

How to Teach a Machine to Detect **Sentiment** A **Machine Learning** Approach



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What is Sentiment?



Sentiments are **feelings**, **opinions**, **emotions**, likes/dislikes ..



The feature of the app is disgusting

I like iPhone
as it is very secured



Negative



Neutral



Positive

I have bought an Android phone



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Why sentiments/emotions are important?



EMOTIONS AFFECT OUR JOB PERFORMANCE

JOB PERFORMANCE AFFECTS OUR EMOTIONS







These pictures are taken from :

- i. Sports club
- ii. Restaurant
- iii. Gym
- iv. Google office



What do you do if you want to download any app specific to any area (e.g., education, weather, and entertainment) from Google Play Store?



The Weather Channel - Radar

The Weather Channel

Contains ads · In-app purchases

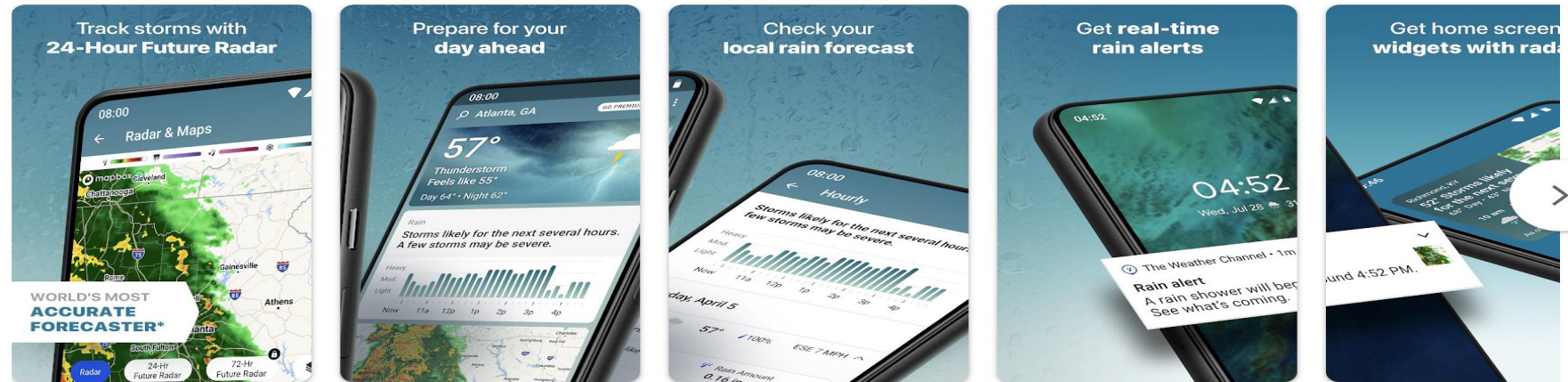
4.6★
2.65M reviews

100M+
Downloads

E
Everyone ⓘ

Install on more devices

📱 This app is available for your device





Applications of Sentiments



- ✧ Social media monitoring
- ✧ Customer support
- ✧ **Customer feedback**
- ✧ Brand monitoring and reputation management
- ✧ Product analysis
- ✧ Market research and competitive research
- ✧ Stock market prediction
- ✧ Election result prediction



4. On Stage MA100 - Screw Adapter



★★★★★ 4.5 read 22 reviews

"Perfect" – Juanpianoman
"Super Useful Adapter Hard to Find!" – Mike O.
"Good for attaching to boom pole, BU..." – Russell Rules

+ Compare

starting at 1,95 USD

5. Verbatim Forecast Bimini 4 Piece Value Set



★★★☆☆ 2.6 read 12 reviews

"I bought this luggage set ..." – RickHawaii
"bum wheels" – bumed1
"I purchase the identical ..." – whoopingcough

+ Compare

starting at 1,99 USD

6. Pro-Co Sound Rack Screws and Washers



★★★★★ 5.0 read 2 reviews

"What can you say "they are screws"" – JM
"hard to mess up a screw" – Gary

+ Compare

starting at 2,50 USD



SP-STUDIO.DE

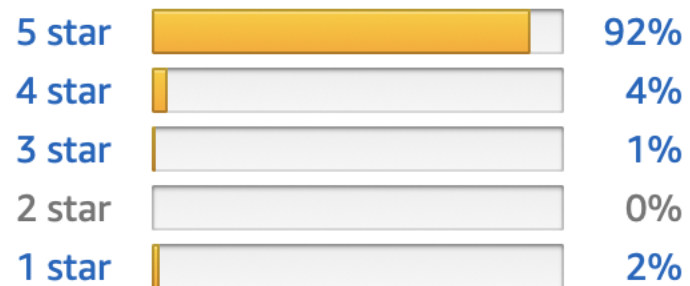


- ✧ A company can sell hundreds of products
- ✧ Each product can have thousands of reviews

