problem statement

To find the best fit of the dataset

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 [2]:

```
df=pd.read_csv(r"C:\Users\LENOVO\Downloads\fiat500_VehicleSelection_Dataset (2
df
```

Out[2]:

	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
...	...	...	...	...	...	...	...	...
1533	1534	sport	51	3712	115280	1	45.069679	7.704920
1534	1535	lounge	74	3835	112000	1	45.845692	8.666870
1535	1536	pop	51	2223	60457	1	45.481541	9.413480
1536	1537	lounge	51	2557	80750	1	45.000702	7.682270
1537	1538	pop	51	1766	54276	1	40.323410	17.568270

1538 rows × 9 columns

In [3]:

```
df=df[['age_in_days','km']]
df.columns=['Age','Km']
```

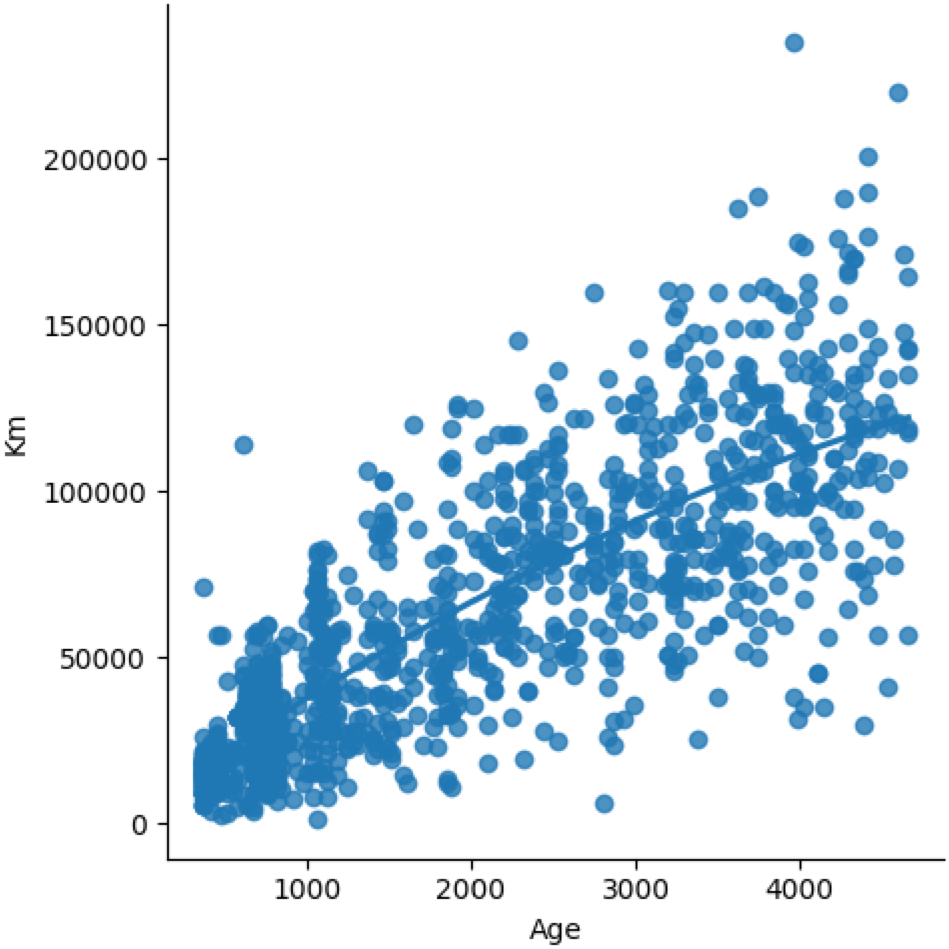
In [4]:
```
df.head(10)
```

Out[4]:

	Age	Km
0	882	25000
1	1186	32500
2	4658	142228
3	2739	160000
4	3074	106880
5	3623	70225
6	731	11600
7	1521	49076
8	4049	76000
9	3653	89000

