Sure! Here's an **ELI5** example using a **scikit-learn** model. Let's say we have a simple **logistic regression** model trained on the **Iris dataset** and want to explain the predictions using the eli5 library.

**Step-by-Step Guide**

1. **Install ELI5**: If you don’t have eli5 installed, you can do so using:
2. pip install eli5
3. **Prepare the Data and Train a Model**:

Let's load the Iris dataset and train a logistic regression model using scikit-learn.

import numpy as np

import pandas as pd

from sklearn import datasets

from sklearn.model\_selection import train\_test\_split

from sklearn.linear\_model import LogisticRegression

from sklearn.preprocessing import StandardScaler

import eli5

from eli5.sklearn import PermutationImportance

# Load the Iris dataset

iris = datasets.load\_iris()

X = iris.data

y = iris.target

# Split into training and test sets

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

# Standardize features

scaler = StandardScaler()

X\_train = scaler.fit\_transform(X\_train)

X\_test = scaler.transform(X\_test)

# Train a Logistic Regression model

model = LogisticRegression(max\_iter=200)

model.fit(X\_train, y\_train)

1. **Explain the Model with ELI5**:

Now, let's use eli5 to explain the predictions.

# Use ELI5 to explain the model's coefficients

eli5.show\_weights(model, feature\_names=iris.feature\_names)

This will output a table with the weights (coefficients) assigned to each feature (e.g., sepal length, sepal width, etc.), and show how each feature contributes to the model's prediction.

1. **Permutation Importance**:

You can also use **Permutation Importance** from eli5 to determine how important each feature is for the model's predictions by randomly shuffling the features and measuring the performance drop.

# Compute permutation importance to see feature importance

perm = PermutationImportance(model, random\_state=42).fit(X\_test, y\_test)

eli5.show\_weights(perm, feature\_names=iris.feature\_names)

This will show which features are most important for the model by observing how much the accuracy drops when the feature values are permuted (randomized).

**Explanation:**

* **eli5.show\_weights()**: This function will display the weights of each feature in the model. For a logistic regression, this is essentially showing the model coefficients (how much each feature contributes to the final prediction).
* **Permutation Importance**: This helps us understand which features affect the model's predictions the most by testing how the model’s performance changes when features are randomly shuffled.

**Example Output:**

If you run the eli5.show\_weights() code, you might see something like this:

Feature weights (top 10 features):

Feature Weight

----------------------------

sepal length (cm) 0.768

sepal width (cm) -0.234

petal length (cm) 1.456

petal width (cm) 1.021

This tells you which features are driving the model's predictions and how much they contribute. Higher weights mean more influence.

Let me know if you'd like further clarification or help with another example!