

# Artificial Intelligence

Hadas Raviv, PhD

I come out of the cocoon naked. The chrysalis is lying there empty. My family and the doctors and the nurses all gasp and say, "You're beautiful".

I am, of course. The transformation is complete. I am beautiful. I have perfect golden eyes, six arms, and wings like butterfly wings, iridescent and blue. I am slim and tall. I am an angel.

I say, "What happened to the chrysalis?"

They say, "You ate it".

I say, "What?"

They say, "You ate it. The moment you were born. It's the first thing you did".

"I'm supposed to eat it?"

"Well, you wouldn't want to leave it lying around. People could trip over it."

"But I'm an angel."

"Yes, dear, you're an angel. But you've been through a lot. You're probably hungry."

"I am. I am so hungry."

They bring me platters of bacon and ham and turkey and roast beef and chicken and fish.

"No," I say. "This is all wrong."

"What?" they say.

"It's all wrong," I say. "The chicken's bones aren't right."

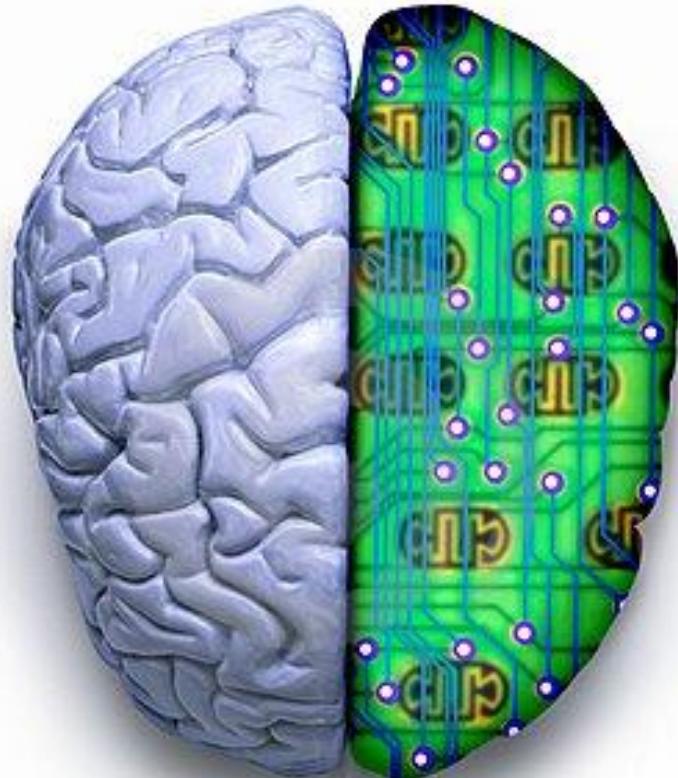
"What do you mean?"

"They're all the wrong shape. And the fish are all the wrong color. And look at this turkey! It's a turkey. Turkeys aren't blue. And look at this ham! Ham isn't green. Where's the beef?"

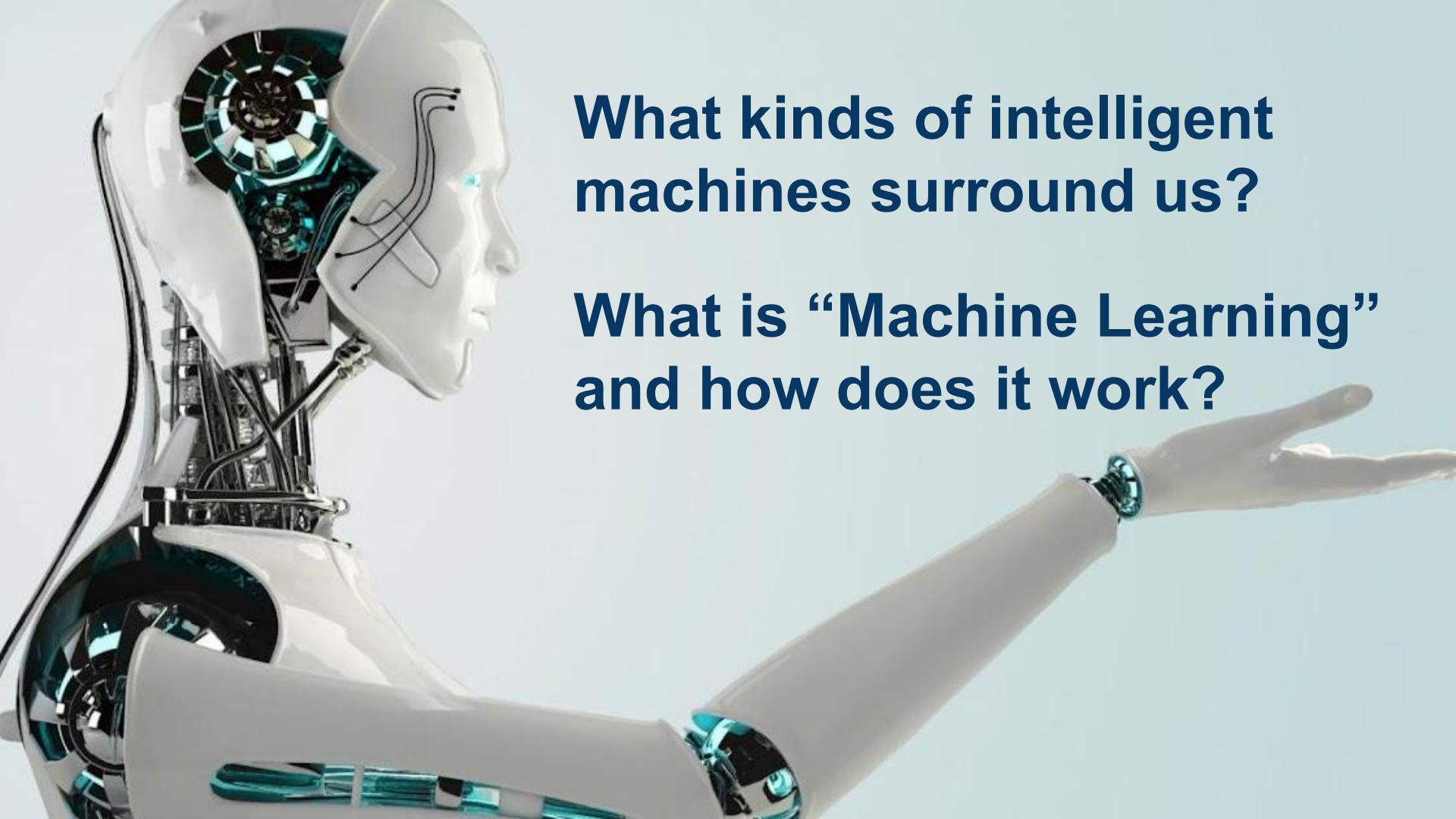
"There isn't any beef," they say.