Customer reviews

★★★★★ 4.8 out of 5

721,099 global ratings



Amazon eGift Card - Amazon Logo

by Amazon

Gift Amount: 50 | Design Name: Amazon Logo | [Change](#)

Write a review

Aggregation of Product Reviews



Compare Products

		—	1%	—	—		
The following listed below	Advanced amateur	—	1%	—	—		
	Beginner	Needed it to use external	—	—	2%		
	Serious amateur	Great access to all ports	—	—	2%		
	Casual photographer	Long lasting	—	—	—	81%	
		Fast charge	—	—	—	34%	
	Student	Good value	—	—	—	17%	
	Budget shopper	Good power output	—	—	—	12%	
	Quality oriented	Large storage capacity	—	—	—	2%	
	Pros		No worries about dead bat	—	—	—	2%
	Easy to use	Good long lasting	—	—	—	2%	
Avg. Pro	Durable	Super compact size	—	—	—	2%	
	Reliable	Cons					
Ratings	Great picture quality	Heavy / bulky	—	34%	—	7%	
	Well built / quality	Pricey / poor value	—	5%	2%	3%	
	Fast / accurate auto-focus	Heavy bulky	—	3%	—	—	
User Type		Price	—	2%	2%	2%	
		Weight	—	2%	—	—	
		Heavy bulky	—	1%	—	—	
		Cost	—	1%	—	—	

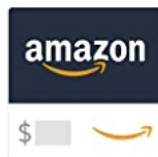
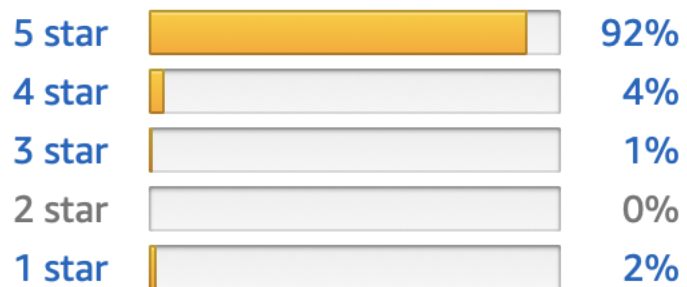


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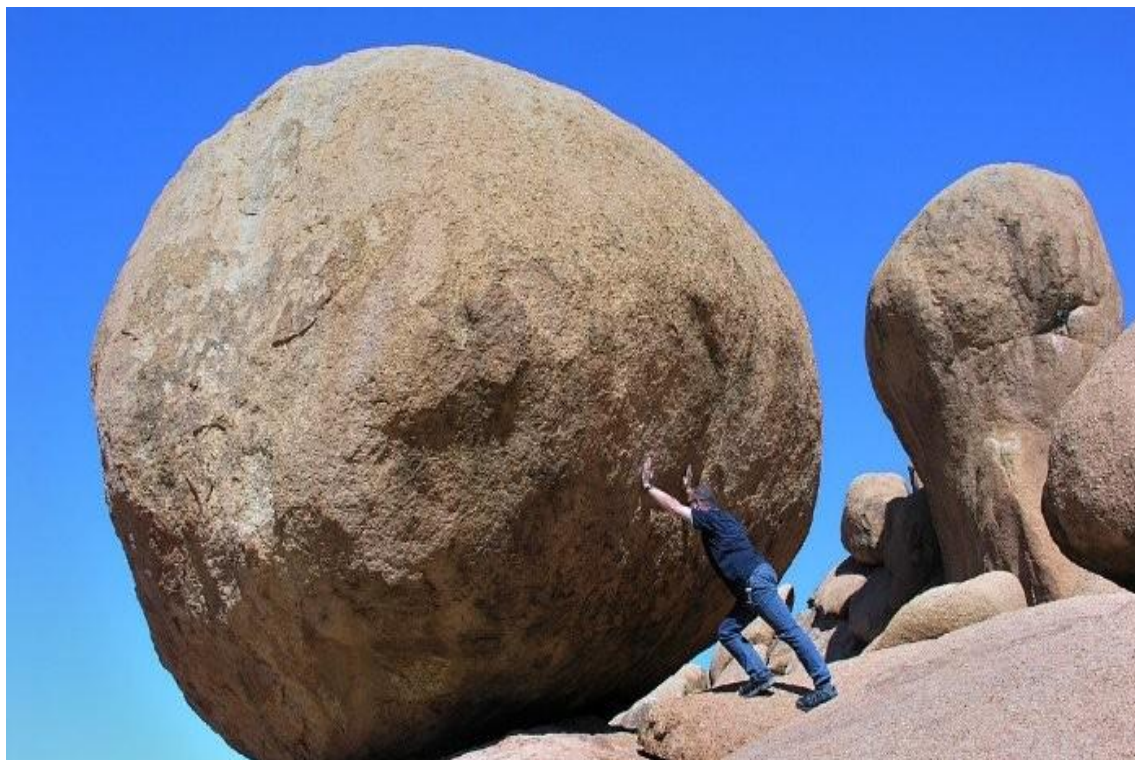


