Chapter- 27 Machine Learning

Objective :

- Introduction to Machine learning
- Types of machine learning
- Break and continue statements

Skills to be attained : Knowledge on machine language and its type, various branches of AI.

Tools / Websites / Resources :

1. https://machinelearningforkids.co.uk/

Teacher Led Instructions :

Introduction to machine learning

Machine learning (ML) is a part of artificial intelligence (AI). It means that computers can learn from data and do tasks without needing help from people. We teach a computer to watch and understand how something works, and then it can find the best way to solve problems on its own. Some of the tasks that includes machine learning

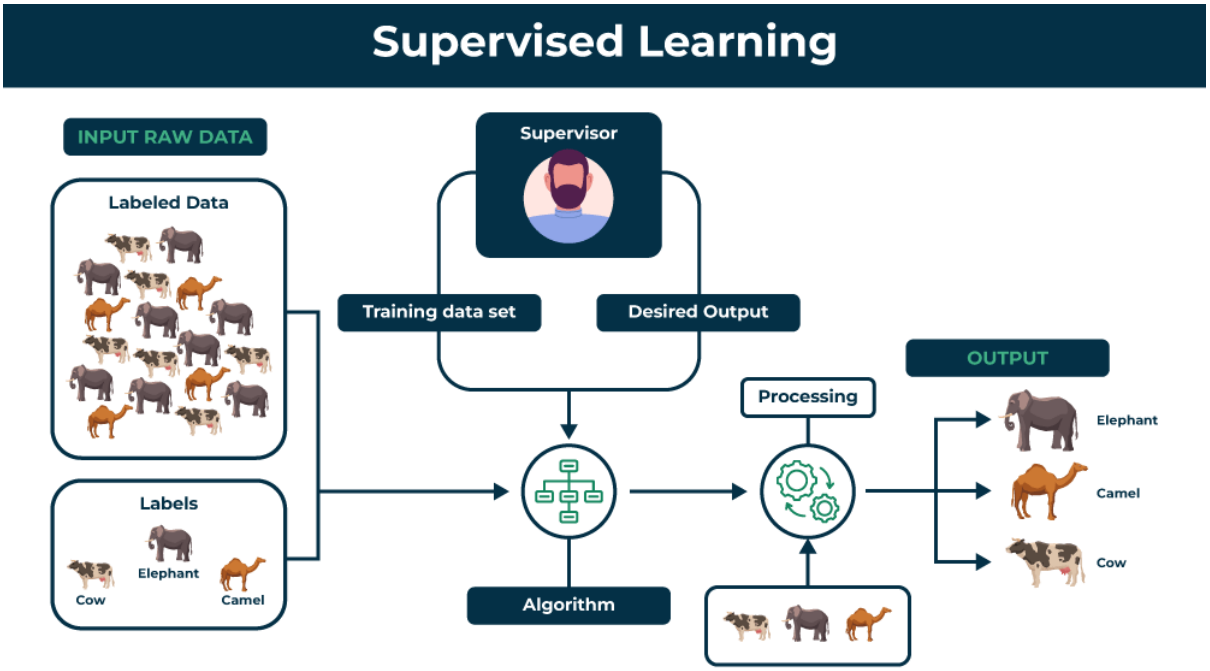
- Speech recognition software
- A bank's fraud detection services.
- Self-driving cars and driver assistance
- Facial recognition
- Machine learning provides you the content in youtube, facebook and instagram you are interested
- Suggest products, songs, or television shows to you