"There isn't?" I say.

"No, dear. There isn't."



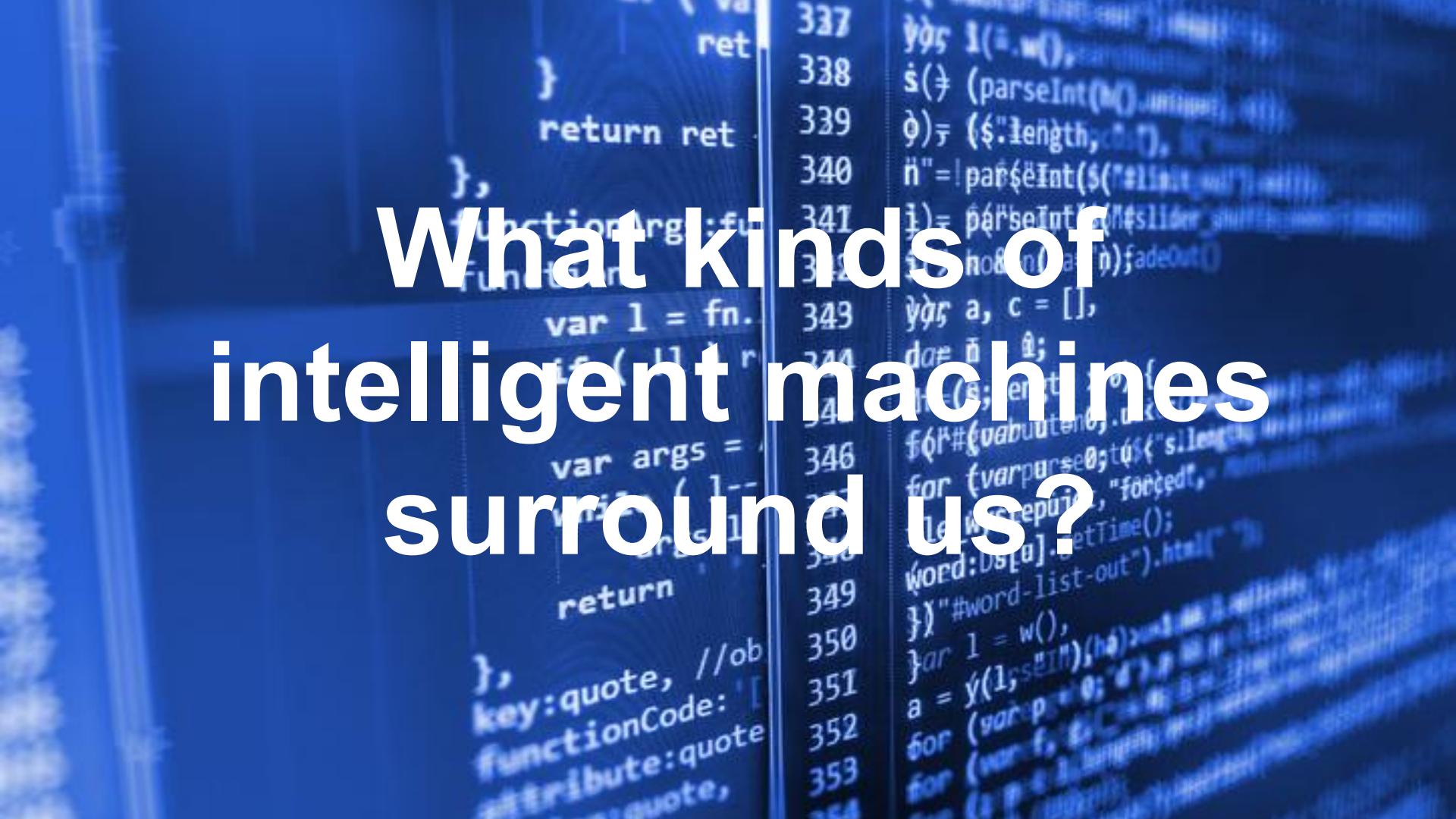
# Intelligence?