Amazon eGift Card - Amazon Logo

by Amazon

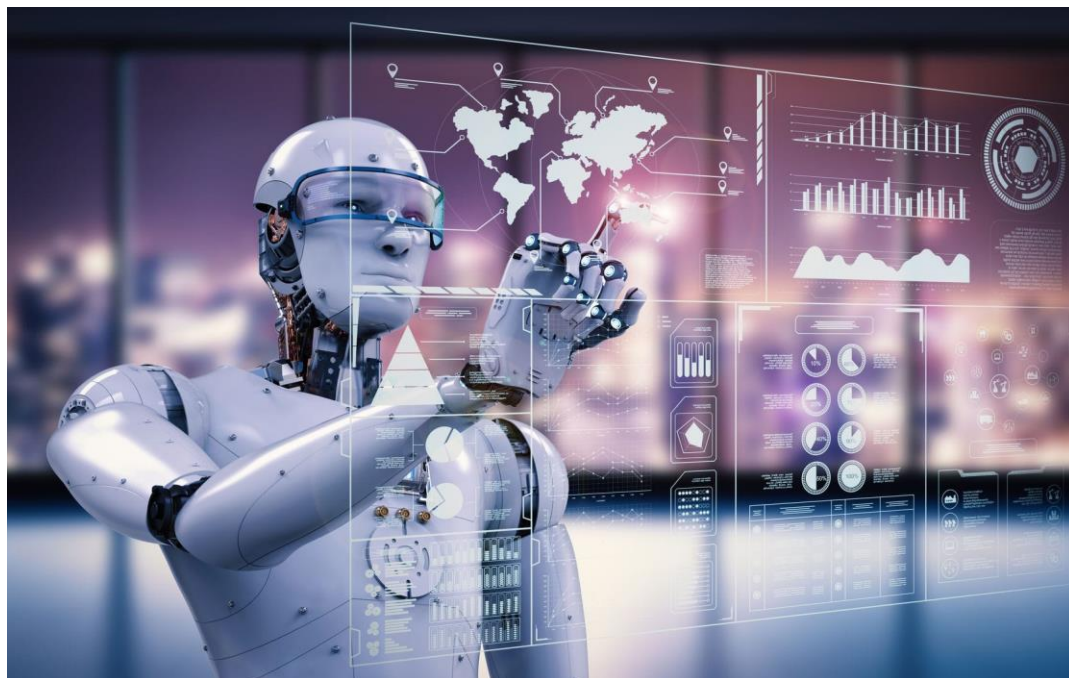
Gift Amount: 50 | Design Name: Amazon Logo | [Change](#)

