

# Prediction: Regression vs Classification

Quacky has finally cleaned all his duck data; no missing feathers or smudged measurements anymore. He has also carefully divided his dataset into two parts: one for training the model and one for testing it later. Now comes the exciting part, predicting the future of ducks in the pond!

The Miss Hootsworth lands beside her and explains:

"**Supervised learning means you teach the model by showing it examples along with the correct answers.**"



Every duck comes with:

- **Features-** like how heavy it is, how fast it flaps its wings, and its feather colours
- **A correct output-** something we want the model to predict later

By learning from these patterns, the model becomes capable of predicting information for any new duck that Quacky meets.

## Two ways a Duck's future can be predicted

The owl draws two paths on the sand:

### Regression - Predicting a Number

Regression deals with continuous numerical values: results that can fall anywhere along a number line.

In the pond, Quacky wonders:

"How fast will this duck swim in the next race?"

The answer might be:

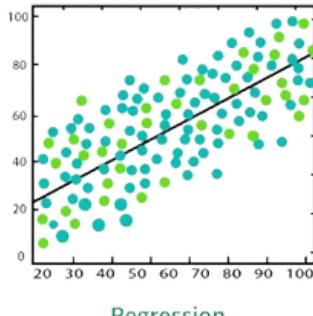
- 8.7 meters per second
- 12.3 meters per second
- Maybe 5.0 meters per second



These aren't categories, they are amounts. Whenever Quacky asks "How much?", he steps into the world of Regression.

Regression helps Quacky solve:

- Estimating a duck's speed
- Predicting a duck's weight next month
- Calculating a duck's age



Regression

## Classification - Predicting a Category

Classification deals with distinct groups: clear, separate labels.

Quacky might instead ask:

*"Will this duck win the race or not?"*

Here, the answer could be:

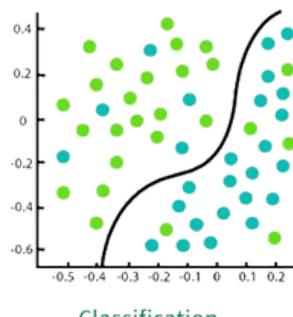
- Winner
- Not a winner

No exact numbers, just group membership.



Whenever Quacky asks "Which type?" or "What class?", he is performing Classification.  
Other examples in Quacky's world:

- Fast duck vs Slow duck
- Healthy duck vs Sick duck
- Treasure-finding duck vs Hopelessly-lost duck



Classification

## Why this difference makes Quacky wiser?

The owl warns gently:

"If you choose the wrong method, the predictions go all Quacky."

Imagine trying to categorize something that should be a number, or trying to assign a number when it should be a category. The model becomes confused and outputs nonsense!

## What Quacky learned?

- Regression predicts "how much, numeric future outcomes"
- Classification predicts "which type", the category the duck belongs to
- Choosing the right method creates smart, meaningful predictions



The Quacky knows:

"Know your answer first, and your model will always swim in the right direction."

instructor



Miss Hootsworth

### Final Simple Definition

Know your answer first, and your model will always swim in the right direction.