**What kinds of intelligent  
machines surround us?**

**What is “Machine Learning”  
and how does it work?**

# What kinds of intelligent machines surround us?



```
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
```

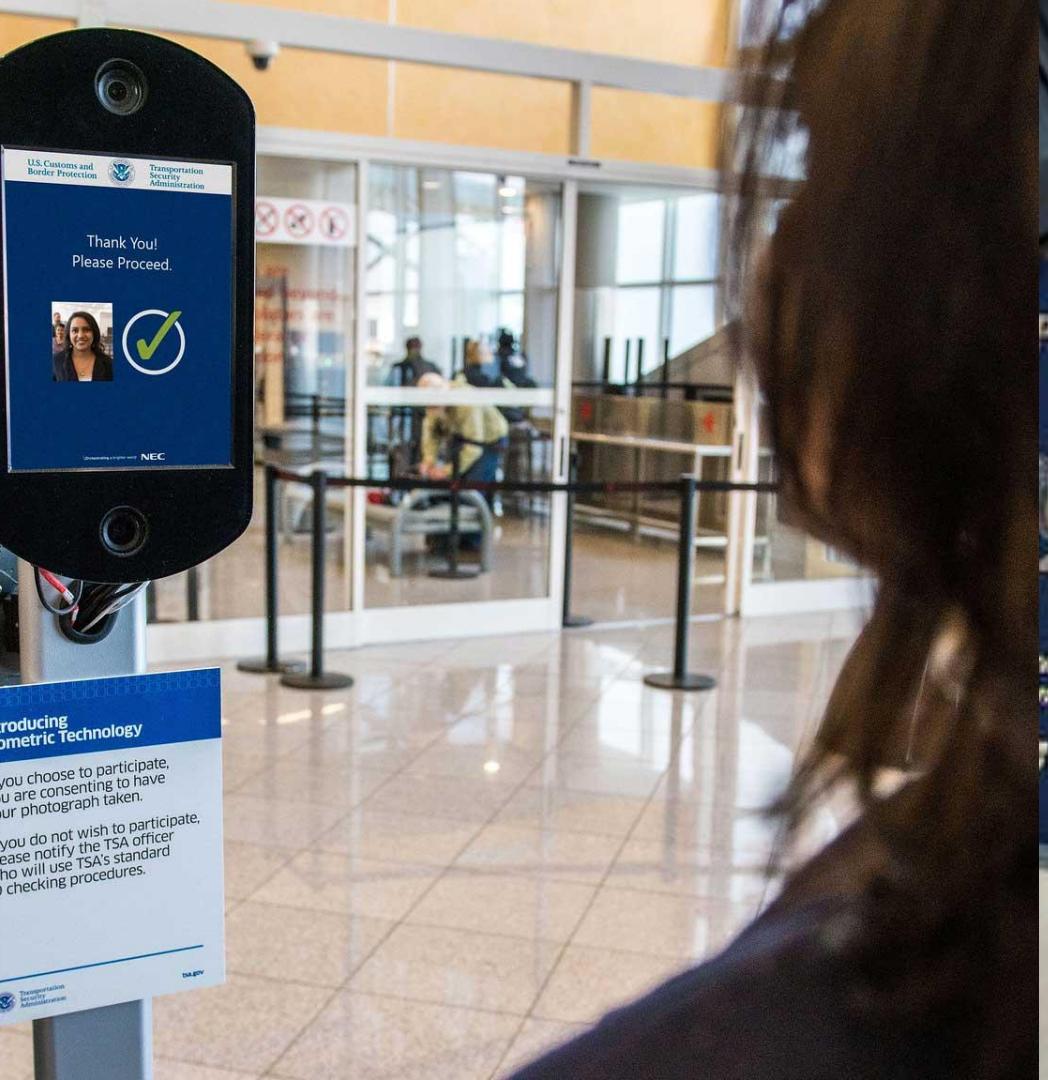


hour of

- hour of **code**
- hour of **code israel**
- hour of **code code.org**
- hour of **code minecraft**
- hour of **code angry birds**
- hour of **the witch**
- hour of **code dance party**
- Hour of Deenest Need









# Machine Learning - addressing specific tasks

A blurred background of a computer screen displaying code in white on a dark blue background. The code appears to be in JavaScript or a similar programming language, with visible lines numbered from 337 to 354. The text is mostly illegible due to the blur, but some words like 'var', 'function', 'if', 'return', and 'for' are faintly visible.

