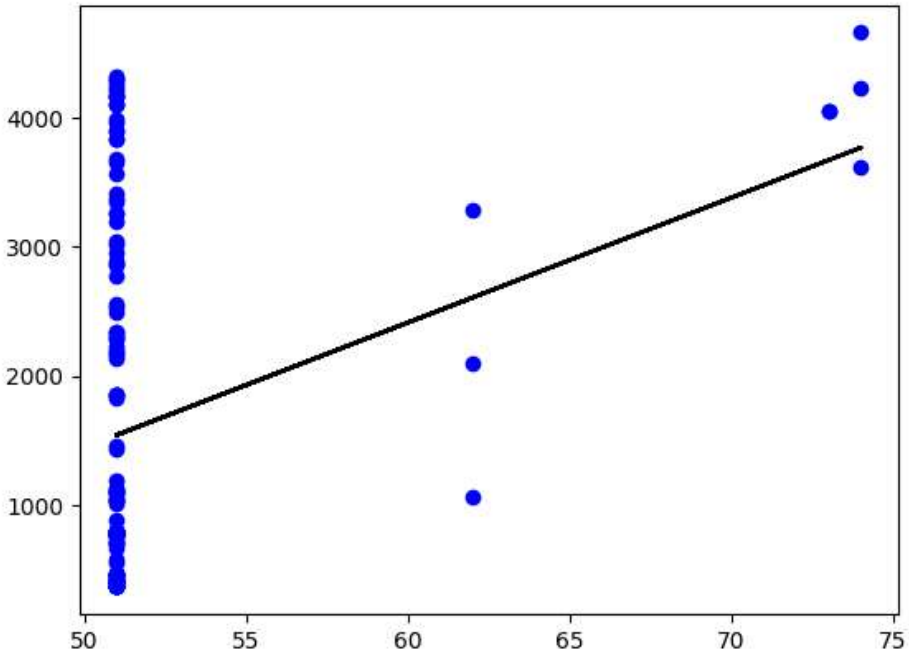
In [29]:
```
df500=df[:][:500]
sns.lmplot(x="eng",y="age",data=df500,order=1,ci=None)
```

Out[29]: <seaborn.axisgrid.FacetGrid at 0x169175f4610>



In [35]:
```
df500.fillna(method="ffill",inplace=True)
x=np.array(df500['eng']).reshape(-1,1)
y=np.array(df500['age']).reshape(-1,1)
df500.dropna(inplace=True)
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25)
regr=LinearRegression()
regr.fit(x_train,y_train)
print("Regression:",regr.score(x_test,y_test))
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```

```
Regression: 0.08633689908802478
```



In [36]:
```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
model=LinearRegression()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
r2=r2_score(y_test,y_pred)
print("R2 score:",r2)
```

```
R2 score: 0.08633689908802478
```

In [ ]:
```
#step-9 conclusion
#dataset we have taken is poor for linear model but with the smaller data works well with linear mode
```