- Some of the types of machine learning are

1. Supervised Machine learning
2. Unsupervised Machine learning
3. Reinforcement learning

1. Supervised Machine Learning (5 Minutes)

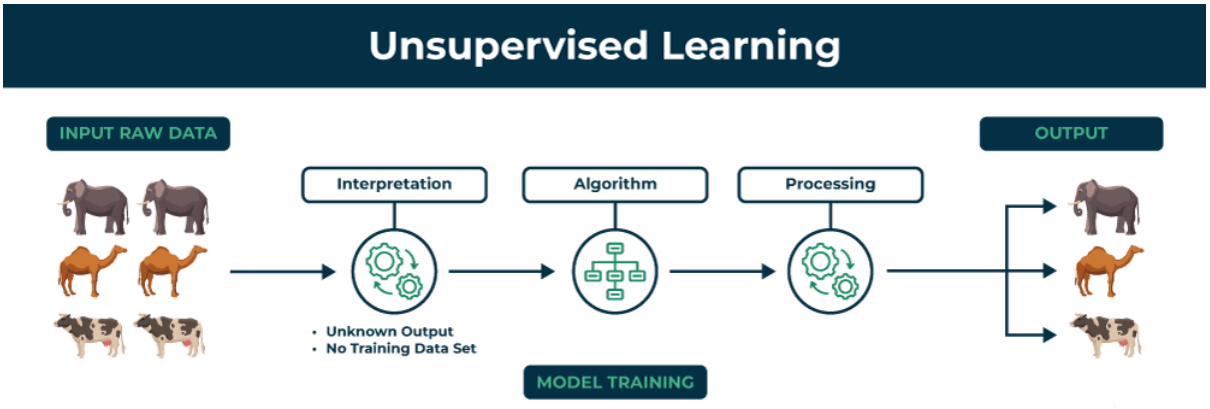
Supervised learning is defined as when a model gets trained on a “Labelled Dataset”. Labelled datasets have both input and output parameters. In Supervised Learning learn to map points between inputs and correct outputs.



Let's understand supervised learning with an example. Imagine we have pictures of cows, elephants, and camels. First, we teach the computer by showing it these pictures with their correct names (labels). Once the training is done, we can give the computer a new picture of a cow, elephant, or camel and ask it to figure out what it is. Since the computer is trained, it will compare the new picture to what it learned and correctly decide if it's a cow, elephant, or camel. This is how the computer identifies things in supervised learning.

2. Unsupervised learning (5 Minutes)

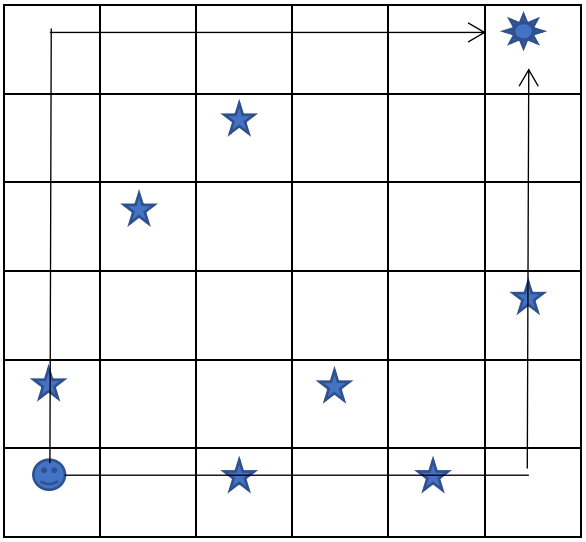
Unsupervised learning in artificial intelligence is type of machine learning that learns from data without human supervision. Unlike supervised learning, unsupervised machine learning models are given unlabeled data and allowed to discover patterns and insights without any explicit guidance or instruction.



Let’s understand unsupervised learning with an example. Imagine we have pictures of cows, elephants, and camels, but this time we don't tell the computer their names. Instead, we let the computer look at things like their size, shape, color, eyes, ears, and tails. After training, when we give the computer a new picture, it will use what it learned about those features (size, shape, etc.) to figure out the differences between the animals. It will find patterns and group the animals based on their differences, like color and shape, to make a guess about what each one is.

3. Reinforcement Learning (5 Minutes)

Reinforcement learning is an autonomous, self-teaching system that essentially learns by trial and error. It performs actions with the aim of maximizing rewards, or in other words, it is learning by doing in order to achieve the best outcomes.



Let’s understand reinforcement learning with an example. Imagine there are two paths to reach a sun block. On the first path, the smiley face will get one star and reach the sun. On the second path, the smiley face will get three stars and still reach the sun. If the smiley face takes the second path, it will get more stars. After training, the computer will learn to look at both paths and pick the one that gives the most stars (rewards) because it's the best and most rewarding option.