# Classification



age: 50  
gender: Female  
race: White



age: 51  
gender: Male  
race: White



age: 52  
gender: Female  
race: White



age: 52  
gender: Female  
race: White



age: 53  
gender: Female  
race: White



age: 54  
gender: Male  
race: Other



age: 50  
gender: Male  
race: Indian



age: 51  
gender: Female  
race: White



age: 52  
gender: Male  
race: White



age: 52  
gender: Female  
race: White

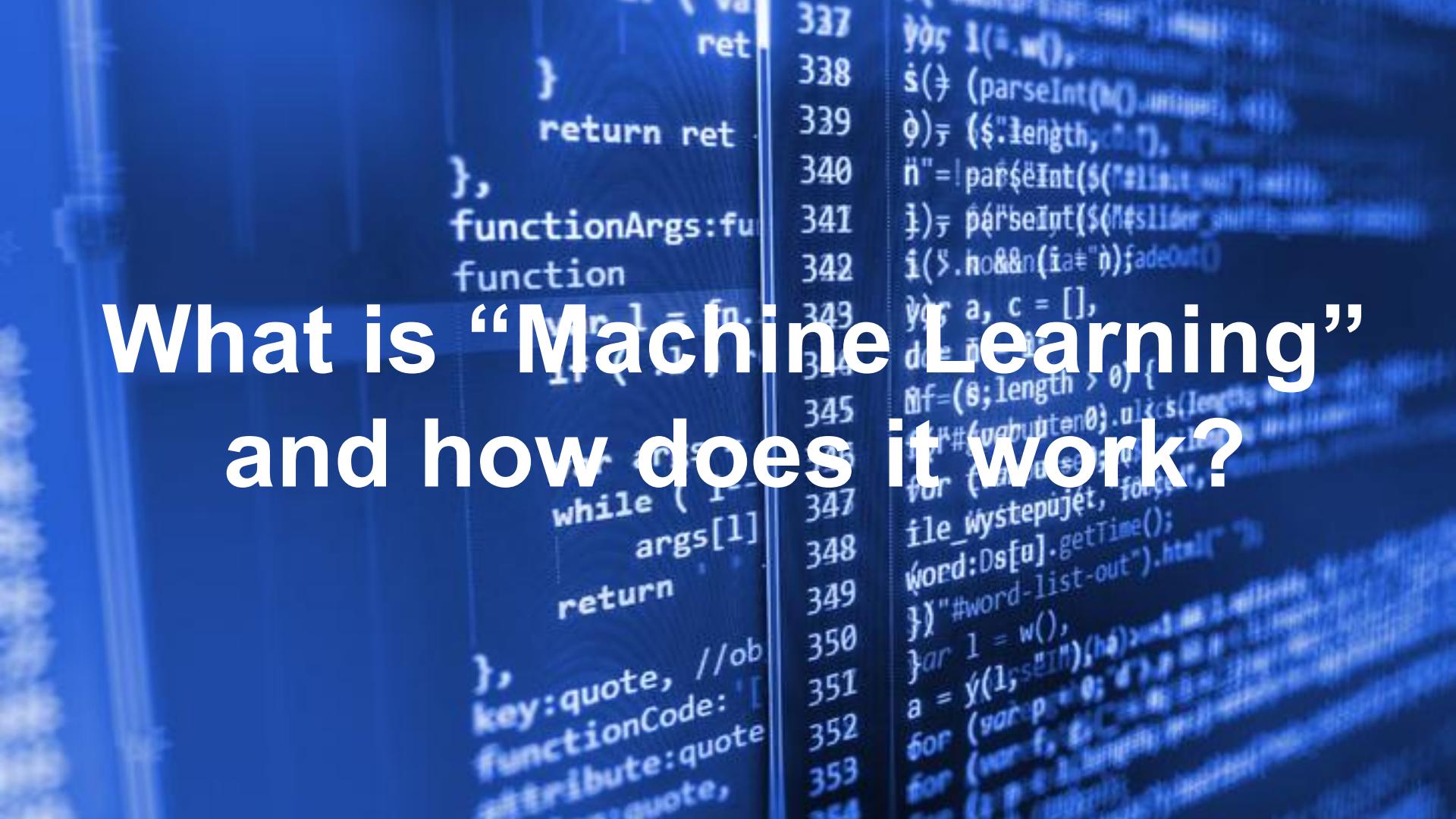


age: 53  
gender: Female  
race: White



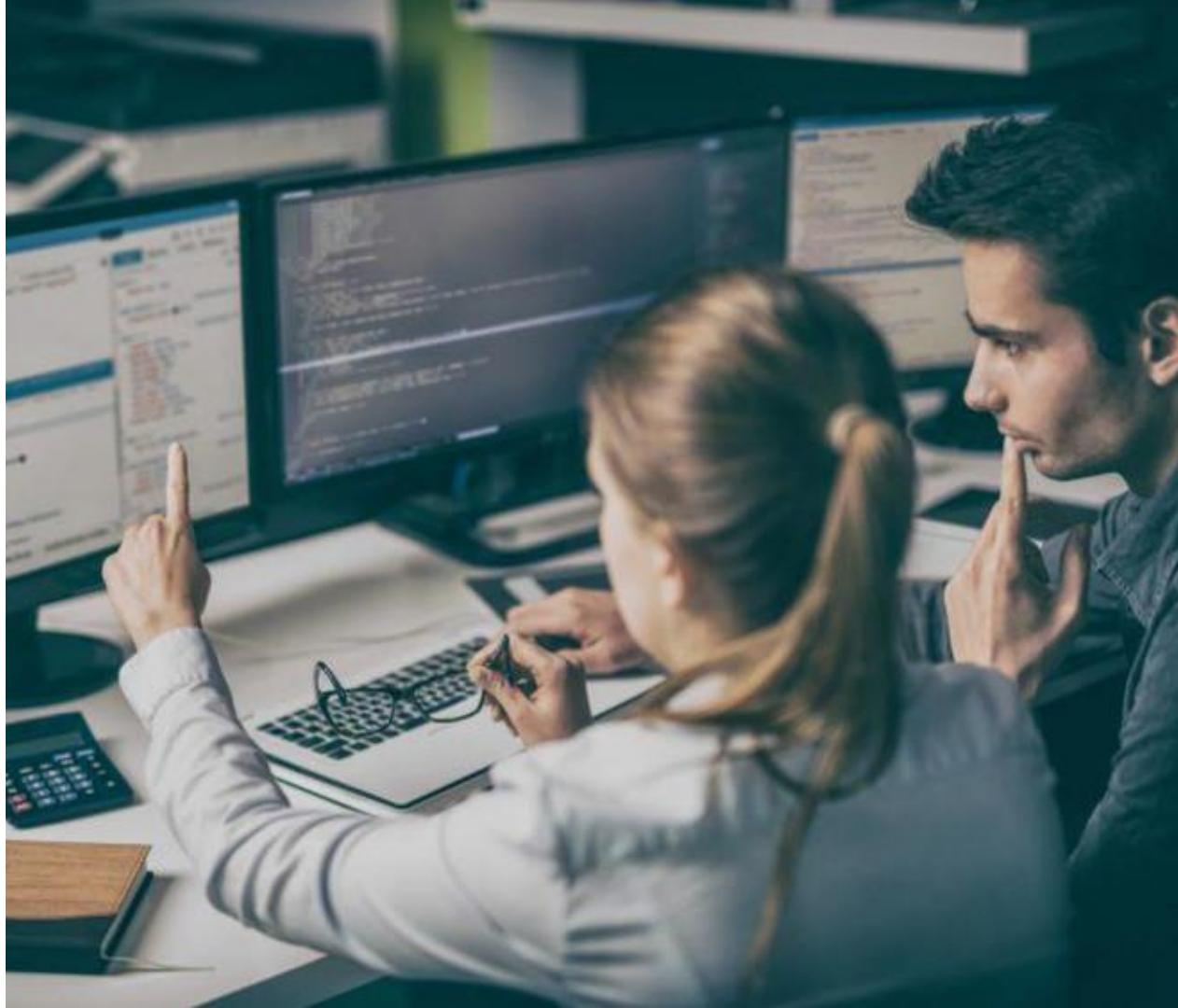
age: 54  
gender: Male  
race: White

# What is “Machine Learning” and how does it work?

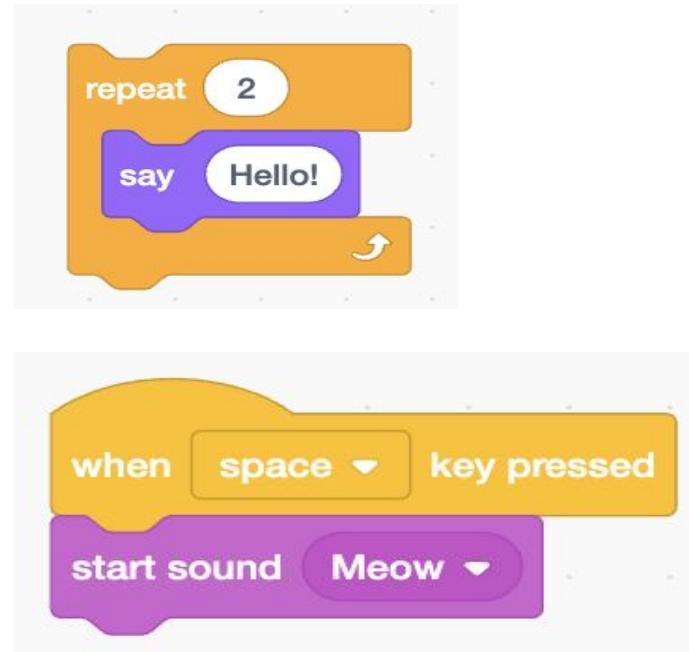
A blurred background image of a computer screen displaying code in a terminal window. The code appears to be in Java or a similar programming language, involving file operations and string manipulation. Lines 337 through 354 are visible, showing methods like 'readFile', 'writeFile', and various file handling logic. The text is in white on a dark blue background.

```
337     y&gt; 1(w(),  