Write a review

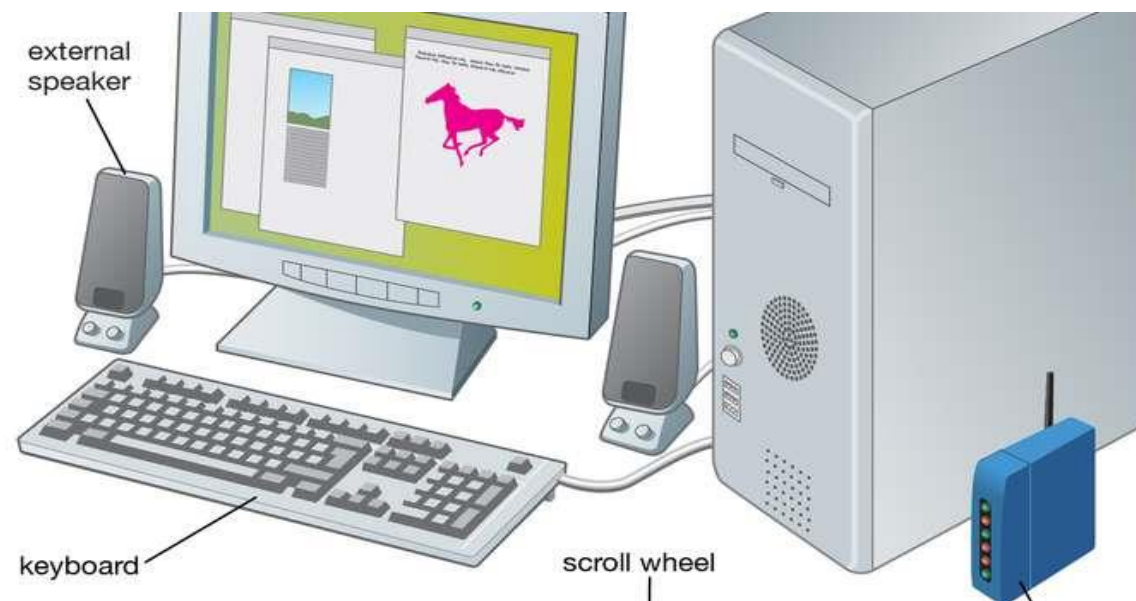


Difficult Job for a Human





Intelligent Machine





Customer reviews

★★★★★ 4.8 out of 5

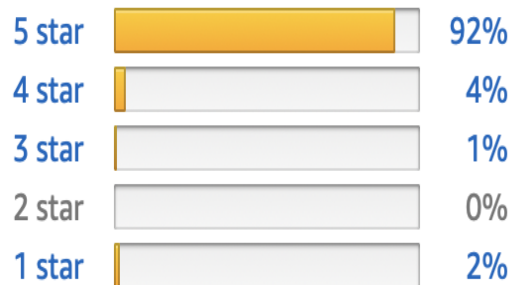
721,099 global ratings



Amazon eGift Card - Amazon Logo

by Amazon

Gift Amount: 50 | Design Name: Amazon Logo | [Change](#)



Write a review

Barbara

★★★★★ **How can you go wrong with a sift card?**

Reviewed in the United States on June 24, 2021

Gift Amount: 50 | Design Name: Amazon Logo | **Verified Purchase**

Very easy and gives the receiver so many options.

Helpful

Report abuse

Carl

★☆☆☆☆ **difficult to activate**

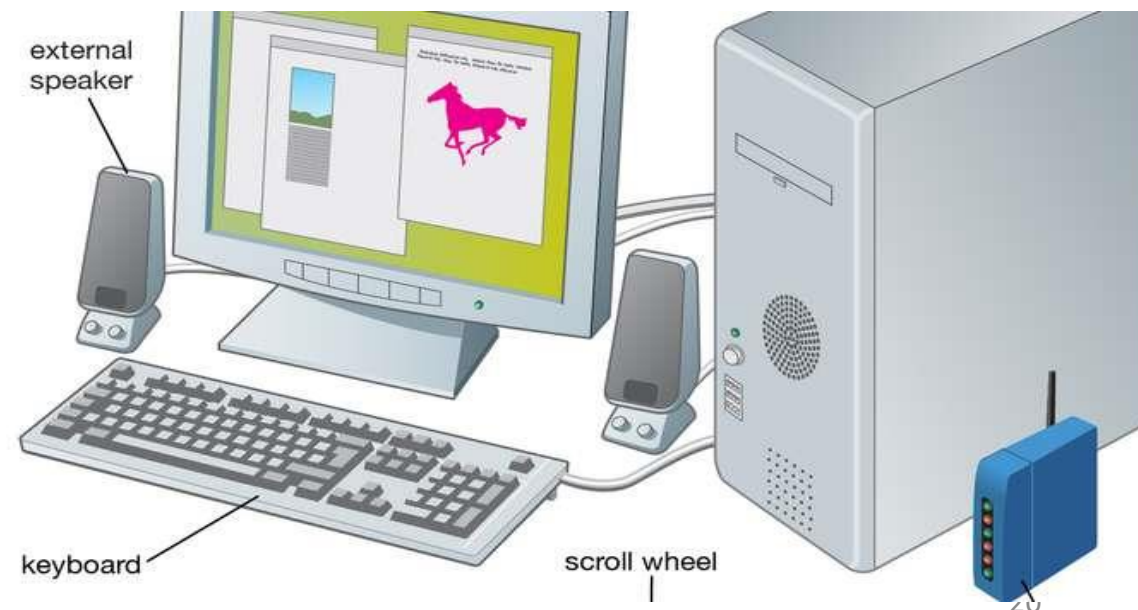
Reviewed in the United States on June 23, 2021