A fun and simple activity to teach machine learning to school students is by using **machinelearningforkids**.

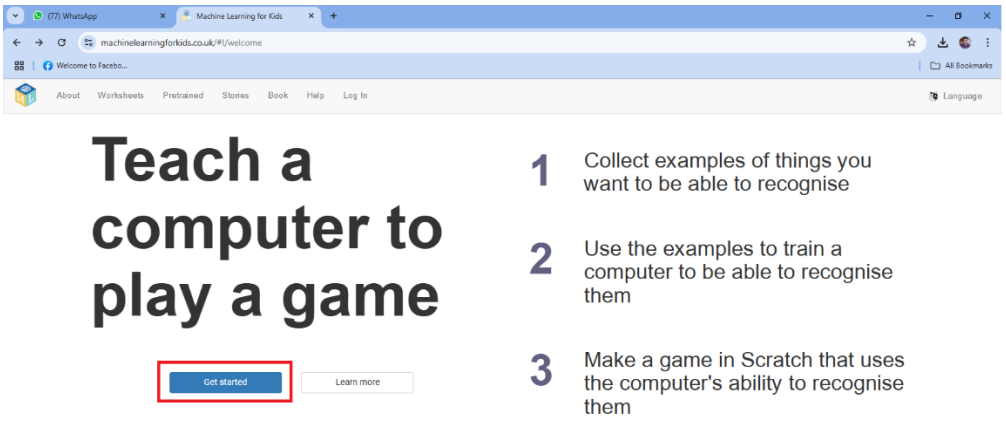
Activity: Identify a sentence conveys a positive thought or negative

Objective:

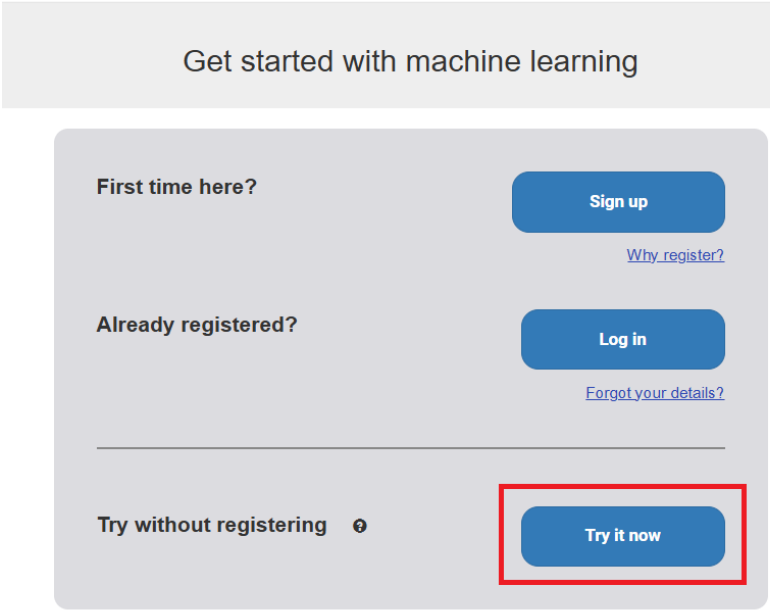
Students will learn the basics of machine learning by training a model to recognize that a sentence conveys a positive thought or negative thought.

Steps:

1. **Introduction**
    - Explain the concept of machine learning: Machines can "learn" from examples (data) to make decisions or predictions.
2. **Getting Started with Teachable Machine**
    - Go to https://machinelearningforkids.co.uk/