338     s(7 (parseInt(m))  
339     0)  ($ .length, 0 ),  
340     n"= parseInt($ ("#list_out").  
341     j)  parseInt($ ("#slider_shade").  
342     i($ .no&&n(iat"n);fadeOut()  
343     y;&gt; a, c = [],  
344     do {  
345     if=(s;length > 0){  
346         # (getBitten0).ul(s.length-1).  
347         file_wystepujet, for (int i=0;i<s.length;i++)  
348             word:Ds[i].getTime();  
349         } } "#word-list-out").html(" "  
350         jar 1 = w(),  
351         a = y(1,s"IM)(h)  
352         for (var p = 0; p < a.length; p++)  
353             for (var f, e = 0; e < a[p].length; e++)  
354                 a[p][e] = a[p][e].replace(/<br>/g, "
```

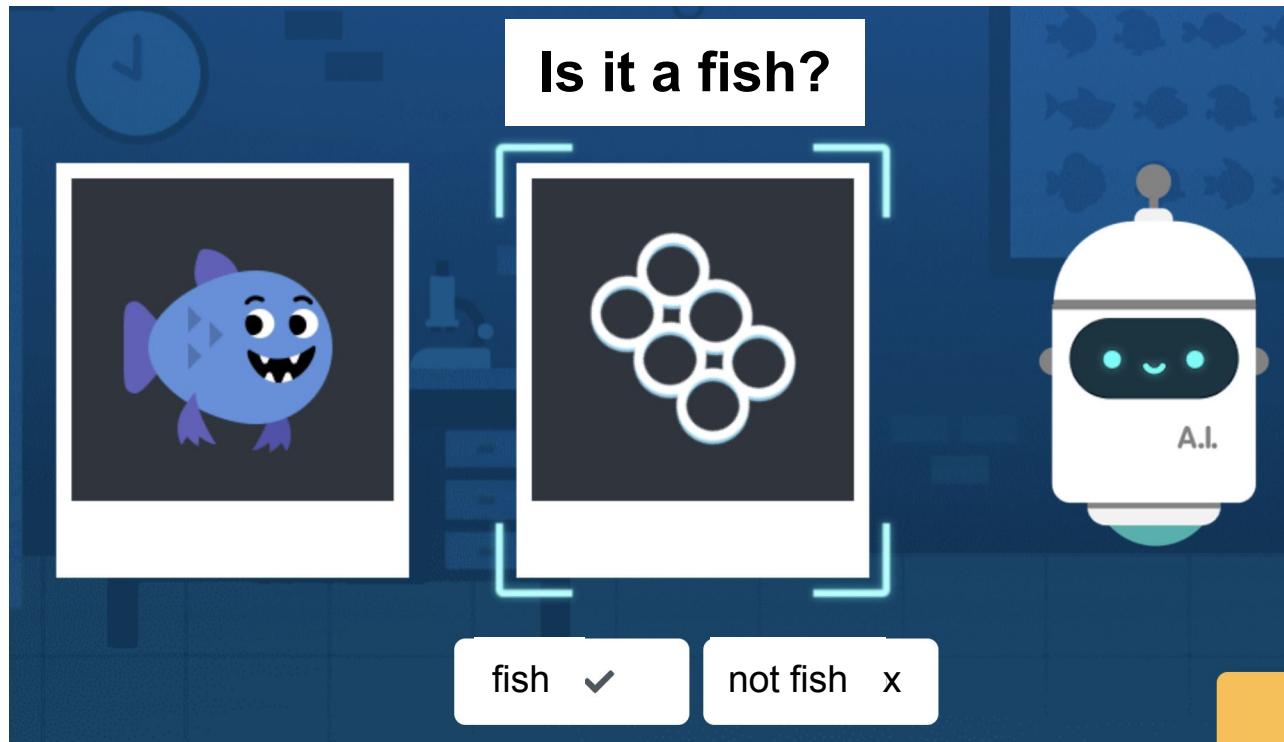
# What does programming mean?



# Explicit programming



# Example-based programming



# Audio

On this subject in the present paper we will consider a number of new factors, in particular the effect of noise in the channel, and the savings possible due to the statistical structure of the original message and due to the nature of the final destination of the information.