Gift Amount: 50 | Design Name: Amazon Logo

bad to activate very time conusming

Helpful

Report abuse

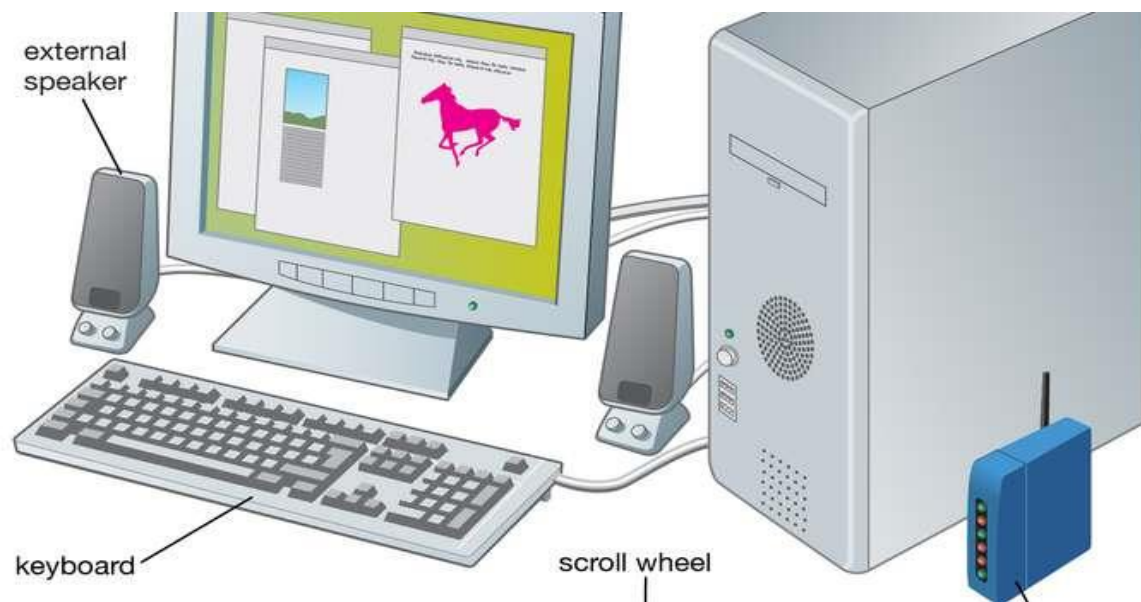


Strength & Weakness of a Product

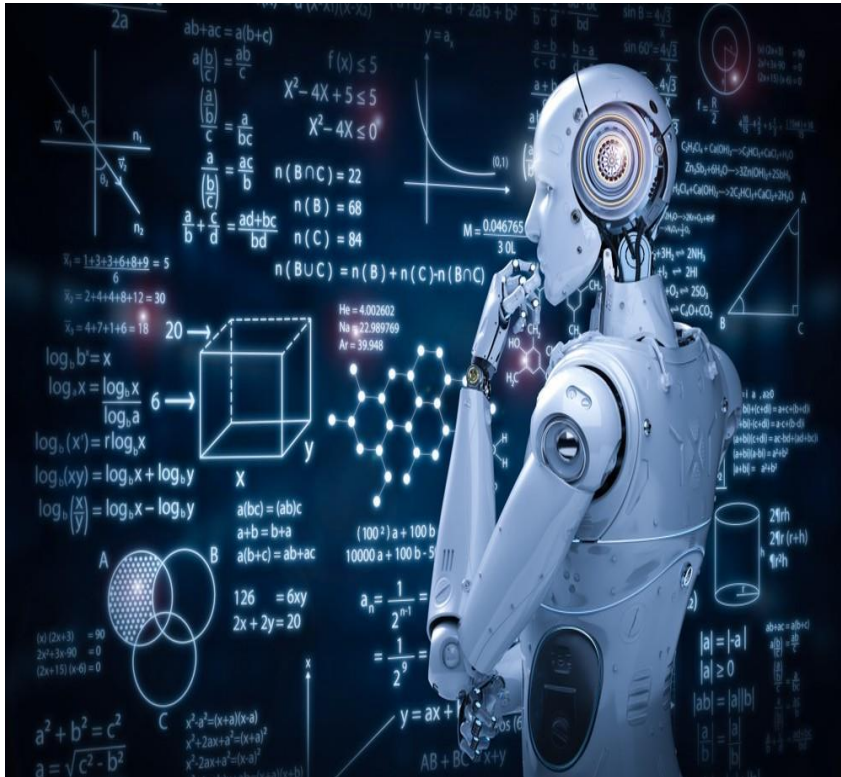


Compare Products

	Advanced amateur	—	1%	—	—	
The following listed below	Beginner	Needed it to use external	—	—	2%	
	Serious amateur	Great access to all ports	—	—	2%	
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		Price	—	2%	2%	
User Type	Weight	—	2%	—		
	Heavy bulky	—	1%	—		
	Cost	—	1%	—		



How can we teach a machine?