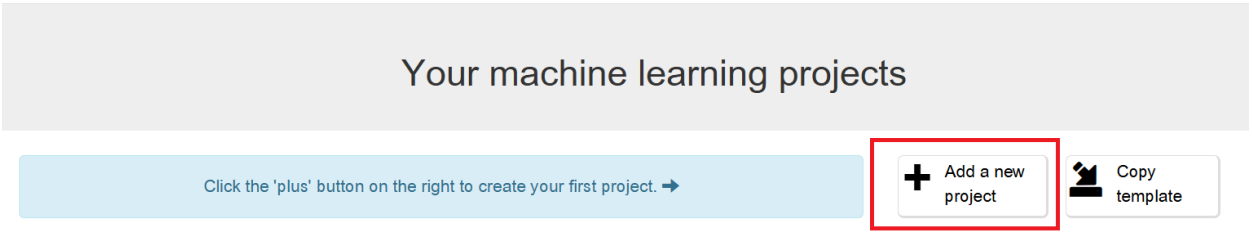


    - Click on the **Get Started** button

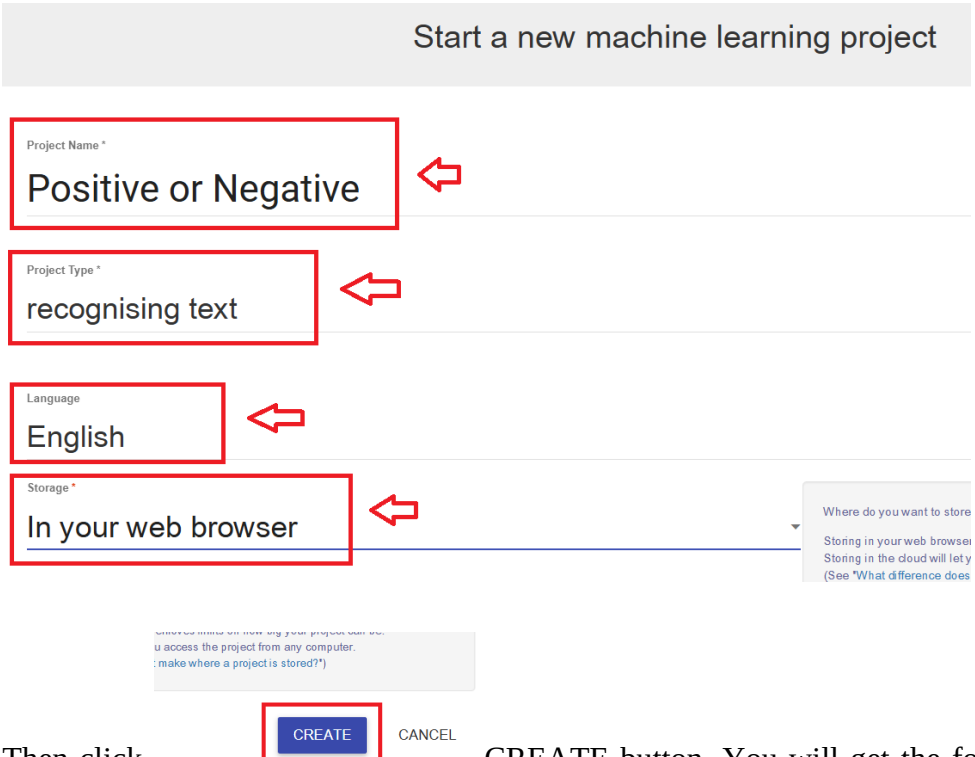


Explain that you will be teaching the machine how to identify a sentence by the words.

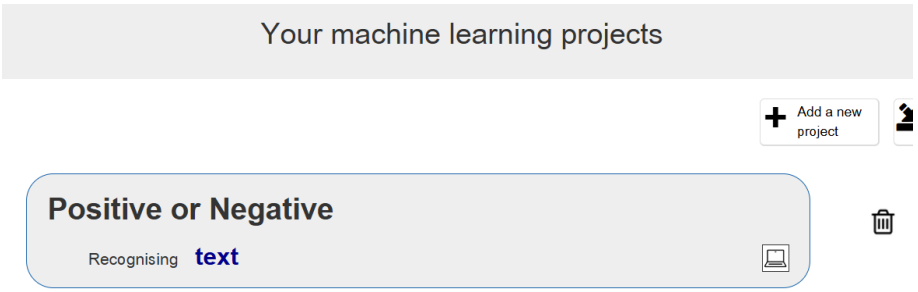
Training the Model



1. Click on **Add a new project .**
2. Type **Positive or Negative** in Project Name
3. Select **recognizing text** in project type
4. Select **English** in Language
5. Select **In your web browser** in Storage