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning*; that is they refer to or are correlated according to some physical or conceptual entities. These semi-engineering problem, one selected from a set to operate for each purpose must be chosen since this is irrelevant to the actual message which will actually

# Text

If the number of choices is finite, the information produced when one message is chosen from the set, all choices being equally likely. As was pointed out by Hartley the most natural choice is the logarithmic function. Although this definition must be generalized considerably when we consider the influence of the statistics of the message and when we have a continuous range of messages, we will in all cases use an essentially logarithmic measure.

The logarithmic measure is more convenient for various reasons:



# Images



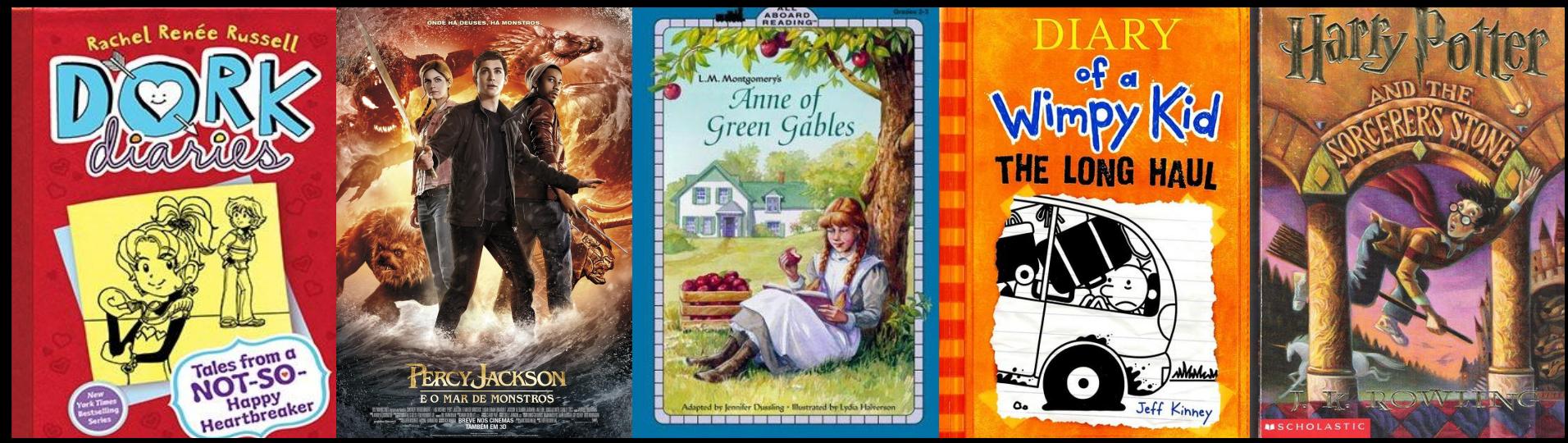
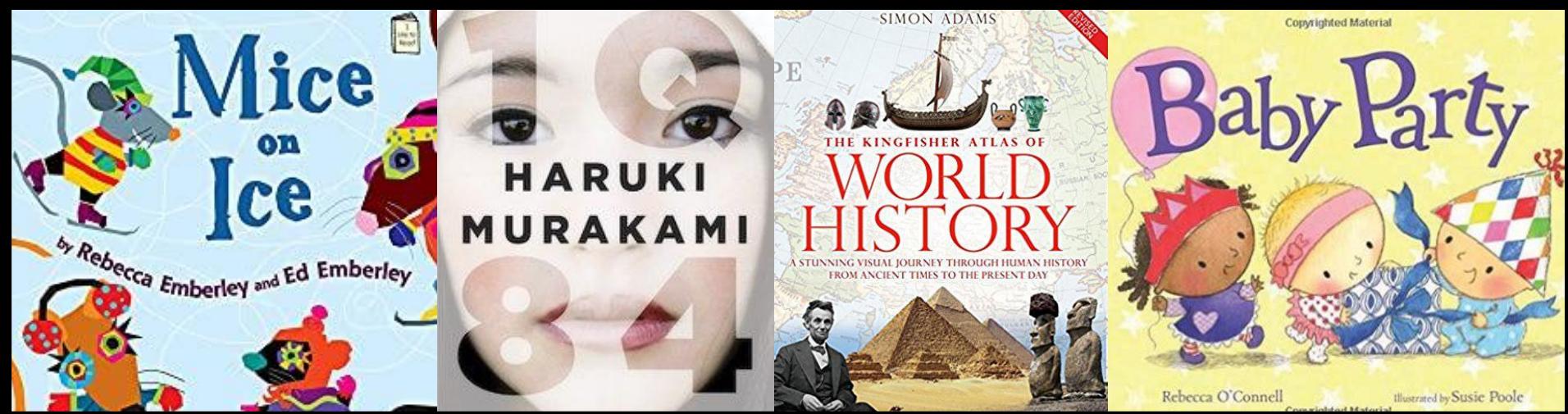
# Video