Machine learning algorithms are **programs** (math and logic) that adjust themselves to perform a specified task in a better way as they **are exposed to more data**.



How does Machine Learning Work?

Input
Data



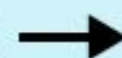
Analyze
Data



Find
Patterns

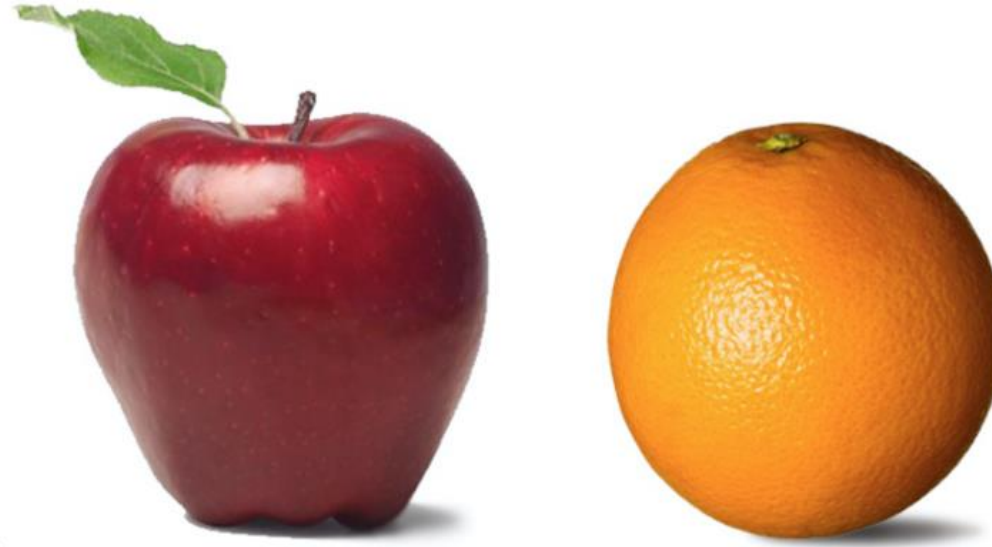


Prediction



Stores the
Feedback





Color
Shape
Skin texture
Width
Height





Human Learning vs Machine learning

Humans acquire knowledge through experience either directly or shared by others

Machines acquire knowledge through experience shared in the **form of past data**

How Does a Machine Learning Algorithm Work?