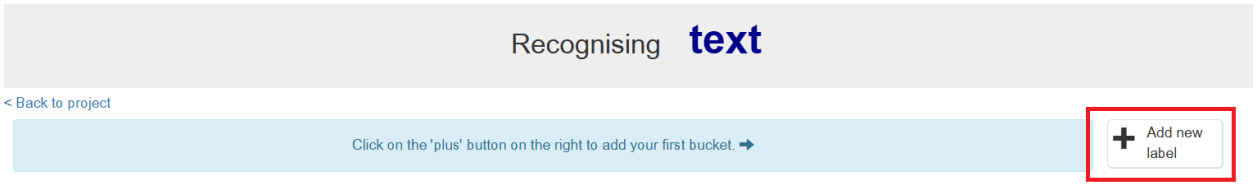


Then click CREATE button. You will get the following page with the name of your project **Positive or Negative.**

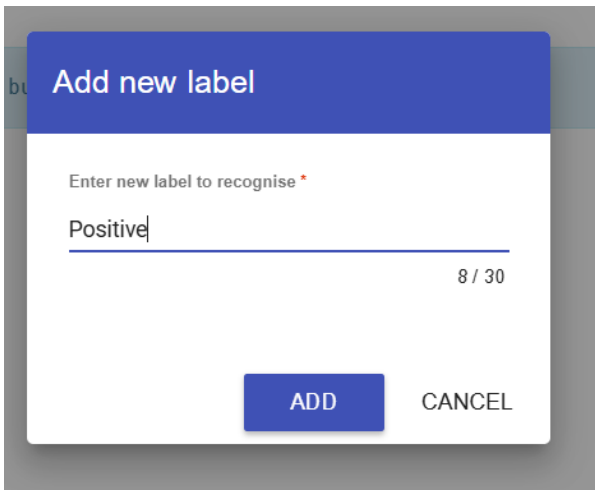


Place your mouse pointer on the name of the project and click the left button on your mouse.

In the next page, select **Train** button

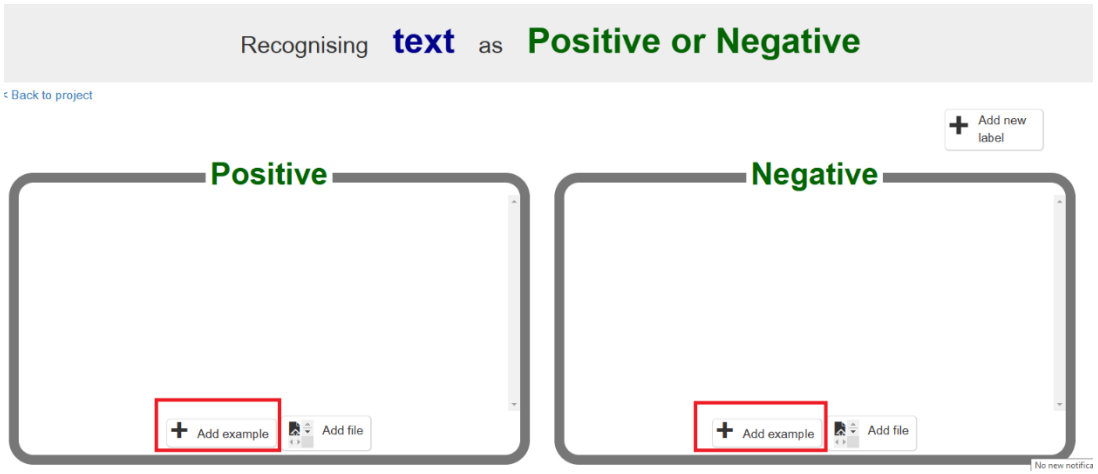


Select **Add now label** button.