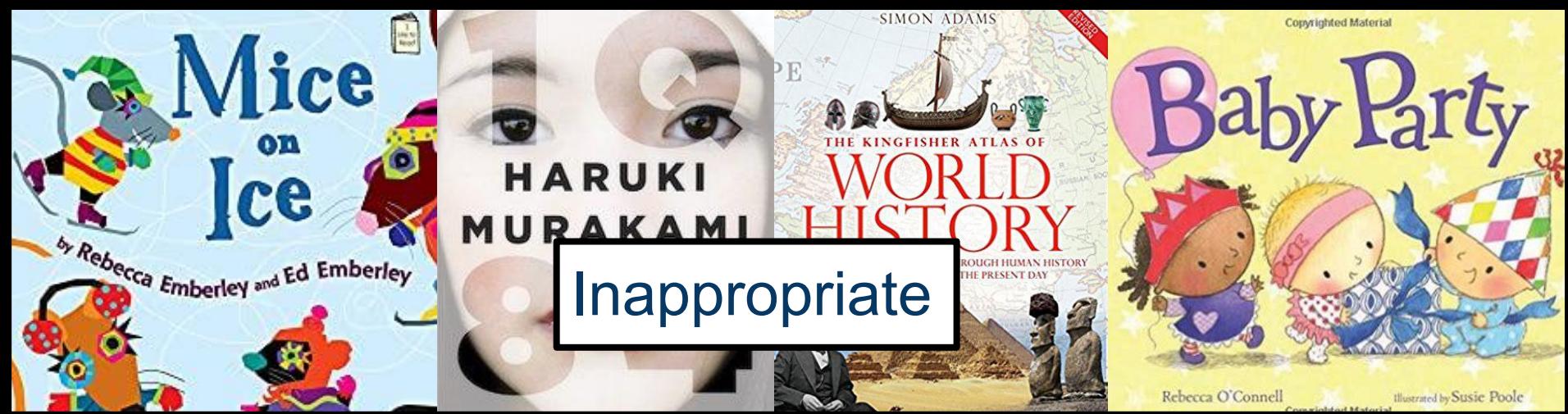


**Let us try to deal with a new challenge:**

We got a new book. Can we determine *whether or not it is appropriate for children in fourth grade?*







**Is the cover of the book colorful?**

**What is the thickness of the book cover?**

**Does the book contain animals?**

**How many words are there in the book?**

**How many rare words are there in the book?**

**How many pictures are there in the book?**

**Does the book contain monsters?**

**How many pages are there in the book?**

**What is the thickness of the book cover?**

not thick

thick

**Is the cover of the book colorful?**

no

yes

Inappropriate

**How many pictures are there in the book?**

< 5

> 5

Appropriate

Inappropriate

**How many words are there in the book?**

< 1000

> 1000

Inappropriate

**How many rare words are there in the book?**

< 100

> 100

Inappropriate

Appropriate

# **How can the computer “learn” to address the problem?**



**How can the computer  
“learn” to address the  
problem?**

**By looking at examples!  
For each example: label, features**

# labels

**Books Search**

Keywords

Author

Title

ISBN(s)

Publisher

Condition

Format

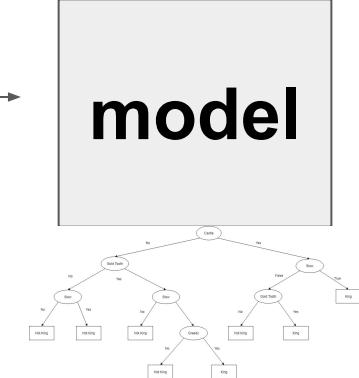
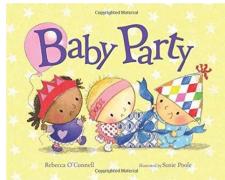
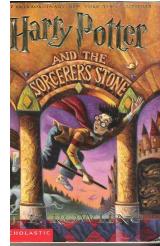
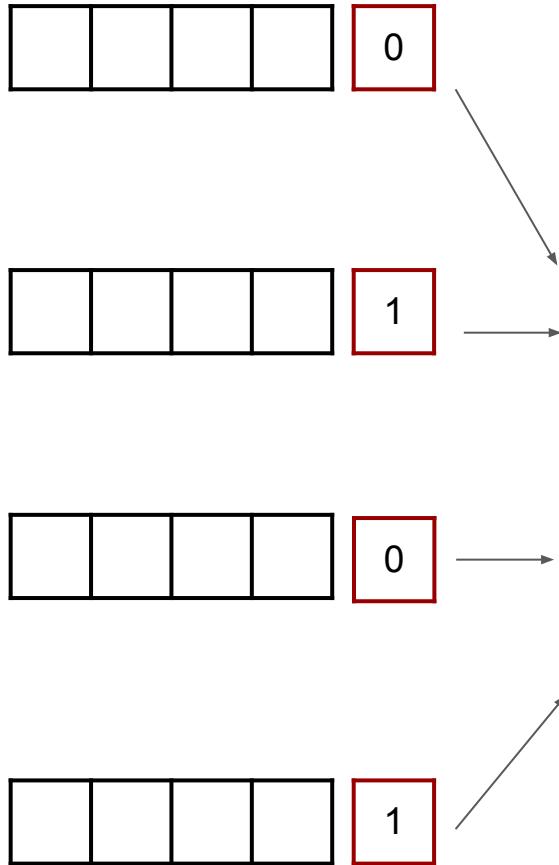
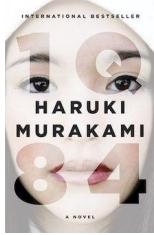
Reader Age

All Ages  
Baby-2 Years  
3-5 Years  
6-8 Years  
9-12 Years

Year

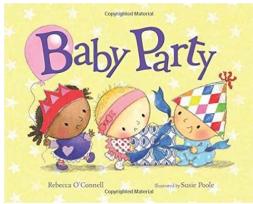
# features

Book name	Thick cover	#rare words	#pictures	#words
Harry Potter	0	2000	2	100000
The Wonderful Things You Will Be	1	10	20	3000

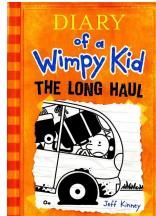
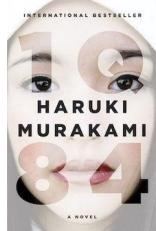


