In [4]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
df=pd.read_csv(r"C:\Users\DELL E5490\Downloads\fiat500_VehicleSelection_Dataset (2).csv"
df
```

Out[4]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	
0	1	lounge	51	882	25000	1	44.907242	8.61
1	2	pop	51	1186	32500	1	45.666359	12.24
2	3	sport	74	4658	142228	1	45.503300	11.41
3	4	lounge	51	2739	160000	1	40.633171	17.63
4	5	pop	73	3074	106880	1	41.903221	12.49
...	...	...	...	...	...	...	...	
1533	1534	sport	51	3712	115280	1	45.069679	7.70
1534	1535	lounge	74	3835	112000	1	45.845692	8.66
1535	1536	pop	51	2223	60457	1	45.481541	9.41
1536	1537	lounge	51	2557	80750	1	45.000702	7.68
1537	1538	pop	51	1766	54276	1	40.323410	17.56

1538 rows × 9 columns

In [5]:

```
df.head(10)
```

Out[5]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon
0	1	lounge	51	882	25000	1	44.907242	8.611560
1	2	pop	51	1186	32500	1	45.666359	12.241890
2	3	sport	74	4658	142228	1	45.503300	11.417840
3	4	lounge	51	2739	160000	1	40.633171	17.634609
4	5	pop	73	3074	106880	1	41.903221	12.495650
5	6	pop	74	3623	70225	1	45.000702	7.682270
6	7	lounge	51	731	11600	1	44.907242	8.611560
7	8	lounge	51	1521	49076	1	41.903221	12.495650
8	9	sport	73	4049	76000	1	45.548000	11.549470
9	10	sport	51	3653	89000	1	45.438301	10.991700

In [6]:

```
df.tail()
```

Out[6]:

	ID	model	engine_power	age_in_days	km	previous_owners	lat	l
1533	1534	sport	51	3712	115280	1	45.069679	7.704
1534	1535	lounge	74	3835	112000	1	45.845692	8.666
1535	1536	pop	51	2223	60457	1	45.481541	9.413
1536	1537	lounge	51	2557	80750	1	45.000702	7.682
1537	1538	pop	51	1766	54276	1	40.323410	17.568

In [7]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1538 entries, 0 to 1537
Data columns (total 9 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   ID               1538 non-null   int64  
 1   model            1538 non-null   object 
 2   engine_power     1538 non-null   int64  
 3   age_in_days      1538 non-null   int64  
 4   km               1538 non-null   int64  
 5   previous_owners  1538 non-null   int64  
 6   lat              1538 non-null   float64
 7   lon              1538 non-null   float64
 8   price            1538 non-null   int64  
dtypes: float64(2), int64(6), object(1)
memory usage: 108.3+ KB
```

In [8]:

```
df.describe()
```

Out[8]:

	ID	engine_power	age_in_days	km	previous_owners	
count	1538.000000	1538.000000	1538.000000	1538.000000	1538.000000	1538.0000
mean	769.500000	51.904421	1650.980494	53396.011704	1.123537	43.5413
std	444.126671	3.988023	1289.522278	40046.830723	0.416423	2.1335
min	1.000000	51.000000	366.000000	1232.000000	1.000000	36.8558
25%	385.250000	51.000000	670.000000	20006.250000	1.000000	41.8029
50%	769.500000	51.000000	1035.000000	39031.000000	1.000000	44.3940
75%	1153.750000	51.000000	2616.000000	79667.750000	1.000000	45.4679
max	1538.000000	77.000000	4658.000000	235000.000000	4.000000	46.7956

In [9]:

```
df.columns
```

Out[9]:

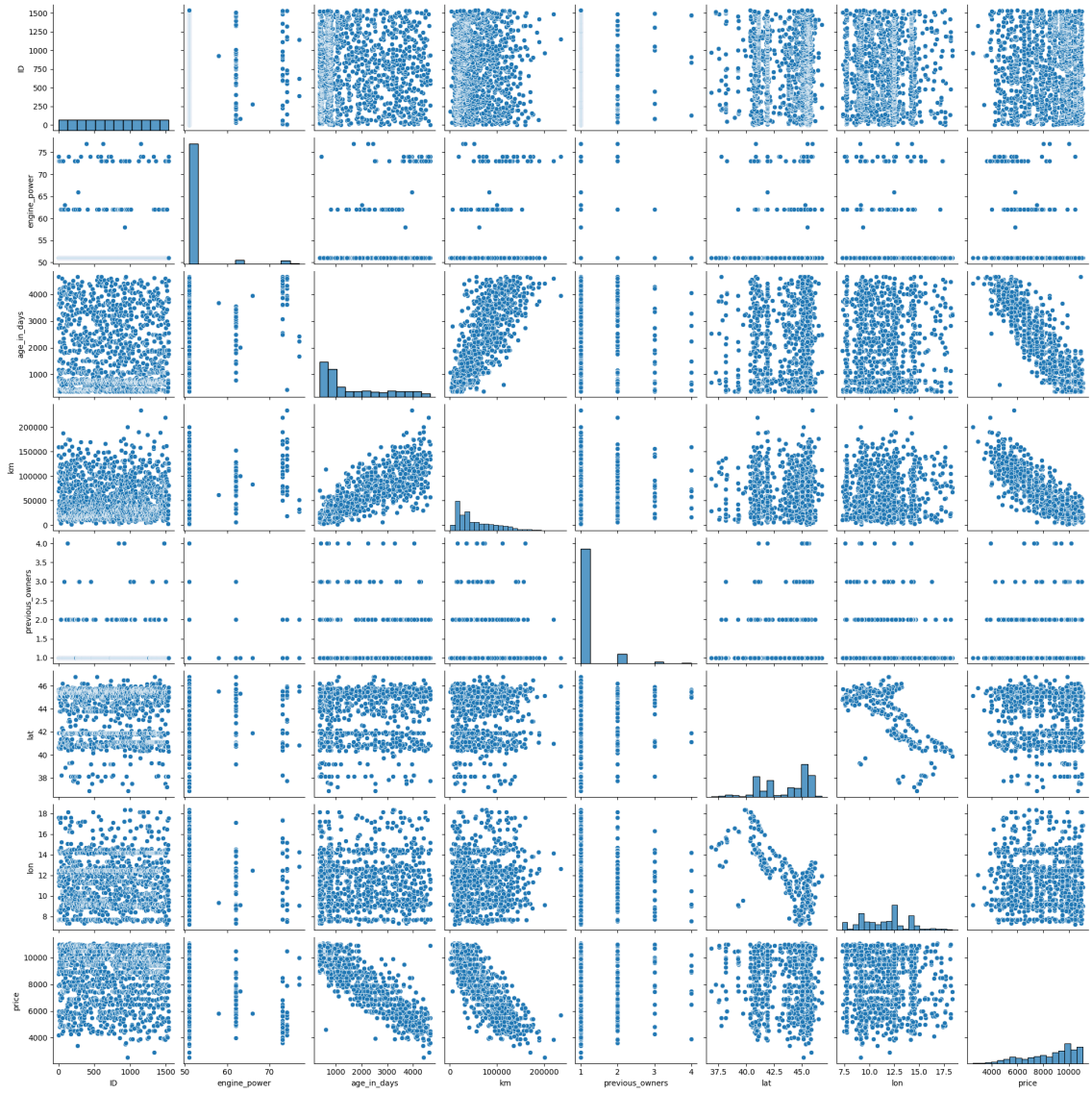
```
Index(['ID', 'model', 'engine_power', 'age_in_days', 'km', 'previous_owne
rs',
       'lat', 'lon', 'price'],
      dtype='object')
```