In [5]:
```
sns.lmplot(x="Age",y="Km",data=df,order=2,ci=None)
```

Out[5]:
```
<seaborn.axisgrid.FacetGrid at 0x11b30832110>
```



In [6]:
```
df.describe()
```

Out[6]:

	Age	Km
count	1538.000000	1538.000000
mean	1650.980494	53396.011704
std	1289.522278	40046.830723
min	366.000000	1232.000000
25%	670.000000	20006.250000
50%	1035.000000	39031.000000
75%	2616.000000	79667.750000
max	4658.000000	235000.000000

In [7]:
```
df.fillna(method='ffill',inplace=True)
```

```
C:\Users\LENOVO\AppData\Local\Temp\ipykernel_6124\3337295870.py:1: SettingWit
hCopyWarning:
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/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (https://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver
sus-a-copy)
  df.fillna(method='ffill',inplace=True)
```

In [8]:
```
df.info()
```

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

In [9]:
```
df.fillna(method='ffill',inplace=True)
```

```
C:\Users\LENOVO\AppData\Local\Temp\ipykernel_6124\4116506308.py:1: SettingWit
hCopyWarning:
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/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (https://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver
sus-a-copy)
  df.fillna(method='ffill',inplace=True)
```

In [10]:
```
x=np.array(df['Age']).reshape(-1,1)
y=np.array(df['Km']).reshape(-1,1)
```

In [11]:
```
df.dropna(inplace=True)
```

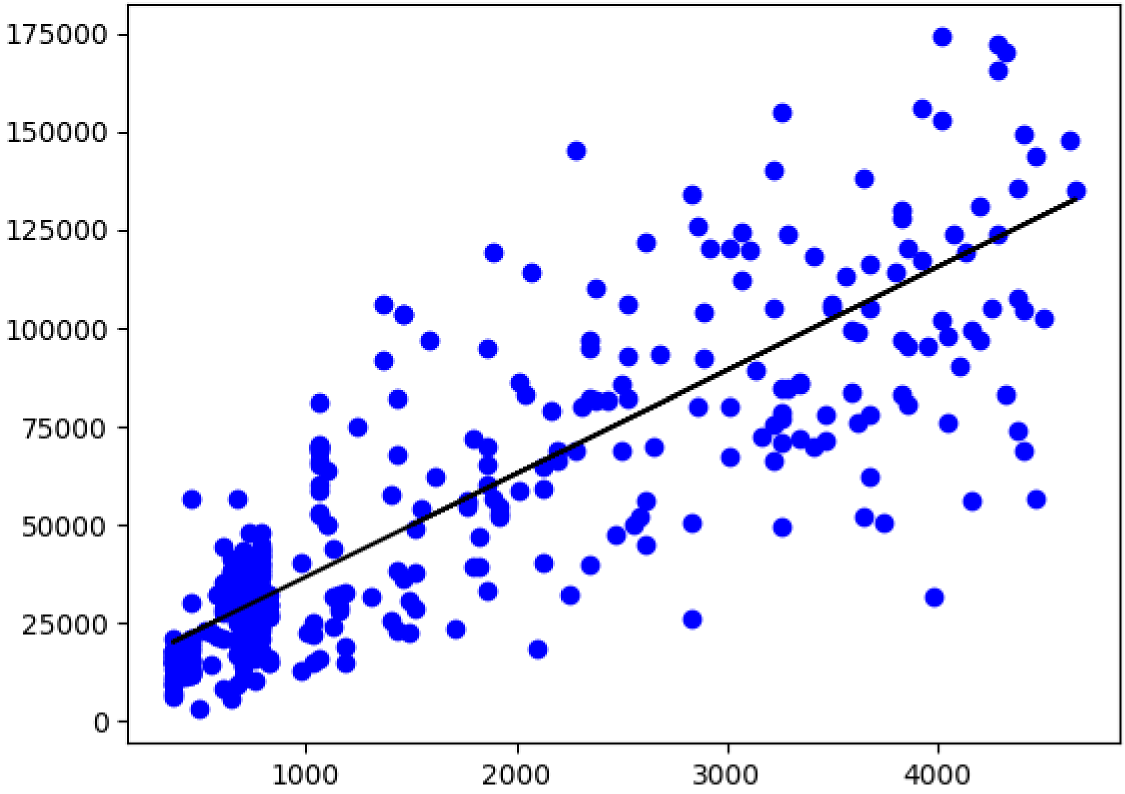
```
C:\Users\LENOVO\AppData\Local\Temp\ipykernel_6124\1379821321.py:1: SettingWit
hCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

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

In [12]:
```
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))
```

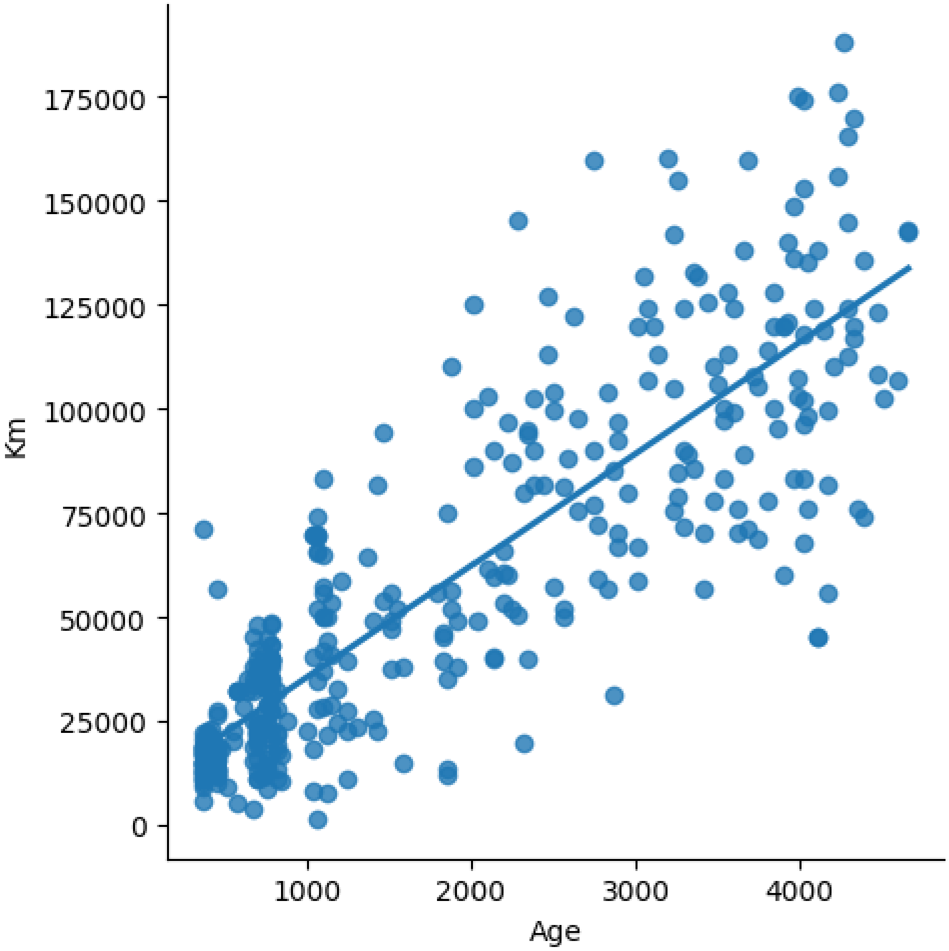
```
0.6946203593238638
```

In [13]:
```
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 [14]:
```
df400=df[:][:400]
sns.lmplot(x="Age",y="Km",data=df400,order=1,ci=None)
```

Out[14]:
```
<seaborn.axisgrid.FacetGrid at 0x11b40315550>
```



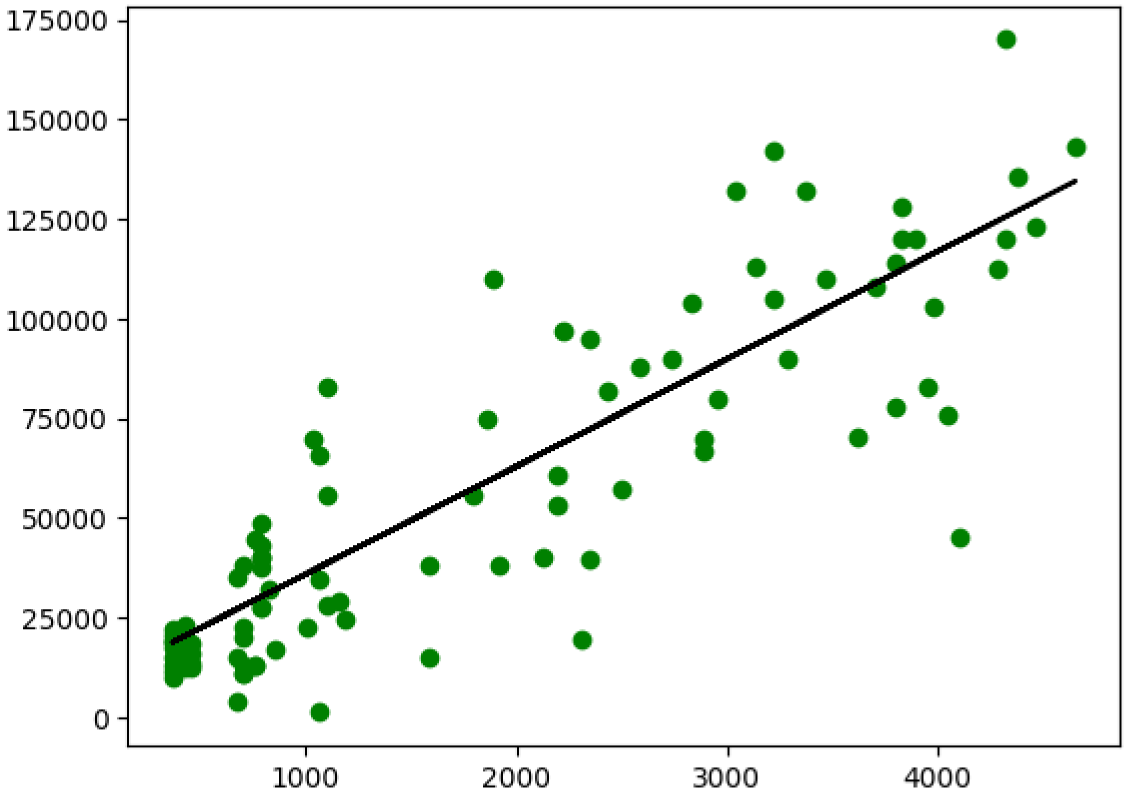
In [15]:
```
x=np.array(df400['Age']).reshape(-1,1)
y=np.array(df400['Km']).reshape(-1,1)
```

In [16]:
```
df400.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))
```

```
Regression: 0.7615536976421272
```

In [17]:

```
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='g')
plt.plot(x_test,y_pred,color='k')
plt.show()
```



In [18]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
model=LinearRegression()
model.fit(x_train,y_train)
```

Out[18]:

```
▾ LinearRegression
LinearRegression()
```

In [19]:

```
y_pred=model.predict(x_test)
r2=r2_score(y_test,y_pred)
print("r2 score:",r2)
```

```
r2 score: 0.7615536976421272
```

# conclusion:

This is the best fit dataset since we got accuracy value is 76%.