# **A04 ITAI 2376 Deep Learning for an 11-year-old**

## **ITAI 2376 Deep Learning in Artificial Intelligence**

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## **Learn from Mistakes: How Robo Learns: “The Secret of Backpropagation!”**

**Objective:**

To explain Backpropagation, a key idea in deep learning, in a fun, relatable, and simple way for 11-year-olds, while keeping it technically accurate and professional.

## **Part 1: The Story “Robo and the Cookie Quest"**

## Characters:

* **Robo**: A robot who wants to bake the perfect cookie.
* **Chef Netta**: A neural network that teaches Robo how to learn.
* **Miss Error**: A taste tester who tells Robo how far off he is.

### Story Summary:

Robo attempts to bake cookies but makes a mistake in the recipe. Chef Netta introduces him to backpropagation, a technique that helps learn from errors. Each time Robo bakes, Miss Error provides feedback. Chef Netta sends that feedback back through Robo's recipe steps, enabling him to adjust the ingredients. After many attempts, Robo finally bakes the perfect cookie!

This story reflects how neural networks learn: they make predictions, assess their mistakes, and modify their “recipe” (weights and biases) using backpropagation.

## **Part 2: Visual Slides (Cartoon Style)**

I’ll generate these slides for you next if you'd like! Here's what they’ll include:

**Slide 1**: Robo in a messy kitchen with a failed cookie.

**Slide 2**: Miss Error holding a sign: “Too salty! 80% wrong!”

**Slide 3**: Arrows showing the error going backward through Robo’s brain.

**Slide 4**: Robo adjusting dials labeled “Salt,” “Sugar,” and “Flour.”

**Slide 5**: Robo holding a golden cookie with a big smile and a “100% Perfect!” badge.

## . **Conclusion:**

So, what can we learn from Robo and his cookie quest?

Like Robo, we all make mistakes when trying something new, but that’s not a bad thing, it's how we learn! Backpropagation is the magical process that allows robots (and computers) to learn from their mistakes, much like how you improve when you practice math, ride a bike, or bake cookies.

Every time Robo makes a mistake, he doesn’t give up. Instead, he listens to feedback, makes small adjustments, and tries again. That’s the essence of learning, trying, adapting, and growing.

So, the next time you mess up a drawing, miss a goal in soccer, or make an error in a math problem, remember Robo. You're just one step closer to getting it right.

Learning is a superpower, and now you know the secret recipe behind how machines learn, too**!**

References:

[Backpropagation Facts for Kids](https://kids.kiddle.co/Backpropagation)

[Deep physical neural networks trained with backpropagation](https://www.nature.com/articles/s41586-021-04223-6.pdf)