In [10]:

```
sns.pairplot(df)
```

Out[10]:

```
<seaborn.axisgrid.PairGrid at 0x174c6025f30>
```

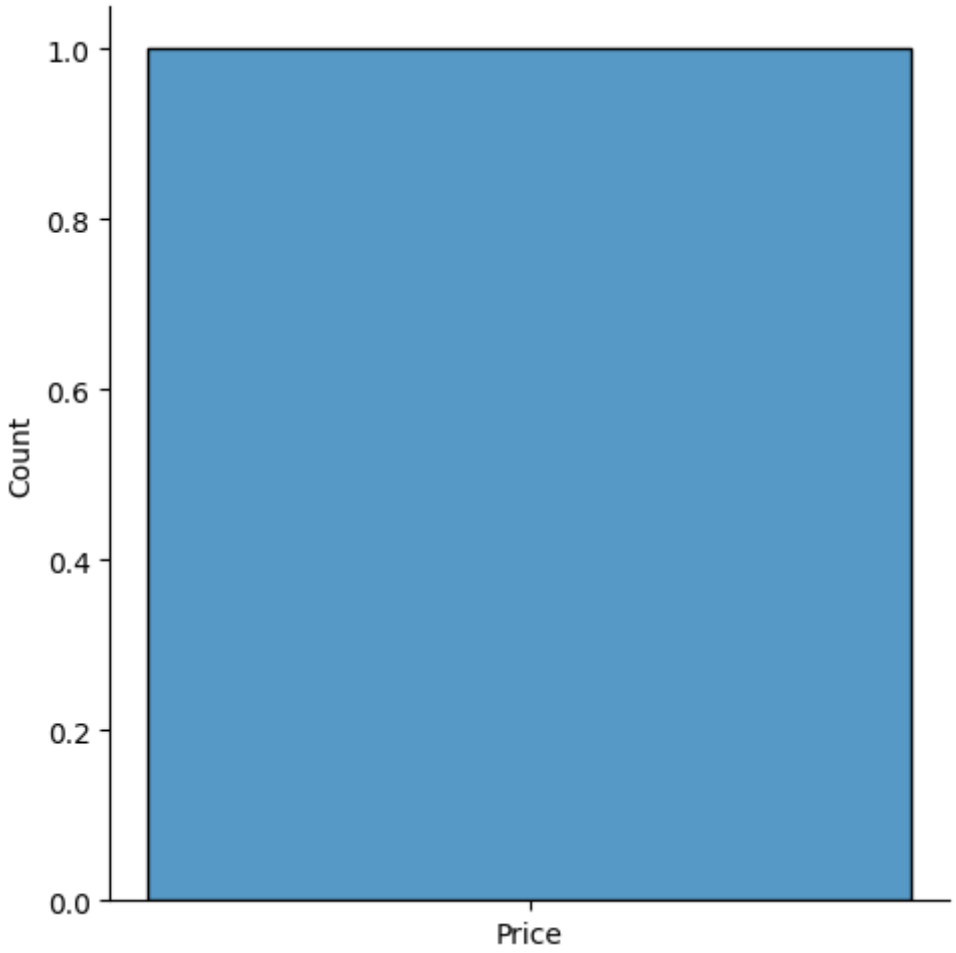


In [11]:

```
sns.displot(['Price'])
```

Out[11]:

```
<seaborn.axisgrid.FacetGrid at 0x174ca43dbd0>
```

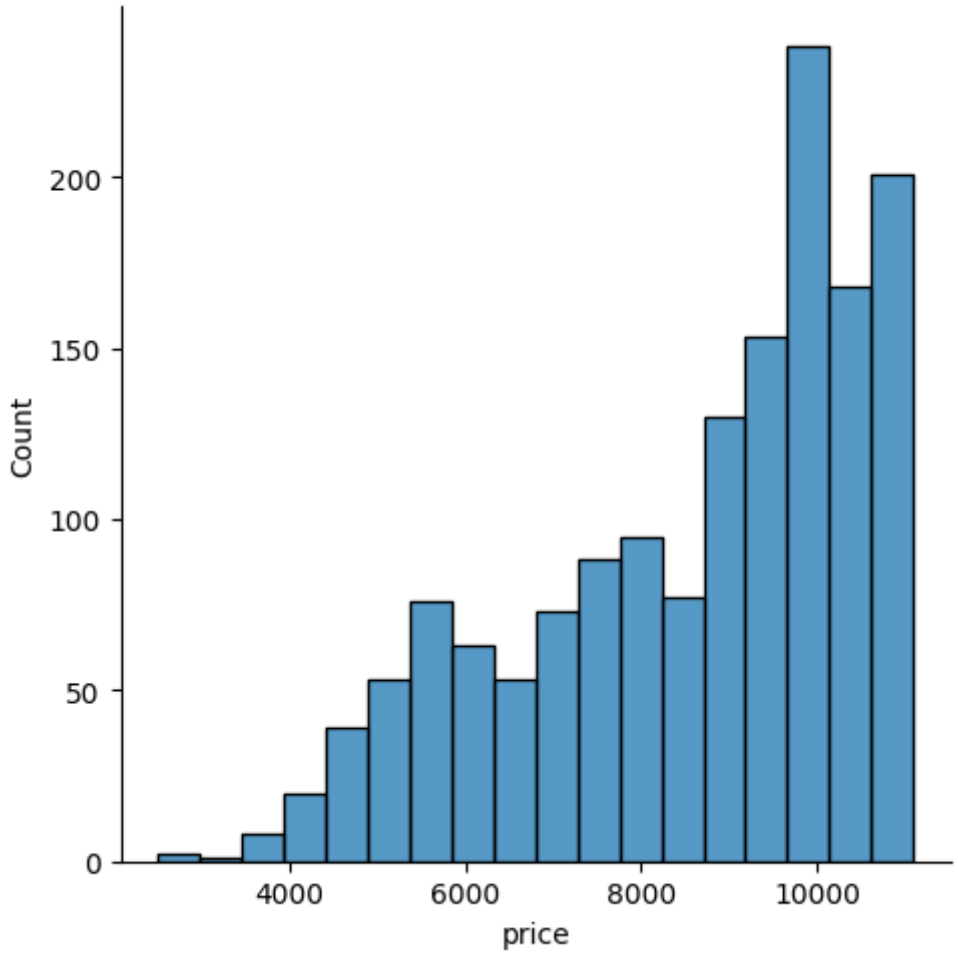


In [12]:

```
sns.displot(df['price'])
```

Out[12]:

```
<seaborn.axisgrid.FacetGrid at 0x174a4ab7d30>
```

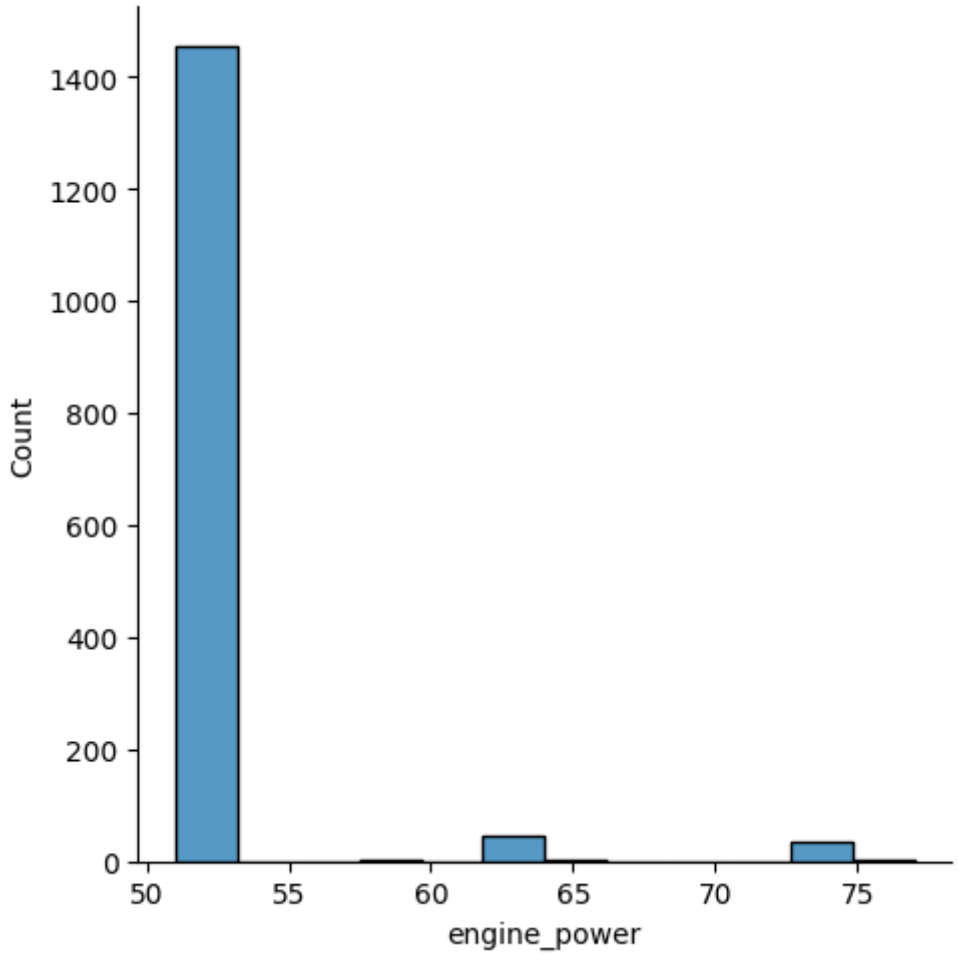