SUPERVISED LEARNING



Known Data



ML Algorithm



Processing



Trained Model



New Response

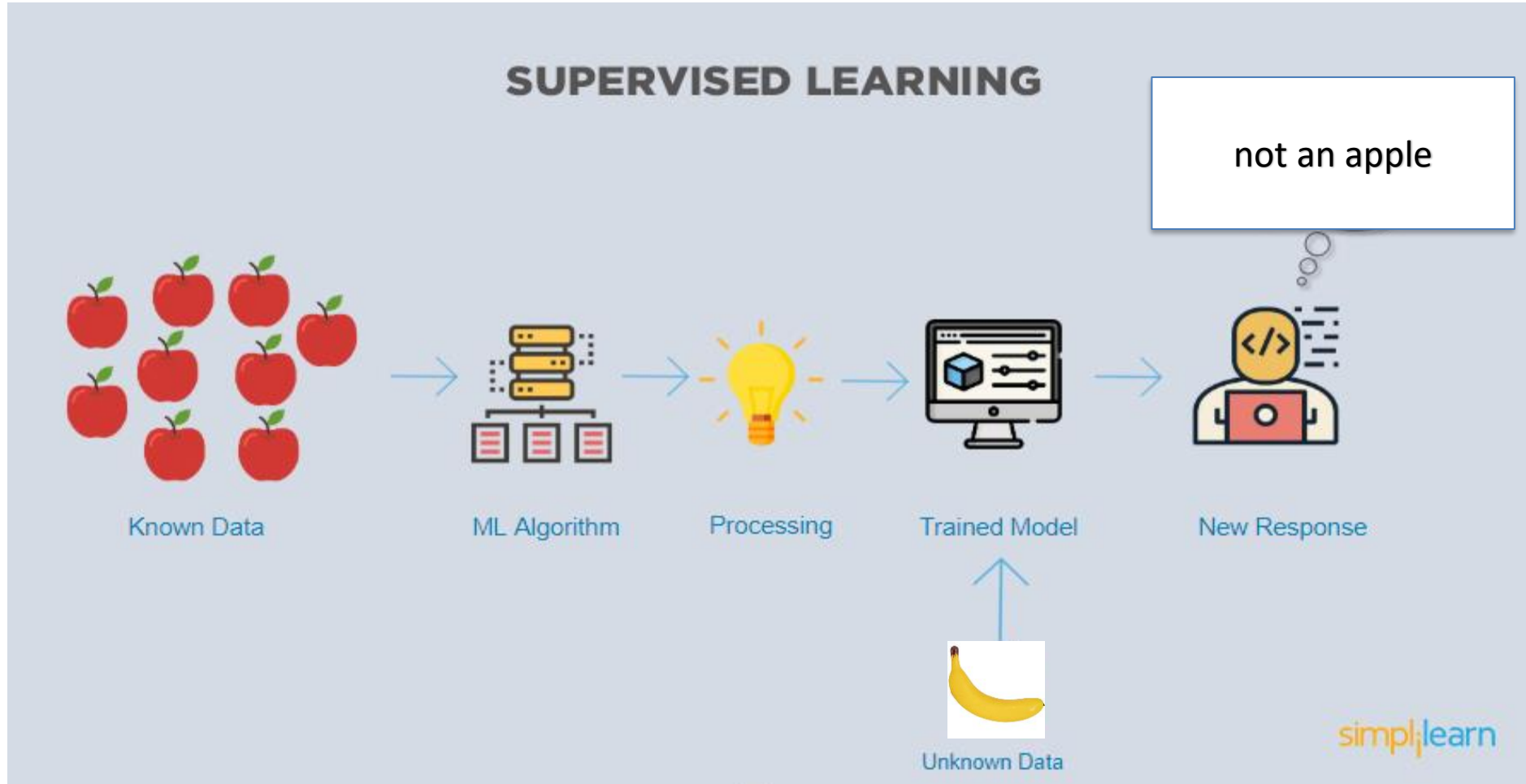


Unknown Data

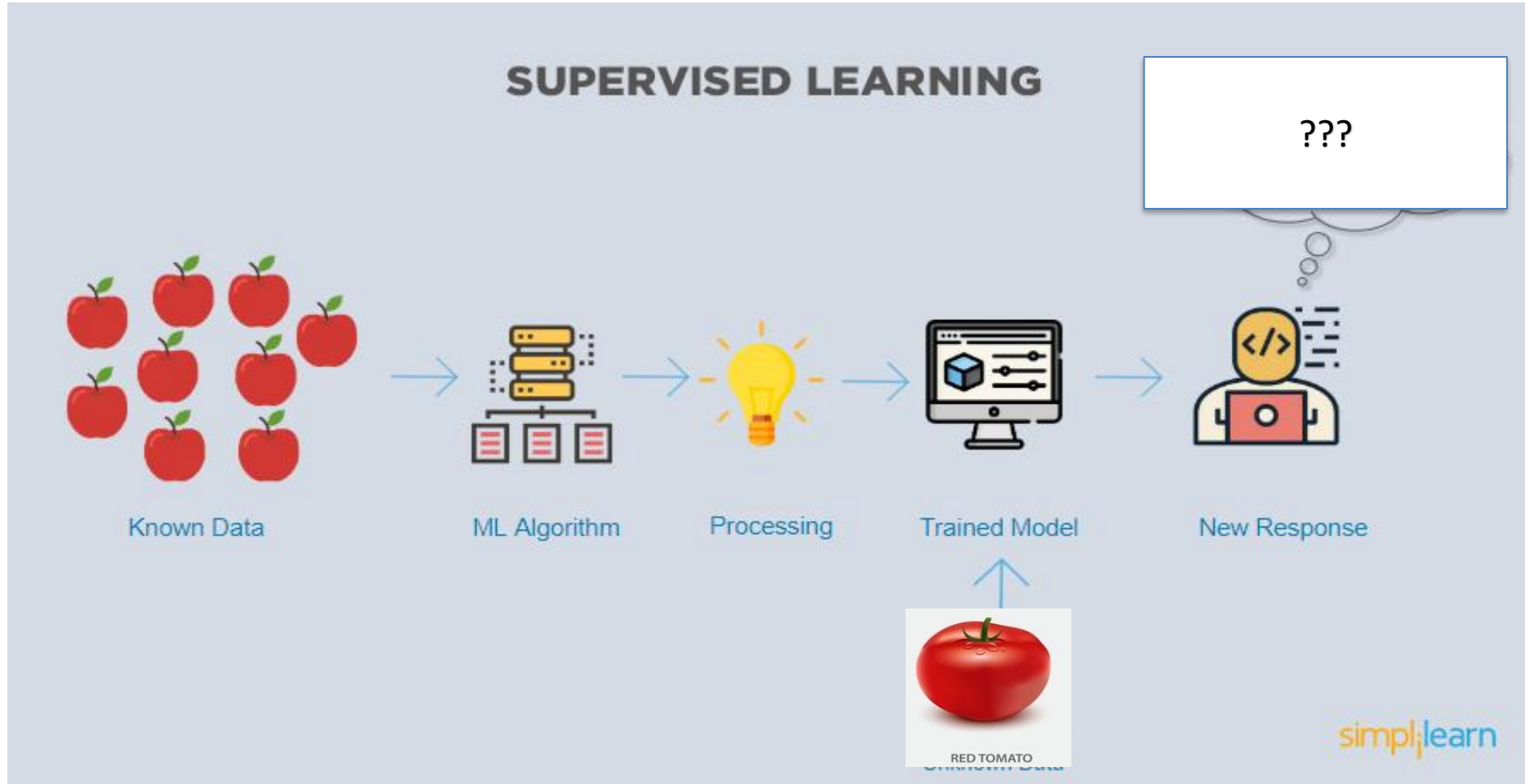
simplylearn

Color
Shape
Skin texture
Width
Height

How Does a Machine Learning Algorithm Work?



How Does a Machine Learning Algorithm Work?





Train a Computer to Detect Sentiment in Texts

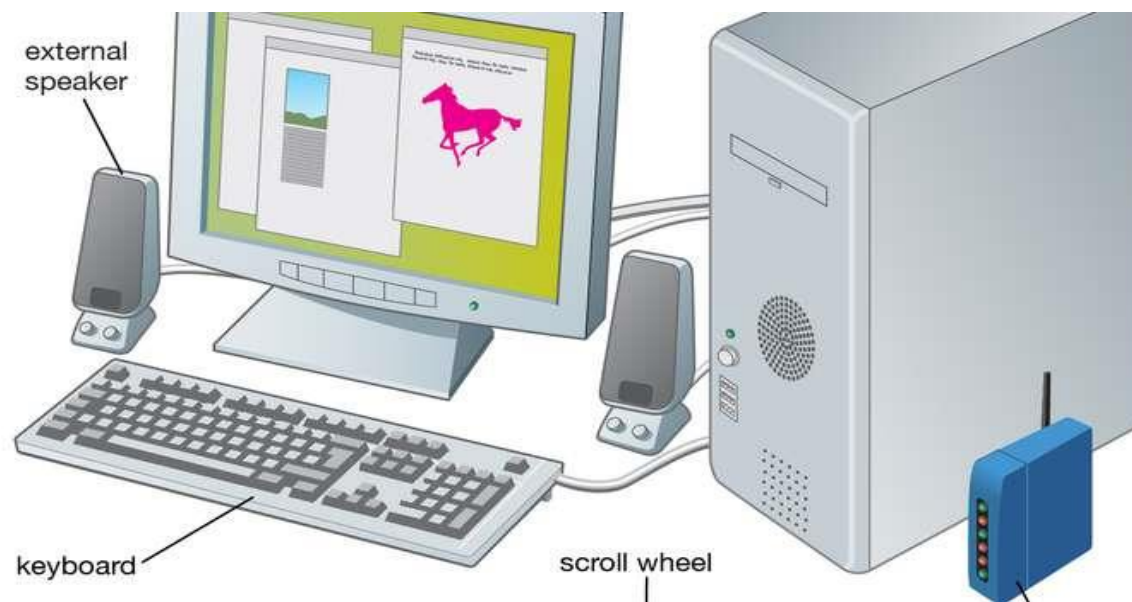


✧ I **like** the product X as it is very **useful**: **Positive** Sentiment

✧ The product is **disgusting**: **Negative** Sentiment



Let's teach a machine to detect sentiment





- ✧ Programming Language: Python
- ✧ IDE: Jupyter Notebook



Let's jump into the code

Steps in a Machine Learning Process



- ✧ Read the dataset
- ✧ Analyze the dataset
- ✧ Divide the data into **training** and **testing** sets
- ✧ Select an ML algorithm
- ✧ Train the ML algorithm using training data
- ✧ Test the **trained ML algorithm** using test/unknown data

An Analogy of Package



Python Packages Used in this Project



- ✧ Pandas: Reading and analyzing data
- ✧ Plotly: a graph plotting library
- ✧ Numpy: Math operation with multi-dimensional arrays and matrices
- ✧ CountVectorizer: Convert a collection of text documents to a matrix of token counts



Questions