Lion Nose Color (Linear Regression)

Can you estimate a lion's age from a photograph of its nose?

Lions are born with pink noses that gradually darken with age, developing black freckles until they eventually turn completely black.

The dataset `lion-nose-color.csv` contains data on 91 lions from the Serengeti, each monitored by researchers since birth. Because their exact ages are known, researchers can analyze photographs to determine the percentage of black on their noses and assess how well nose coloration predicts age.

Overview of the data frame

```
1  import pandas as pd
2  import matplotlib.pyplot as plt
3  from linear_model import LinearModel
4
5  df = pd.read_csv('lion-nose-color.csv')
6  df.head()
```

✓ 6.9s

	age	proportion_black
0	1.10	21.1
1	4.19	34.9
2	1.91	26.8
3	8.16	84.8
4	7.32	47.9

Project Ideas

- Create a linear regression model to predict `age` from `proportion_black`

- Use the model to estimate a lion's age when its nose is 50% black.

- Can you determine a lion's age when its nose is 100% black? Why or why not?

```
def clean_axes( ):
    ax = plt.gca()
    ax.spines[['top', 'left', 'right']].set_visible(False)
    ax.grid(axis='y', alpha=0.5)
    ax.tick_params(axis='y', length=0)


# Linear model API
linear = LinearModel()
linear.fit(df['age'], df['proportion_black'])
linear.predict(df['proportion_black'])
linear.plot_model(df['age'].min(), df['age'].max(), color="black")
linear.print_model_info()


plt.xlabel('Age (years)')
plt.ylabel('Proportion of Black Nose')
plt.title('Lion Nose Color vs Age')
plt.scatter(df['age'], df['proportion_black'], color='blue', label='Data')
plt.axhline(y=50, color='orange', linestyle='--')
clean_axes( )
```

Explanation of the code:

The function clean_axes() is a function that will just clean the graph to be much readable as a whole. Using the Linear model from linear_model.py, fitting the data frame into the model is the first thing to do, train the model. Predict is coded next, this will predict the ages of the lions based on their nose's proportion of color black.

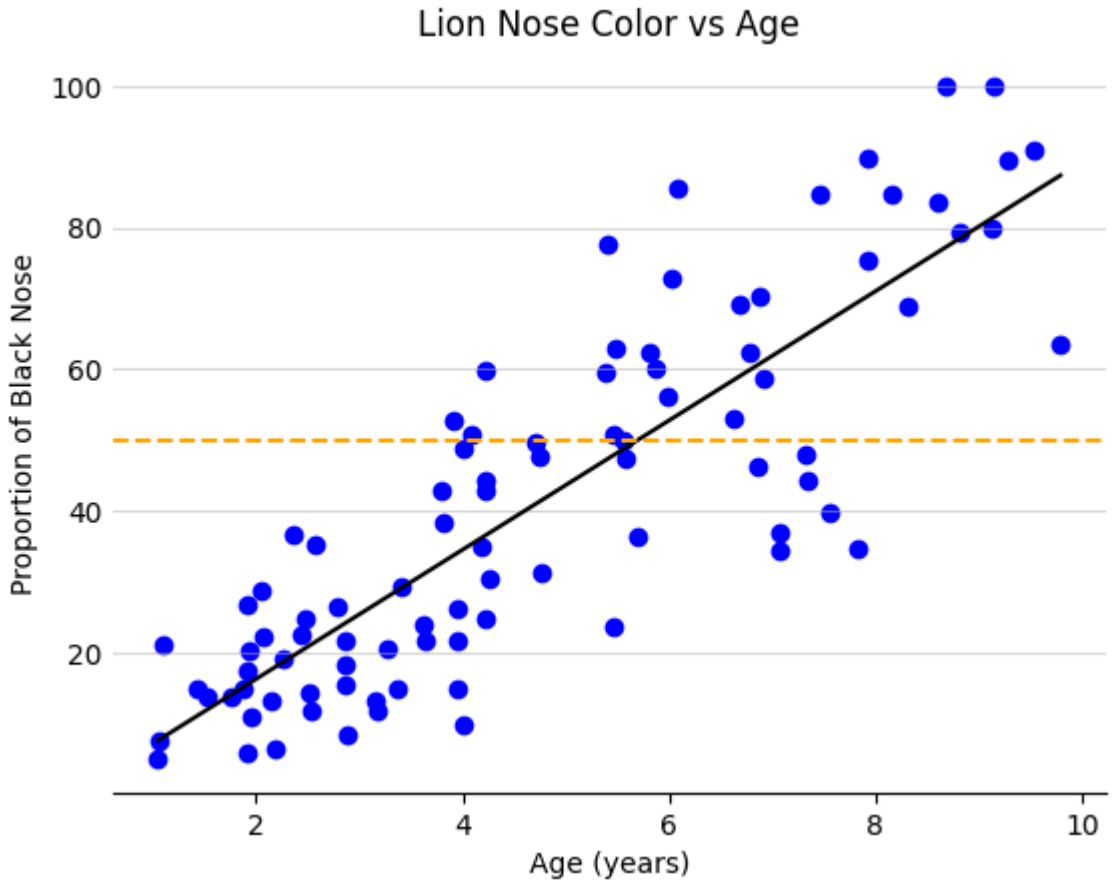
Then the rest are codes to plot the regression line and the scatter plot.

LinearModel():

Slope: 9.130711064490434

Intercept: -2.019842094958477

R-squared: 0.7184884343030966



Use the model to estimate a lion's age when its nose is 50% black.

The estimated age range of lions when its nose gets 50% black is around 4 to 6.

Can you determine a lion's age when its nose is 100% black? Why or why not?

Using this data, we cannot determine the age of a lion based on a fully black-colored nose. Because, even when if we can say that as the lion ages, it's nose color proportion also increases. However, it's not a consistent metric that we can use to identify age. There are lions that achieves 100% black color proportion at a younger age and some can't even reach it at age 10.

So, before we can truly confirm, we need to consider other variable in order predict a lion's age.