In [13]:

```
sns.displot(df['engine_power'])
```

Out[13]:

```
<seaborn.axisgrid.FacetGrid at 0x174ccc99b70>
```

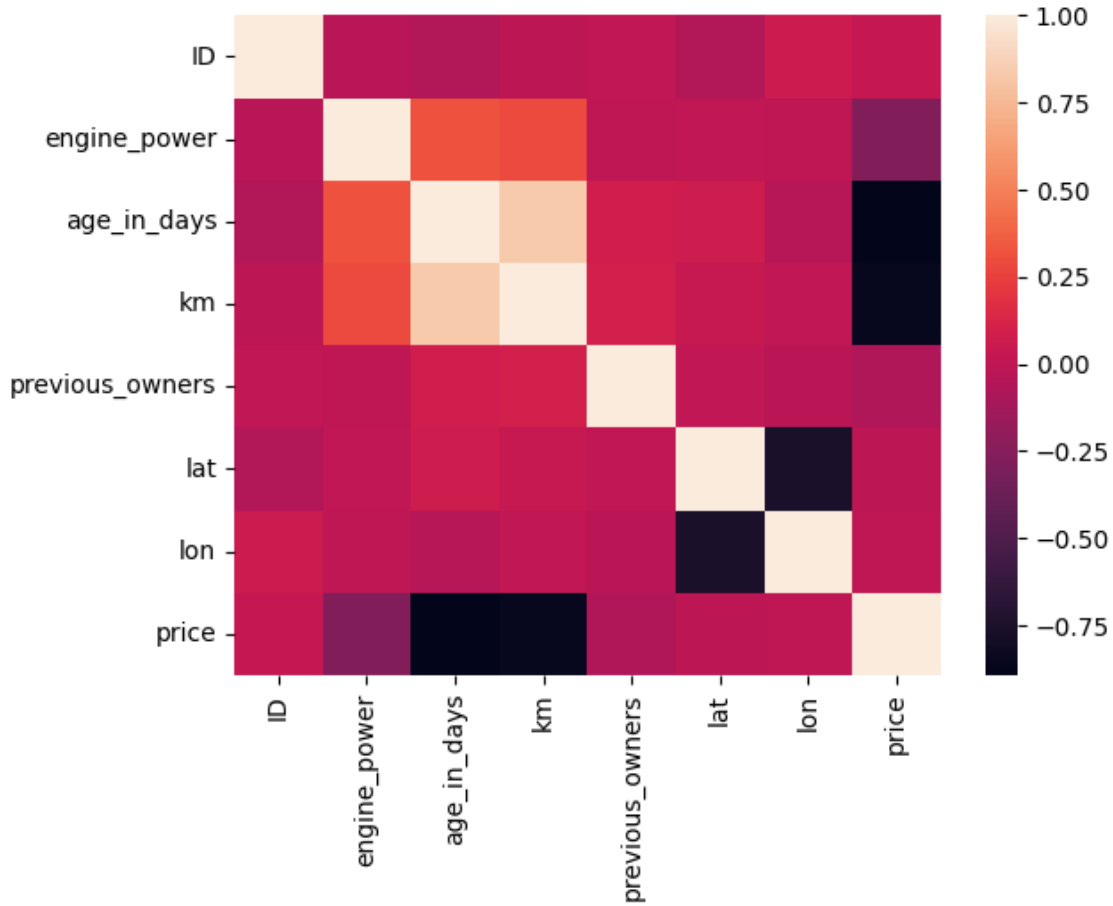


In [14]:

```
fiatdf=df[['ID', 'engine_power', 'age_in_days', 'km', 'previous_owners',
'lat', 'lon','price']]
sns.heatmap(fiatdf.corr())
```

Out[14]:

<Axes: >

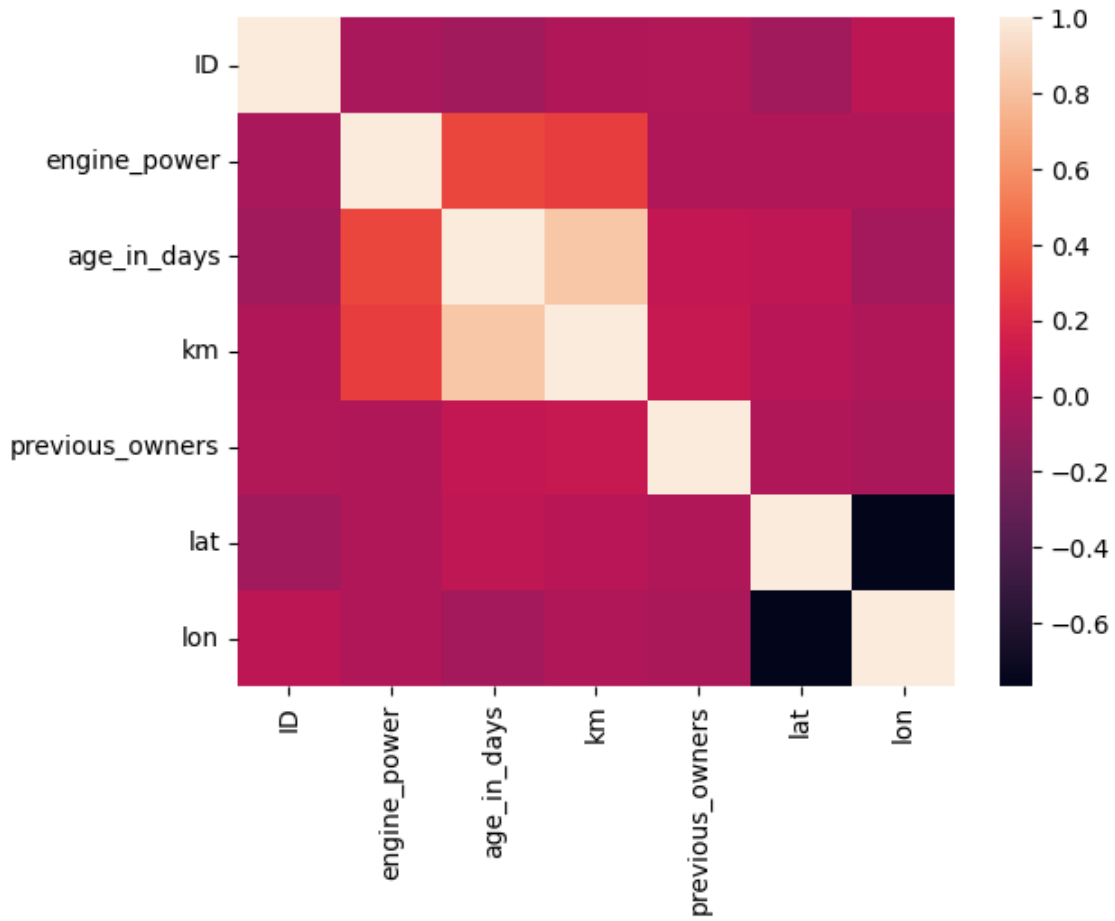


In [15]:

```
fiatdf=df[['ID', 'engine_power', 'age_in_days', 'km', 'previous_owners',
'lat', 'lon']]
sns.heatmap(fiatdf.corr())
```

Out[15]:

```
<Axes: >
```



In [16]:

```
X=fiatdf[['ID', 'engine_power', 'age_in_days', 'km', 'previous_owners',
'lat', 'lon']]
y=df['price']
```

In [17]:

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.3,random_state=101)
from sklearn.linear_model import LinearRegression
regr=LinearRegression()
regr.fit(X_train,y_train)
print(regr.intercept_)
```

```
8971.195683500262
```

In [18]:

```
coeff_df=pd.DataFrame(regr.coef_,X.columns,columns=['coefficient'])
coeff_df
```

Out[18]:

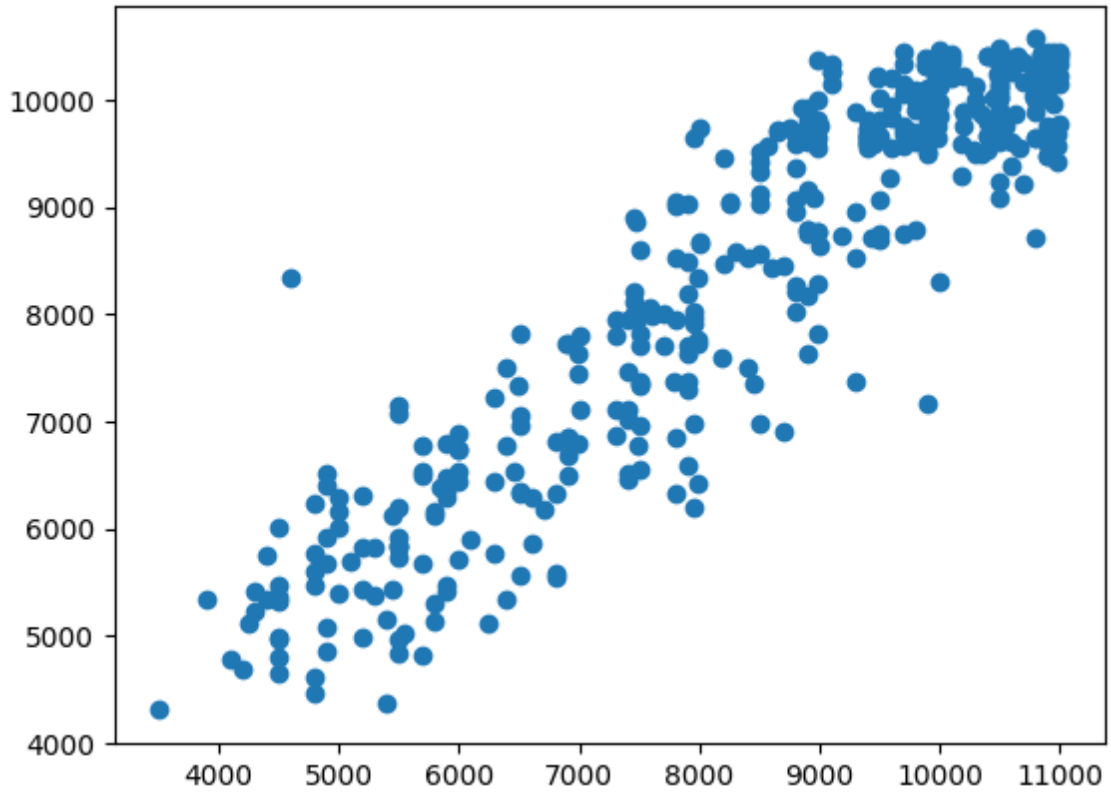
	coefficient
ID	-0.046704
engine_power	11.646408
age_in_days	-0.898018
km	-0.017232
previous_owners	26.400886
lat	32.189709
lon	0.161073

In [19]:

```
predictions=regr.predict(X_test)
plt.scatter(y_test,predictions)
```

Out[19]:

```
<matplotlib.collections.PathCollection at 0x174b3feaa40>
```

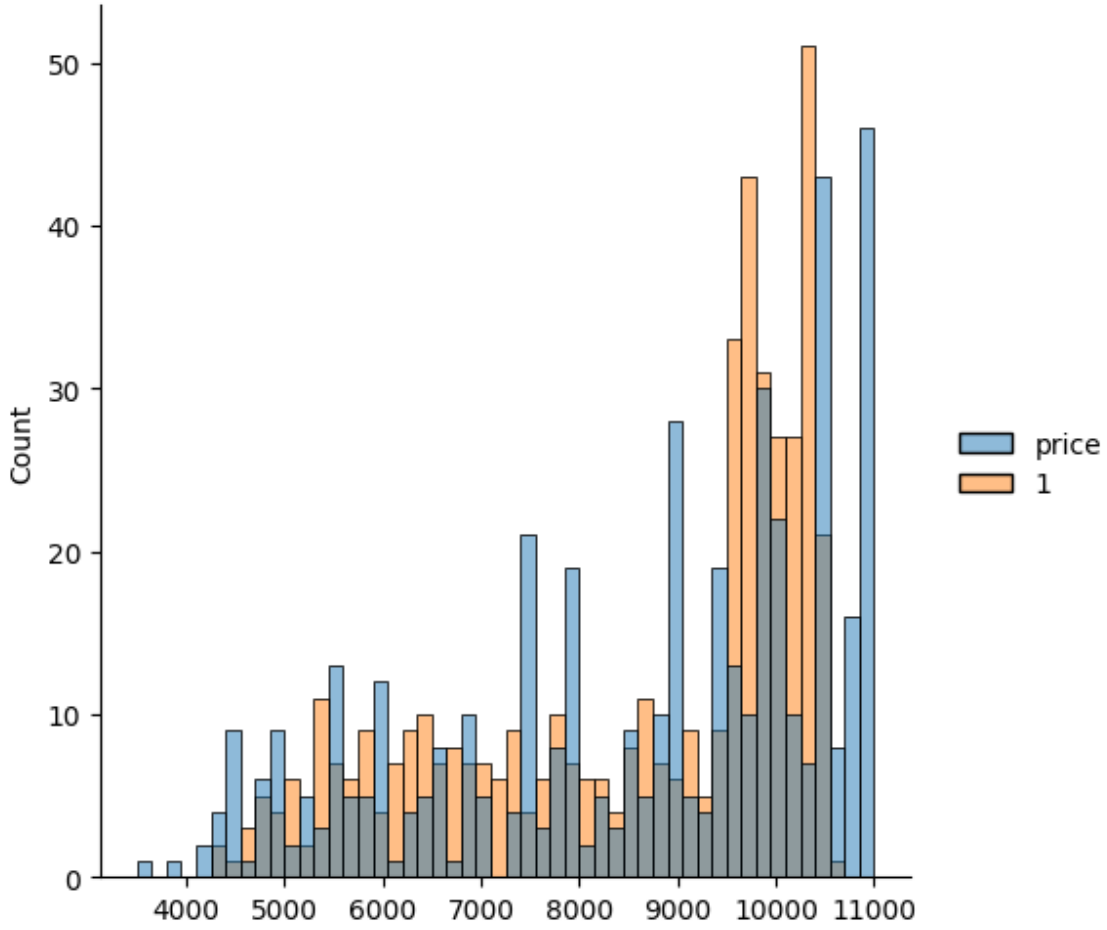


In [20]:

```
sns.displot((y_test,predictions),bins=50)
```

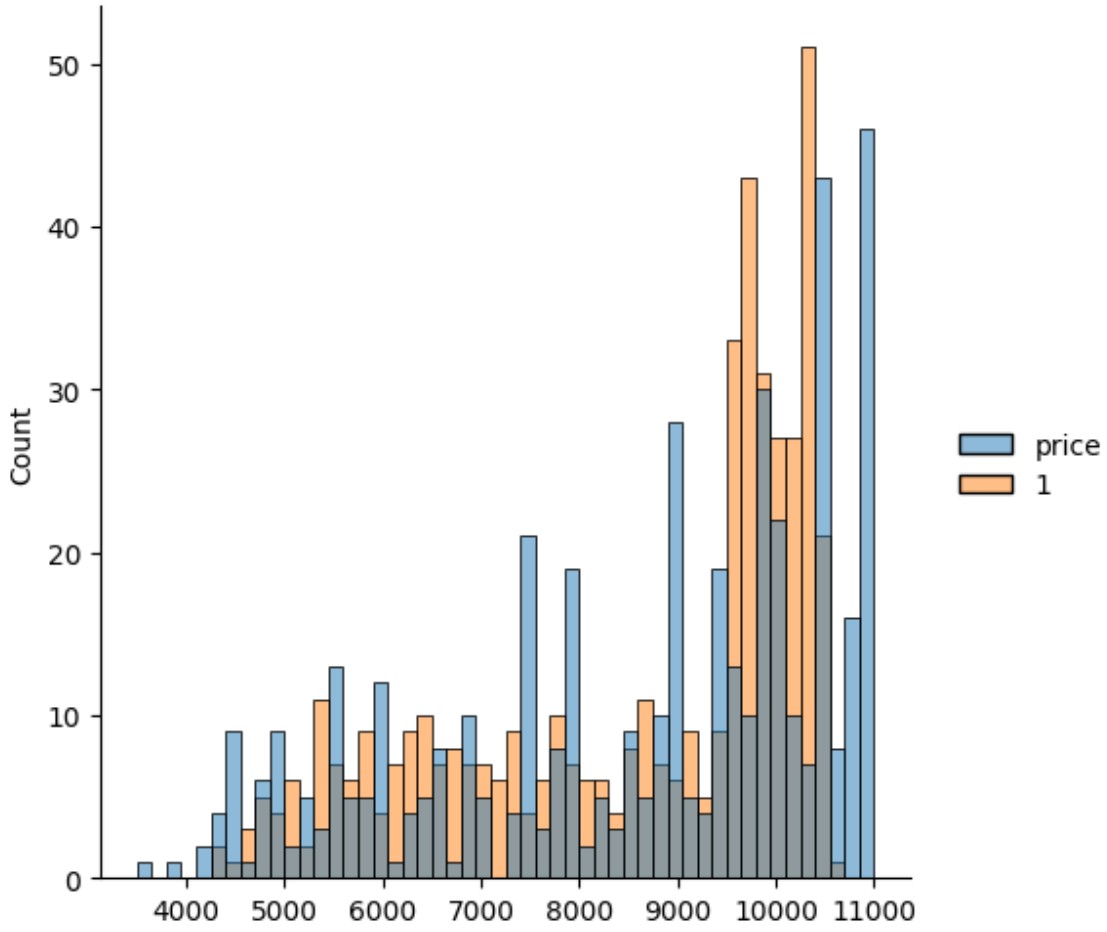
Out[20]:

