In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
cars = pd.read_csv("final_cars.csv")
```

In [3]:

```
y=cars['price']
X=cars.drop(columns=['price'])
```

In [4]:

```
X=pd.get_dummies(X)
```

In [5]:

```
X.shape
```

Out[5]:

```
(201, 37)
```

In [6]:

```
from sklearn.model_selection import GridSearchCV
from sklearn.ensemble import RandomForestRegressor
from sklearn.model_selection import train_test_split
```

Set aside some data for testing

In [7]:

```
X_train, X_test, y_train, y_test = train_test_split(X,y, test_size=0.2, random_state=99)
```

In [19]:

```
model=RandomForestRegressor()
params_grid=[{'n_estimators':[10,20,30],'max_depth':[2,3,4]}]
```

In [20]:

```
grid_search=GridSearchCV(model,params_grid,cv=5)
grid_search.fit(X_train,y_train)
```

Out[20]:

```
GridSearchCV(cv=5, estimator=RandomForestRegressor(),
             param_grid=[{'max_depth': [2, 3, 4],
                          'n_estimators': [10, 20, 30]}])
```

In [21]:

```
## display scores
results = grid_search.cv_results_
for score,param in zip(results['mean_test_score'], results['params']):
      print(score,param)
```

```
0.8361772467279962 {'max_depth': 2, 'n_estimators': 10}
0.8320222585199872 {'max_depth': 2, 'n_estimators': 20}
0.8295776535522655 {'max_depth': 2, 'n_estimators': 30}
0.8198113892026878 {'max_depth': 3, 'n_estimators': 10}
0.8326232623513949 {'max_depth': 3, 'n_estimators': 20}
0.8479513214167522 {'max_depth': 3, 'n_estimators': 30}
0.8065789398241195 {'max_depth': 4, 'n_estimators': 10}
0.8398351981647927 {'max_depth': 4, 'n_estimators': 20}
0.8229384243167465 {'max_depth': 4, 'n_estimators': 30}
```

In [22]:

```
grid_search.best_params_
```

Out[22]:

```
{'max_depth': 3, 'n_estimators': 30}
```

In [23]:

```
grid_search.best_score_
```

Out[23]:

```
0.8479513214167522
```

In [24]:

```
grid_search.best_estimator_
```

Out[24]:

```
RandomForestRegressor(max_depth=3, n_estimators=30)
```

Build model with best estimator

In [25]:

```
model = grid_search.best_estimator_
```

In [26]:

```python
y_pred = model.predict(X_test)
```

In [27]:

```python
from sklearn.metrics import mean_squared_error, r2_score
mse = mean_squared_error(y_test,y_pred)
```

In [28]:

```python
r2_score(y_test,y_pred)
```

Out[28]:

```
0.9291307092284495
```

In [29]:

```python
np.sqrt(mse)
```

Out[29]:

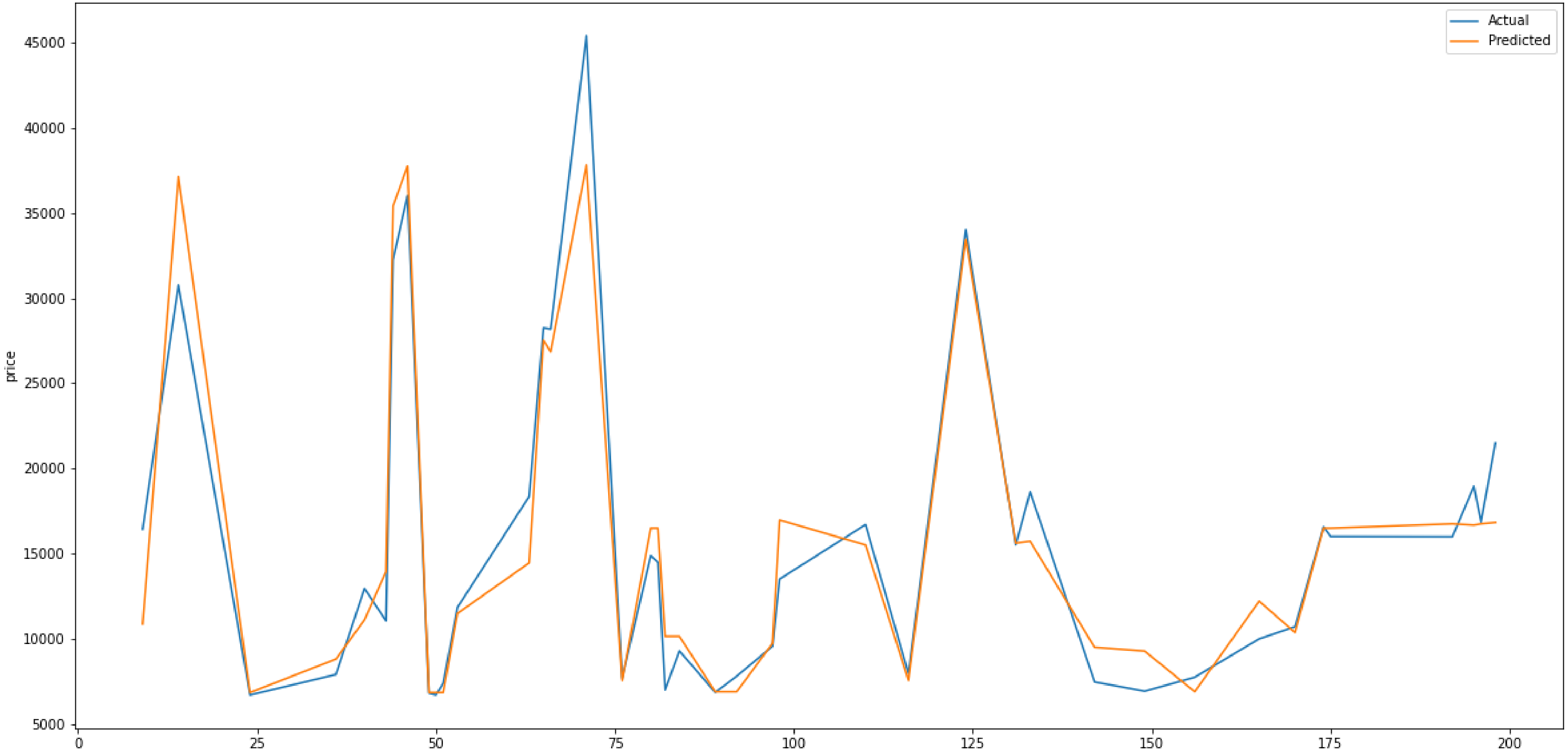
```
2499.763936062209
```

In [30]:

```python
# Compare actual and predicted values
plt.gcf().set_size_inches(20,10)
sns.lineplot( y = y_test, x = X_test.index, label="Actual")
sns.lineplot( y = y_pred, x = X_test.index, label="Predicted")
```

Out[30]:

```
<AxesSubplot:ylabel='price'>
```


Actual
Predicted
price
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
25
50
75
100
125
150
175
200

```
In [ ]:
```