# Colorful cover

yes

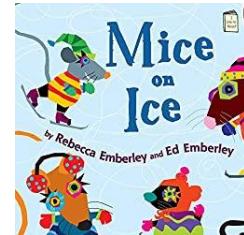
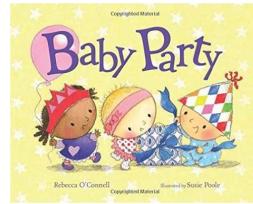


no

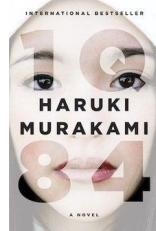


# Number of words

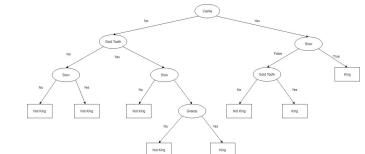
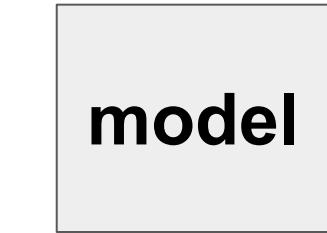
< 1000

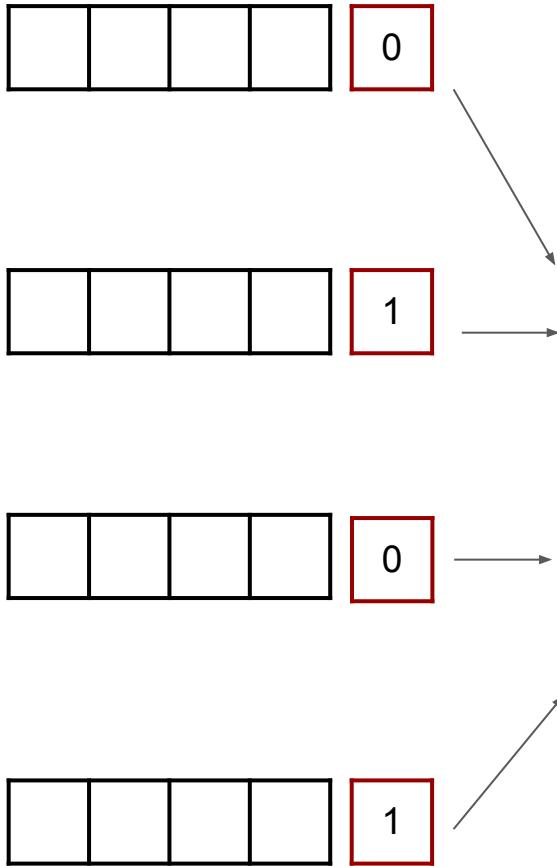
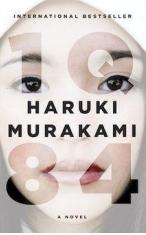


> 1000

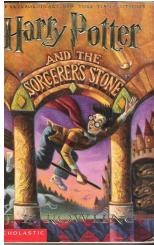
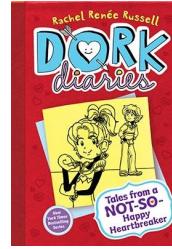
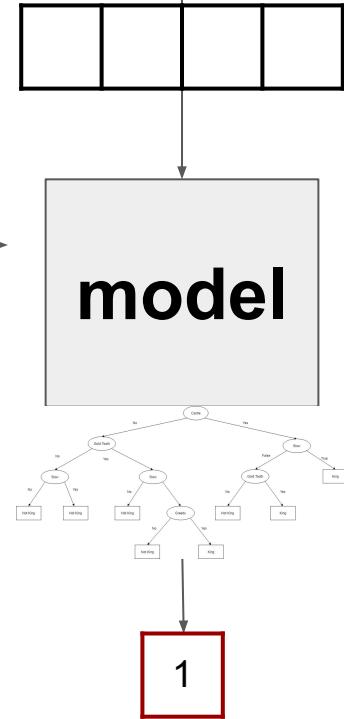


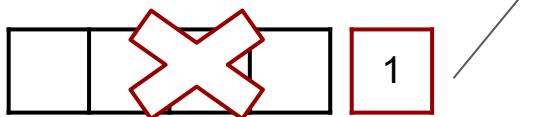
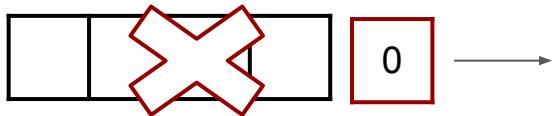
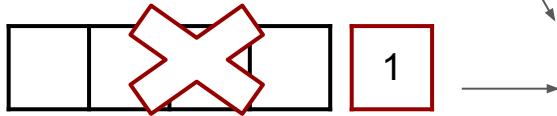
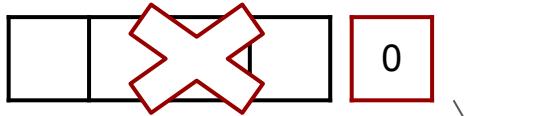
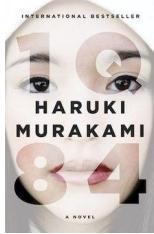
model



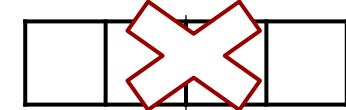
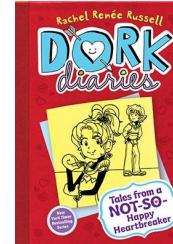


training

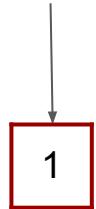




training



model



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"But I'm an angel."

"Yes, dear, you're an angel. But you've been through a lot. You're probably hungry."

"I am. I am so hungry."

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"No," I say. "This is all wrong."

"What?" they say.

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"What do you mean?"

"They're all the wrong shape. And the fish are all the wrong color. And look at this turkey! It's a turkey. Turkeys aren't blue. And look at this ham! Ham isn't green. Where's the beef?"

"There isn't any beef," they say.

"There isn't?" I say.

"No, dear. There isn't."

# What does the future hold?

A blurred background image of a computer screen showing a terminal window with multiple lines of code. The code appears to be in a programming language like JavaScript or Python, with syntax highlighting in blue, red, and green. The lines are numbered from 337 down to 354. The text is mostly illegible due to the blur, but some words like 'function', 'return', 'args', 'while', 'for', and 'if' are visible.





**Thank you!**