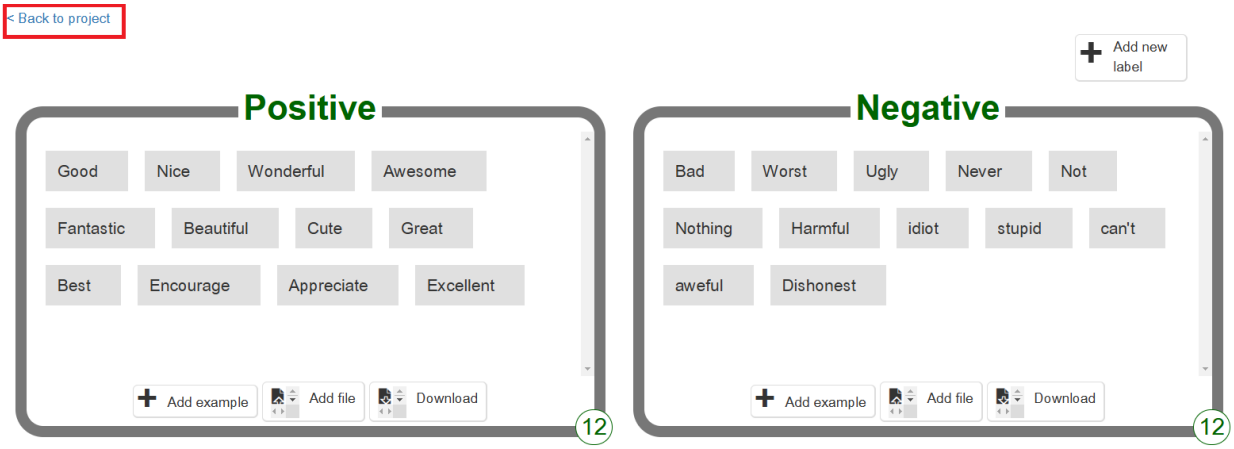


Type **Positive** in the text box and click **ADD** button.

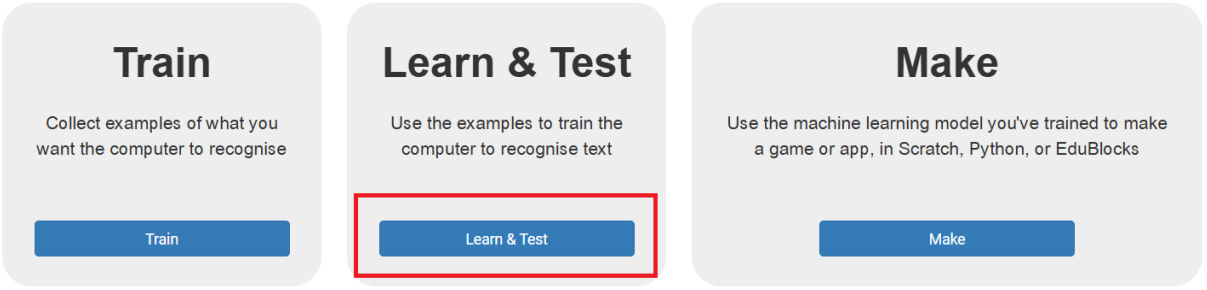
Again, do the same for **Negative** label. After creating two labels you will get screen as shown below.



By selecting + **Add examples** add words as shown below.

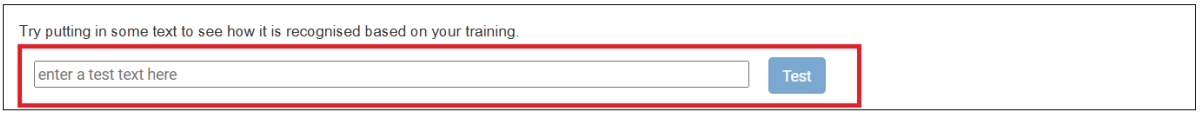


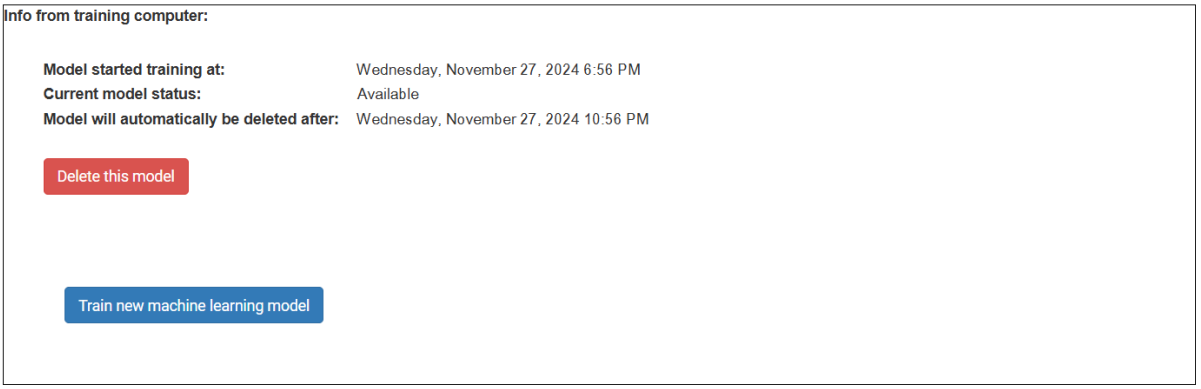
After adding the above words in both the boxes. Click **back to project**



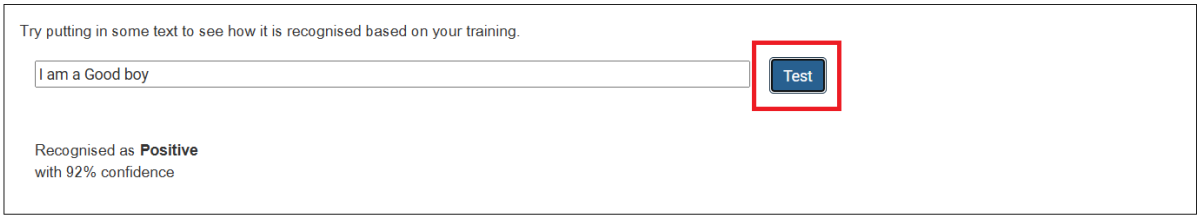
Select **Learn & Test** button to test the model.

Then click **Train new machine learning model** button to train the model on your data. The page will take few seconds to train the model and show the next screen as shown below. Type the sentence you want to test.



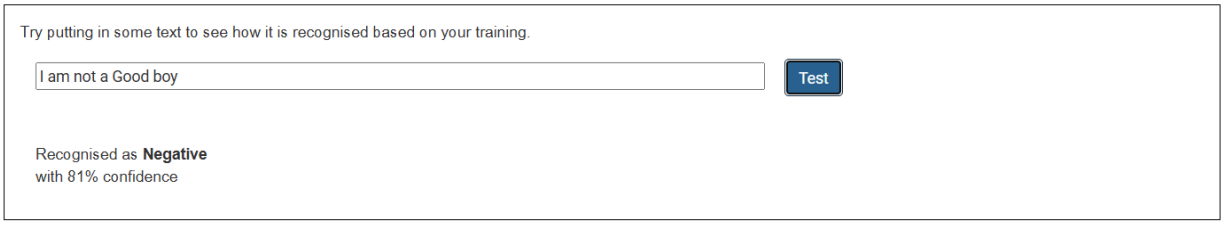


Type a positive sentence, and click **Test** button



The model recognizes the sentence as Positive.

Type a negative sentence and click Test button



The model recognizes the sentence as Negative.

Extension (Optional):

- Encourage students to try training the model with more projects.
- Try the same in https://teachablemachine.withgoogle.com/ web page also.

Key Learning Points:

- **Machine learning** involves teaching computers to recognize patterns from data.
- The quality of the training data (the examples) is important for making accurate predictions.
- Machine learning models can learn to recognize objects based on the examples we provide.

This activity makes learning about machine learning fun and interactive, allowing students to see how machines can "learn" from the data they give!

Conclusion:

Students will understand what is machine learning and how a machine perform this task