```
<seaborn.axisgrid.FacetGrid at 0x174b3fbdb70>
```



In [22]:

```
sns.displot((y_test,predictions),bins=50);
```



In [23]:

```
from sklearn import metrics
print('MAE:',metrics.mean_absolute_error(y_test,predictions))
print('MSE:',metrics.mean_squared_error(y_test,predictions))
print('MAE:',np.sqrt(metrics.mean_squared_error(y_test,predictions)))
```

```
MAE: 593.0876179519996
MSE: 551442.6799691911
MAE: 742.59186635001
```

In [24]:

```
regr=LinearRegression()
regr.fit(X_train,y_train)
regr.fit(X_train,y_train)
print(regr.score(X_test,y_test))
```

```
0.859713670430884
```

In [25]:

```
df.fillna(method='ffill',inplace=True)
```

In [26]:

```
x=np.array(df['age_in_days']).reshape(-1,1)
y=np.array(df['km']).reshape(-1,1)
df.dropna(inplace=True)
```

In [27]:

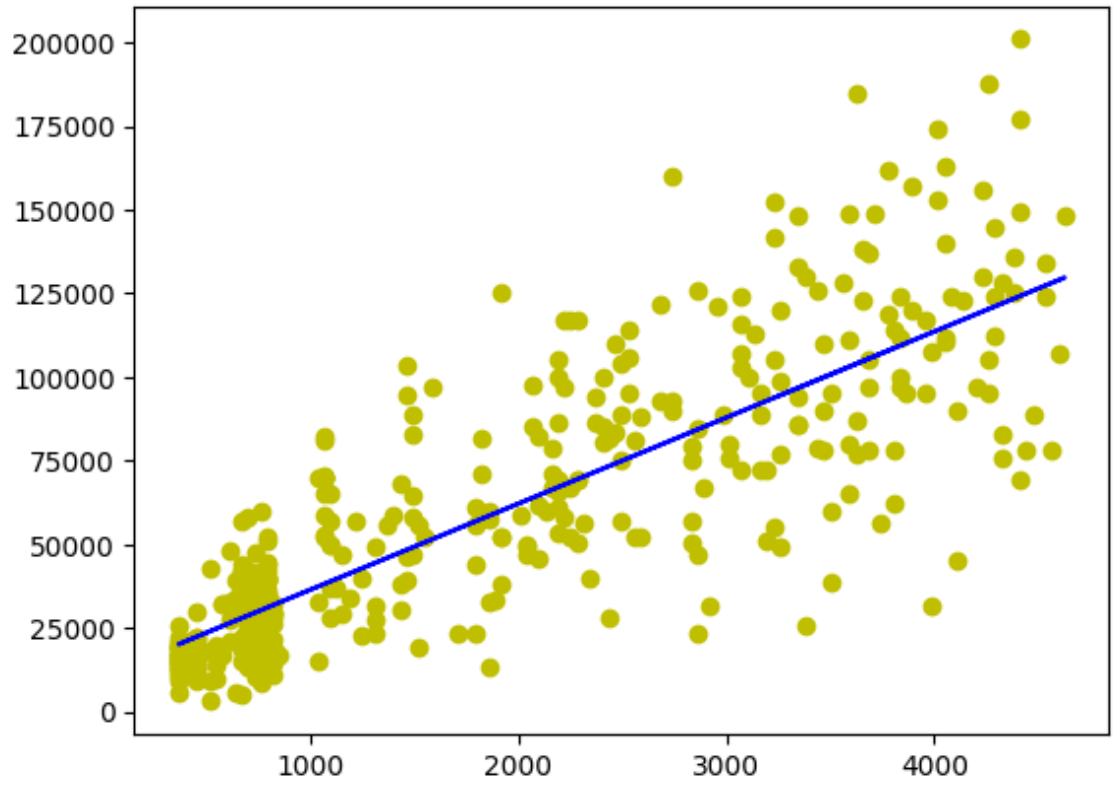
```
X_train,X_test,y_train,y_test=train_test_split(x,y,test_size=0.3)
regr.fit(X_train,y_train)
regr.fit(X_train,y_train)
```

Out[27]:

```
LinearRegression
LinearRegression()
```

In [28]:

```
y_pred=regr.predict(X_test)
plt.scatter(X_test,y_test,color='y')
plt.plot(X_test,y_pred,color='b')
plt.show()
```



In [29]:

```
from sklearn.linear_model import ElasticNet
regr=ElasticNet()
regr.fit(x,y)
print(regr.coef_)
print(regr.intercept_)
y_pred_elastic=regr.predict(X_train)
mean_squared_error=np.mean((y_pred_elastic-y_train)**2)
print("Mean Squared Error on test set",mean_squared_error)
```

```
[25.89689696]
[10640.73996329]
Mean Squared Error on test set 2673175755.9165087
```

In [ ]:

In [ ]:

In [ ]:

In [ ]: