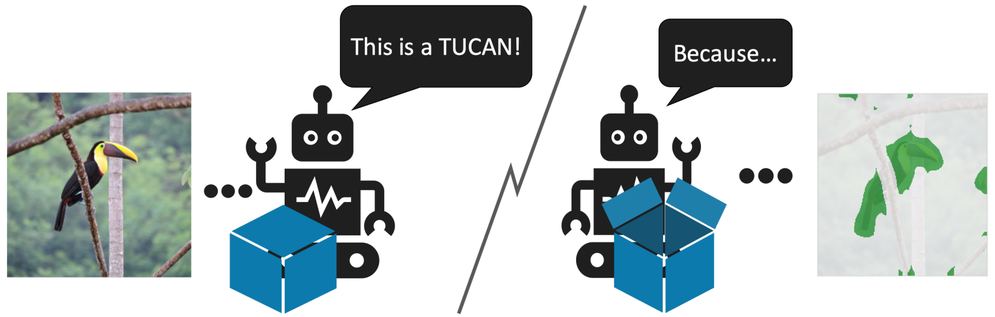
1 2 3 4 5 6 7 8 9 10 11 12 13 14

# EBANO - EXPLAINING BLACK-BOX MODELS

## User survey

Given an image and the object recognized by an AI model, EBAnO identifies the portions of the image leading to that recognition




Start

1 2 3 4 5 6 7 8 9 10 11 12 13 14

# EBANO - SURVEY

## Some information about you...

The form is completely anonymous!

**How old are you?**

- 0-18
- 19-24
- 25-29
- 30+

**Your education level?**

- Bachelor degree
- Master degree
- PhD
- Other

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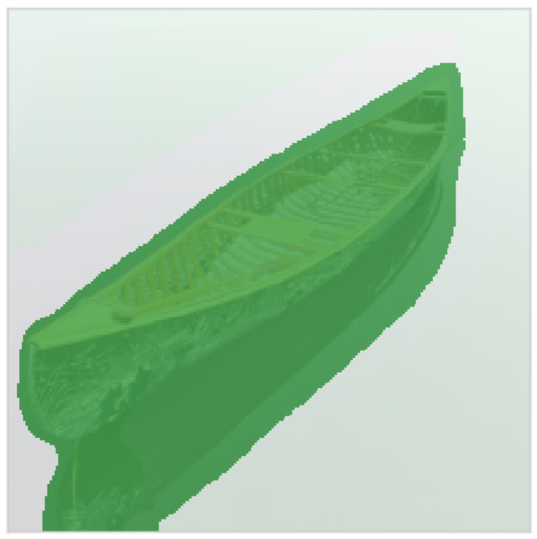
# EXPLANATION 1 - CANOE

The **BLACK-BOX** model prediction is **canoe** with a probability of **88.128%**.

## Why is it a **canoe**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **canoe**.




**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **canoe**?

- ○ Yes, the green areas are representing **canoe**
- ○ Partially, the green areas are partially representing **canoe**
- ○ No, the green areas are **not** representing **canoe**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

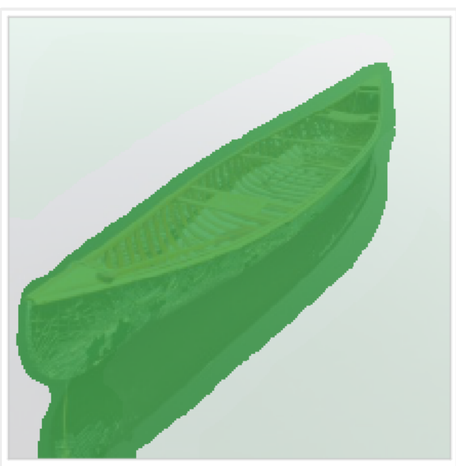
**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **canoe**?

- ○ The red areas are **NOT IMPORTANT** for **canoe**
- ○ The red areas are **important** for **canoe**
- ○ I do not know.
- ○ Not Available (there are no red areas)

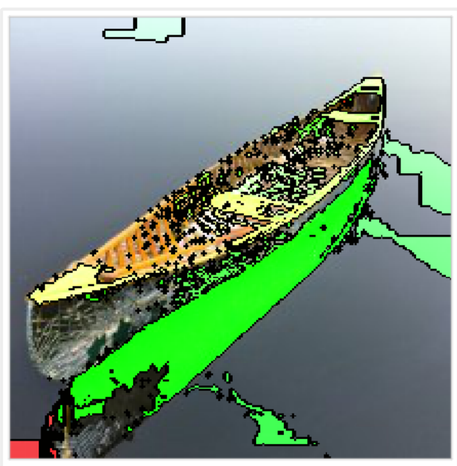
## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **canoe**?

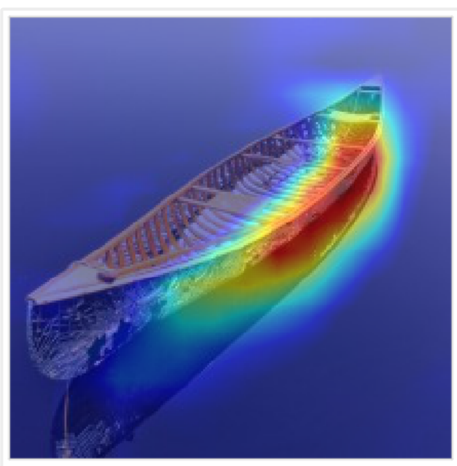
You can select more than one image.




↑ **EBAnO**
**GREEN** areas are positive for class **canoe.**
**RED** areas are negative for class **canoe.**




↑ **LIME**
**GREEN** areas are positive for class **canoe.**
**RED** areas are negative for class **canoe.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **canoe.**
The most the area is close to **RED** color, the most it is important for class **canoe.**

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# EXPLANATION 2 - ACOUSTIC_GUITAR

The **BLACK-BOX** model prediction is **acoustic_guitar** with a probability of **21.707%**.

Why is it a **acoustic_guitar**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **acoustic_guitar**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **acoustic_guitar**?

- ○ Yes, the green areas are representing **acoustic_guitar**
- ○ Partially, the green areas are partially representing **acoustic_guitar**
- ○ No, the green areas are **not** representing **acoustic_guitar**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **acoustic_guitar**?

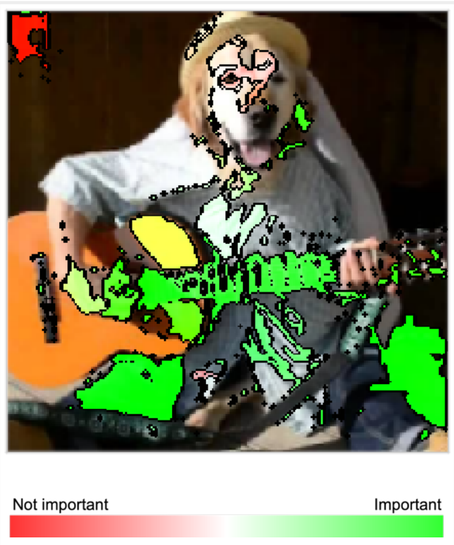
- ○ The red areas are **NOT IMPORTANT** for **acoustic_guitar**
- ○ The red areas are **important** for **acoustic_guitar**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

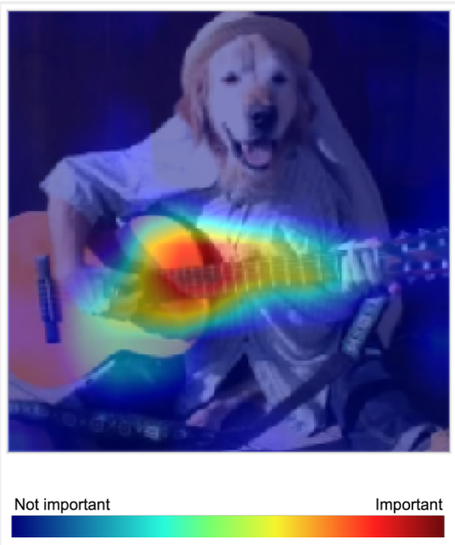
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **acoustic_guitar**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **acoustic_guitar.**
**RED** areas are negative for class **acoustic_guitar.**




↑ **LIME**
**GREEN** areas are positive for class **acoustic_guitar.**
**RED** areas are negative for class **acoustic_guitar.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **acoustic_guitar.**
The most the area is close to **RED** color, the most it is important for class **acoustic_guitar.**

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# EXPLANATION 3 - TOUCAN

The **BLACK-BOX** model prediction is **toucan** with a probability of **98.557%**.

## Why is it a **toucan**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **toucan**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **toucan**?

- ○ Yes, the green areas are representing **toucan**
- ○ Partially, the green areas are partially representing **toucan**
- ○ No, the green areas are **not** representing **toucan**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **toucan**?

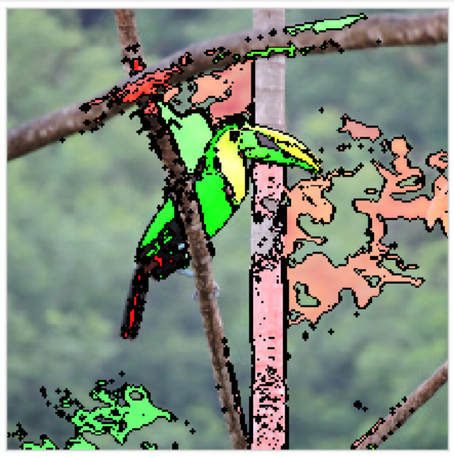
- ○ The red areas are **NOT IMPORTANT** for **toucan**
- ○ The red areas are **important** for **toucan**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **toucan**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **toucan.**
**RED** areas are negative for class **toucan.**




↑ **LIME**
**GREEN** areas are positive for class **toucan.**
**RED** areas are negative for class **toucan.**


↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **toucan.**
The most the area is close to **RED** color, the most it is important for class **toucan.**

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# EXPLANATION 4 - MISSILE

The **BLACK-BOX** model prediction is **missile** with a probability of **22.547%**.

## Why is it a **missile**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **missile**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **missile**?

- ○ Yes, the green areas are representing **missile**
- ○ Partially, the green areas are partially representing **missile**
- ○ No, the green areas are **not** representing **missile**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **missile**?

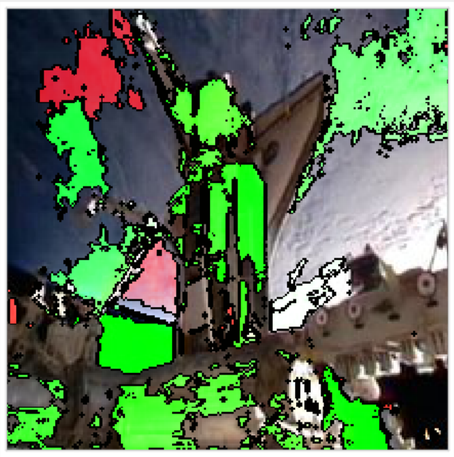
- ○ The red areas are **NOT IMPORTANT** for **missile**
- ○ The red areas are **important** for **missile**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

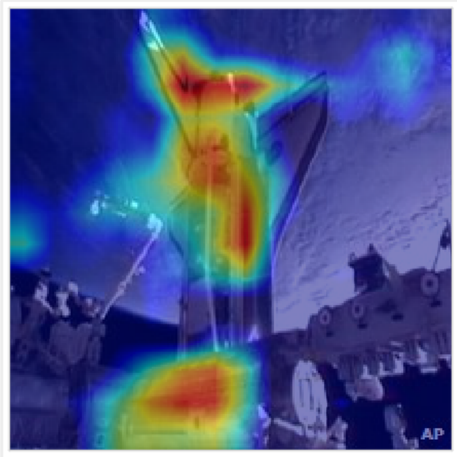
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **missile**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **missile.**
**RED** areas are negative for class **missile.**




↑ **LIME**
**GREEN** areas are positive for class **missile.**
**RED** areas are negative for class **missile.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **missile.**
The most the area is close to **RED** color, the most it is important for class **missile.**

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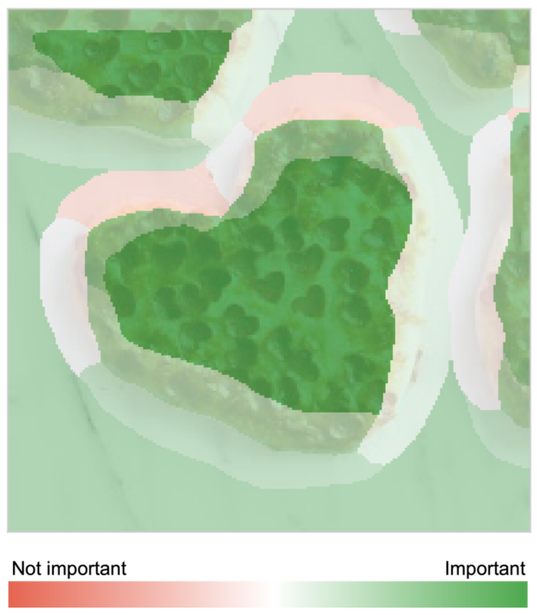
# EXPLANATION 5 - PIZZA

The **BLACK-BOX** model prediction is **pizza** with a probability of **48.39%**.

## Why is it a **pizza**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **pizza**.




**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **pizza**?

- ○ Yes, the green areas are representing **pizza**
- ○ Partially, the green areas are partially representing **pizza**
- ○ No, the green areas are **not** representing **pizza**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **pizza**?

- ○ The red areas are **NOT IMPORTANT** for **pizza**
- ○ The red areas are **important** for **pizza**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **pizza**?

You can select more than one image.


↑ **EBAnO**

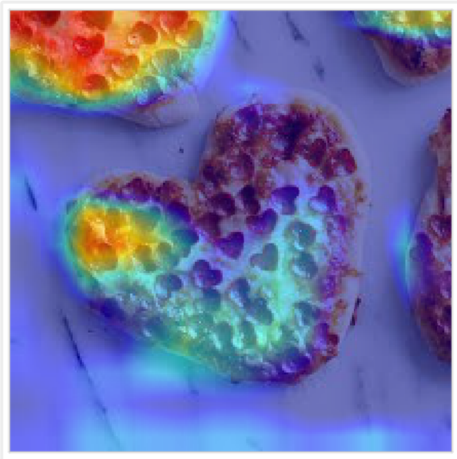
**GREEN** areas are positive for class **pizza.**

**RED** areas are negative for class **pizza.**


↑ **LIME**

**GREEN** areas are positive for class **pizza.**

**RED** areas are negative for class **pizza.**




↑ **GRAD-CAM**

Gradient saliency map from **BLUE** to **RED**.

**BLUE** areas are neutral for class **pizza.**

The most the area is close to **RED** color, the most it is important for class **pizza.**

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# EXPLANATION 6 - MOUNTAIN_BIKE


The **BLACK-BOX** model prediction is **mountain_bike** with a probability of **70.933%**.

## Why is it a **mountain_bike**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **mountain_bike**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **mountain_bike**?

- ○ Yes, the green areas are representing **mountain_bike**
- ○ Partially, the green areas are partially representing **mountain_bike**
- ○ No, the green areas are **not** representing **mountain_bike**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

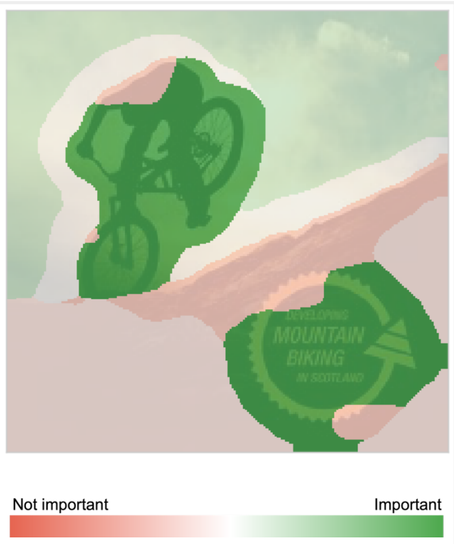
**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **mountain_bike**?

- ○ The red areas are **NOT IMPORTANT** for **mountain_bike**
- ○ The red areas are **important** for **mountain_bike**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

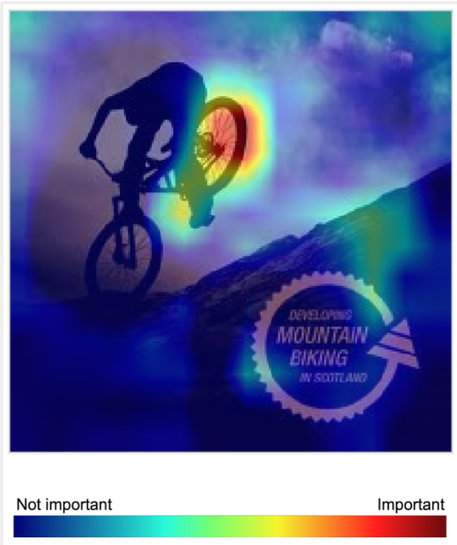
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **mountain_bike**?

You can select more than one image.




↑ **EBAnO**
**GREEN** areas are positive for class **mountain_bike.**
**RED** areas are negative for class **mountain_bike.**


↑ **LIME**
**GREEN** areas are positive for class **mountain_bike.**
**RED** areas are negative for class **mountain_bike.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **mountain_bike.**
The most the area is close to **RED** color, the most it is important for class **mountain_bike.**

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# EXPLANATION 7 - SCUBA_DIVER

The **BLACK-BOX** model prediction is **scuba_diver** with a probability of **87.322%**.

Why is it a **scuba_diver**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **scuba_diver**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **scuba_diver**?

- ○ Yes, the green areas are representing **scuba_diver**
- ○ Partially, the green areas are partially representing **scuba_diver**
- ○ No, the green areas are **not** representing **scuba_diver**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **scuba_diver**?

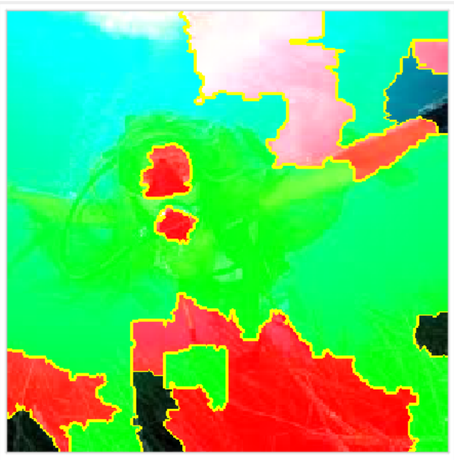
- ○ The red areas are **NOT IMPORTANT** for **scuba_diver**
- ○ The red areas are **important** for **scuba_diver**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

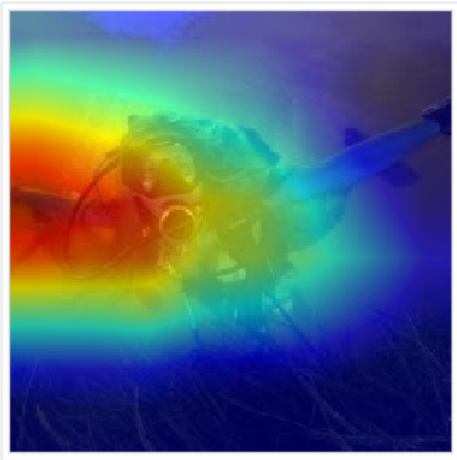
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **scuba_diver**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **scuba_diver.**
**RED** areas are negative for class **scuba_diver.**




↑ **LIME**
**GREEN** areas are positive for class **scuba_diver.**
**RED** areas are negative for class **scuba_diver.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **scuba_diver.**
The most the area is close to **RED** color, the most it is important for class **scuba_diver.**

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# EXPLANATION 8 - ACOUSTIC_GUITAR

The **BLACK-BOX** model prediction is **acoustic_guitar** with a probability of **79.722%**.

Why is it a **acoustic_guitar**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **acoustic_guitar**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **acoustic_guitar**?

- ○ Yes, the green areas are representing **acoustic_guitar**
- ○ Partially, the green areas are partially representing **acoustic_guitar**
- ○ No, the green areas are **not** representing **acoustic_guitar**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **acoustic_guitar**?

- ○ The red areas are **NOT IMPORTANT** for **acoustic_guitar**
- ○ The red areas are **important** for **acoustic_guitar**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **acoustic_guitar**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **acoustic_guitar.**
**RED** areas are negative for class **acoustic_guitar.**


↑ **LIME**
**GREEN** areas are positive for class **acoustic_guitar.**
**RED** areas are negative for class **acoustic_guitar.**


↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **acoustic_guitar.**
The most the area is close to **RED** color, the most it is important for class **acoustic_guitar.**

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# EXPLANATION 9 - ESKIMO_DOG

The **BLACK-BOX** model prediction is **Eskimo_dog** with a probability of **62.406%**.

Why is it a **Eskimo_dog**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **Eskimo_dog**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **Eskimo_dog**?

- ○ Yes, the green areas are representing **Eskimo_dog**
- ○ Partially, the green areas are partially representing **Eskimo_dog**
- ○ No, the green areas are **not** representing **Eskimo_dog**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **Eskimo_dog**?

- ○ The red areas are **NOT IMPORTANT** for **Eskimo_dog**
- ○ The red areas are **important** for **Eskimo_dog**
- ○ I do not know.
- ○ Not Available (there are no red areas)

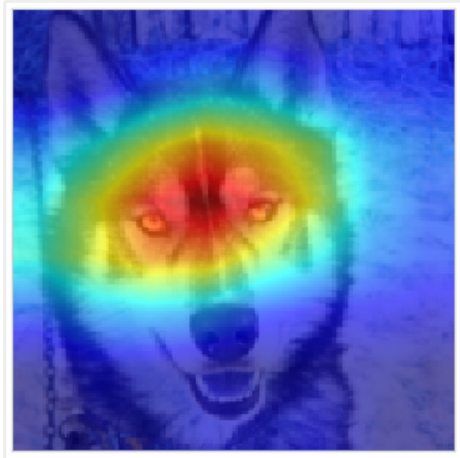
## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **Eskimo_dog**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **Eskimo_dog.**
**RED** areas are negative for class **Eskimo_dog.**


↑ **LIME**
**GREEN** areas are positive for class **Eskimo_dog.**
**RED** areas are negative for class **Eskimo_dog.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **Eskimo_dog.**
The most the area is close to **RED** color, the most it is important for class **Eskimo_dog.**

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# EXPLANATION 10 - AFRICAN_ELEPHANT

The **BLACK-BOX** model prediction is **African_elephant** with a probability of **57.355%**.

## Why is it a **African_elephant**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **African_elephant**.


**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **African_elephant**?

- ○ Yes, the green areas are representing **African_elephant**
- ○ Partially, the green areas are partially representing **African_elephant**
- ○ No, the green areas are **not** representing **African_elephant**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **African_elephant**?

- ○ The red areas are **NOT IMPORTANT** for **African_elephant**
- ○ The red areas are **important** for **African_elephant**
- ○ I do not know.
- ○ Not Available (there are no red areas)

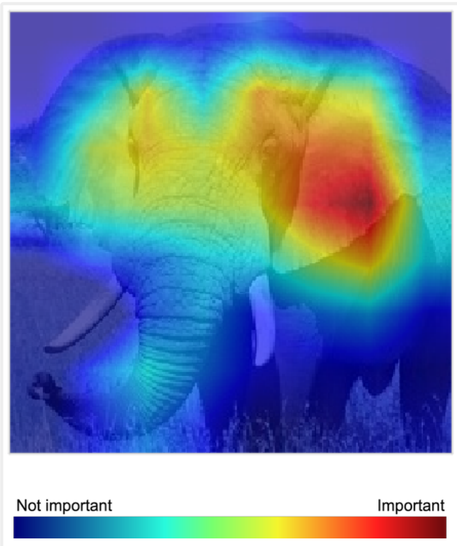
## SELECT THE EXPLANATION

↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **African_elephant**?

You can select more than one image.


↑ **EBAnO**
**GREEN** areas are positive for class **African_elephant.**
**RED** areas are negative for class **African_elephant.**


↑ **LIME**
**GREEN** areas are positive for class **African_elephant.**
**RED** areas are negative for class **African_elephant.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **African_elephant.**
The most the area is close to **RED** color, the most it is important for class **African_elephant.**

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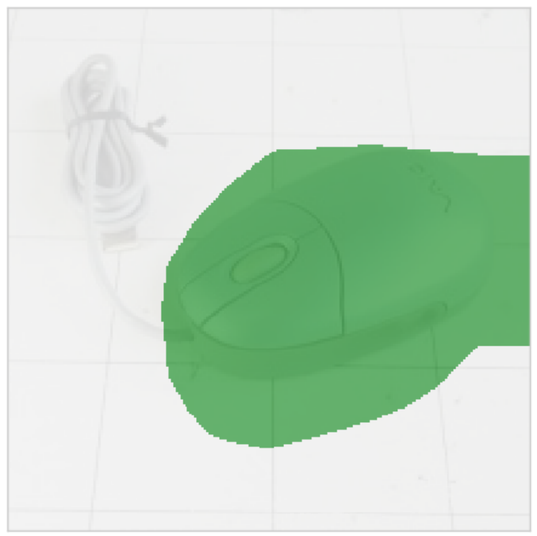
# EXPLANATION 11 - MOUSE

The **BLACK-BOX** model prediction is **mouse** with a probability of **99.998%**.

Why is it a **mouse**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **mouse**.




**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **mouse**?

- ○ Yes, the green areas are representing **mouse**
- ○ Partially, the green areas are partially representing **mouse**
- ○ No, the green areas are **not** representing **mouse**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

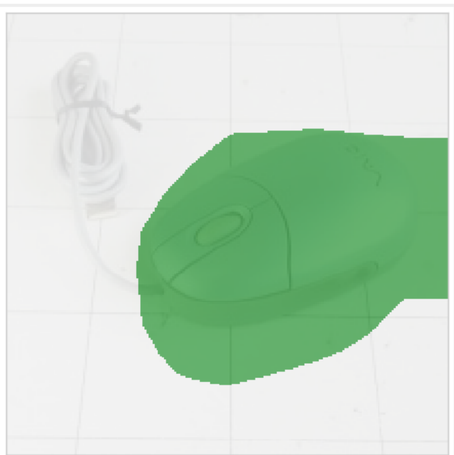
**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **mouse**?

- ○ The red areas are **NOT IMPORTANT** for **mouse**
- ○ The red areas are **important** for **mouse**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

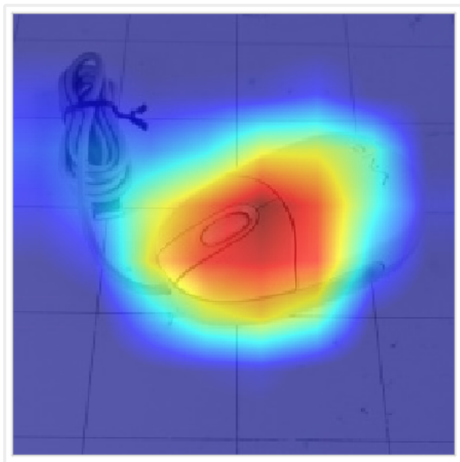
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **mouse**?

You can select more than one image.




↑ **EBAnO**
**GREEN** areas are positive for class **mouse.**
**RED** areas are negative for class **mouse.**


↑ **LIME**
**GREEN** areas are positive for class **mouse.**
**RED** areas are negative for class **mouse.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **mouse.**
The most the area is close to **RED** color, the most it is important for class **mouse.**

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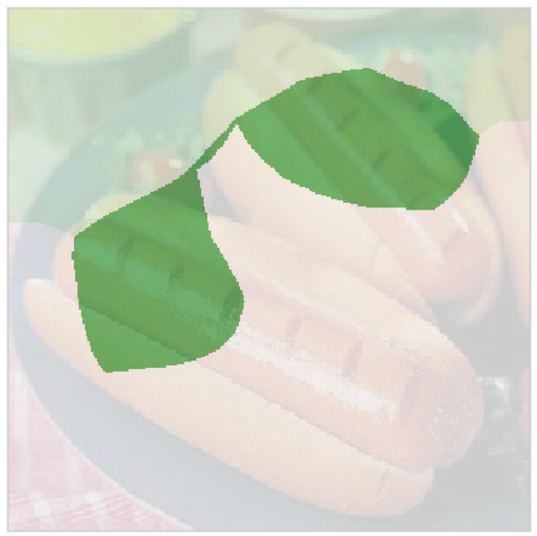
# EXPLANATION 12 - HOTDOG

The **BLACK-BOX** model prediction is **hotdog** with a probability of **92.783%**.

## Why is it a **hotdog**?

## ANSWER THE QUESTIONS

↓ The picture below shows the visual explanation produced by EBAnO for the prediction **hotdog**.




**1.** Is it TRUE that the **GREEN** areas are correctly representing the predicted class **hotdog**?

- ○ Yes, the green areas are representing **hotdog**
- ○ Partially, the green areas are partially representing **hotdog**
- ○ No, the green areas are **not** representing **hotdog**

**2.** Are there any **RED** areas in the image?

- ○ Yes, there are dark red areas (even small)
- ○ Partially, There are only soft red areas
- ○ No, there are no red areas

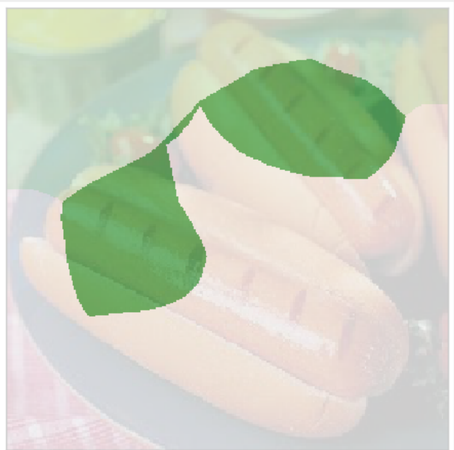
**3.** Is it TRUE that the **RED** areas (if any) are **NOT IMPORTANT** for **hotdog**?

- ○ The red areas are **NOT IMPORTANT** for **hotdog**
- ○ The red areas are **important** for **hotdog**
- ○ I do not know.
- ○ Not Available (there are no red areas)

## SELECT THE EXPLANATION

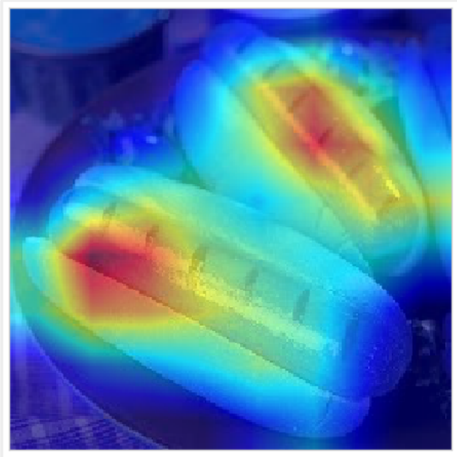
↓ Among the following alternative explanations, which are the best at identifying the right portions of the image leading to the predicted class **hotdog**?

You can select more than one image.




↑ **EBAnO**
**GREEN** areas are positive for class **hotdog.**
**RED** areas are negative for class **hotdog.**


↑ **LIME**
**GREEN** areas are positive for class **hotdog.**
**RED** areas are negative for class **hotdog.**




↑ **GRAD-CAM**
Gradient saliency map from **BLUE** to **RED**.
**BLUE** areas are neutral for class **hotdog.**
The most the area is close to **RED** color, the most it is important for class **hotdog.**

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

# SOME FEEDBACKS

Answer the question then click on submit to complete the survey.

How complex was the survey?

- Simple, the task and the questions were clear.
- The questions were clear but the task was not clear enough.
- The task was clear but the questions were not clear enough.
- The survey was very complex. The task and the questions were not clear at all.

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