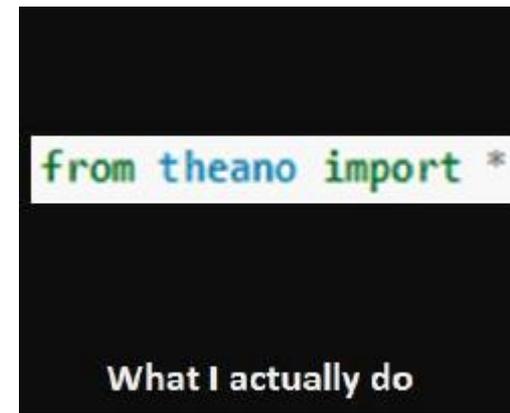
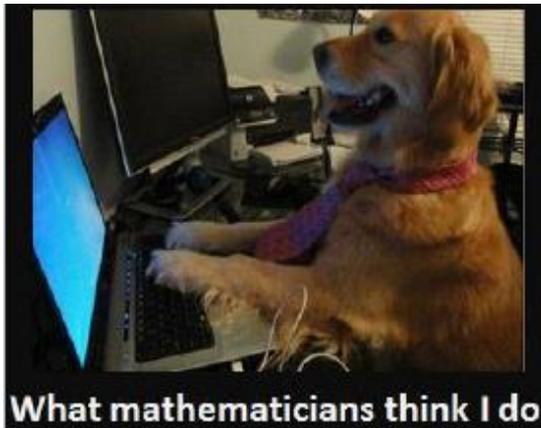


# Deep Learning Algorithms and Approaches for Teaching English

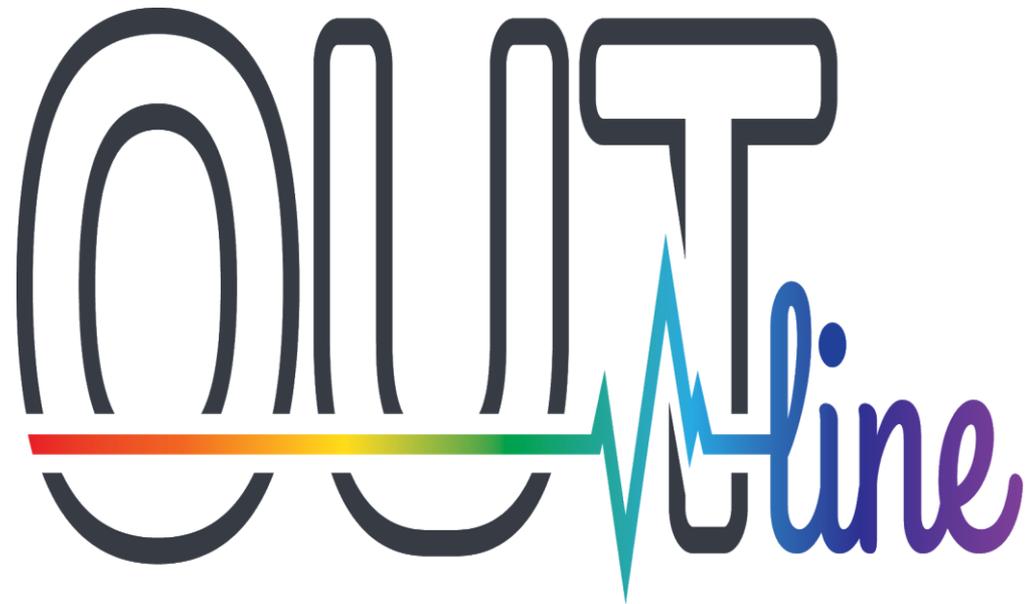
Dr. Asma H. Sbaih, Palestine Aliya University



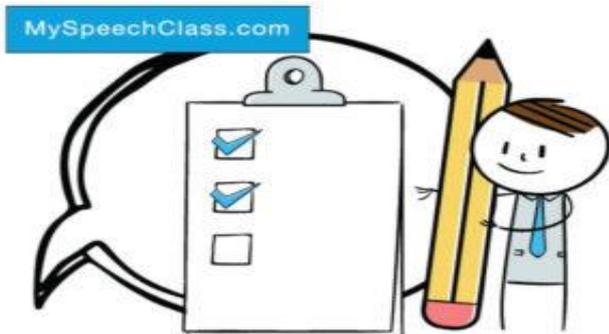
June 28, 2019



# Outline



- Definitions.
- Machine learning.
- Deep learning.
- Applications of deep learning.
- Deep Learning Architectures
- Deep Learning in education.
- Deep Learning applications in English Education



# Definitions

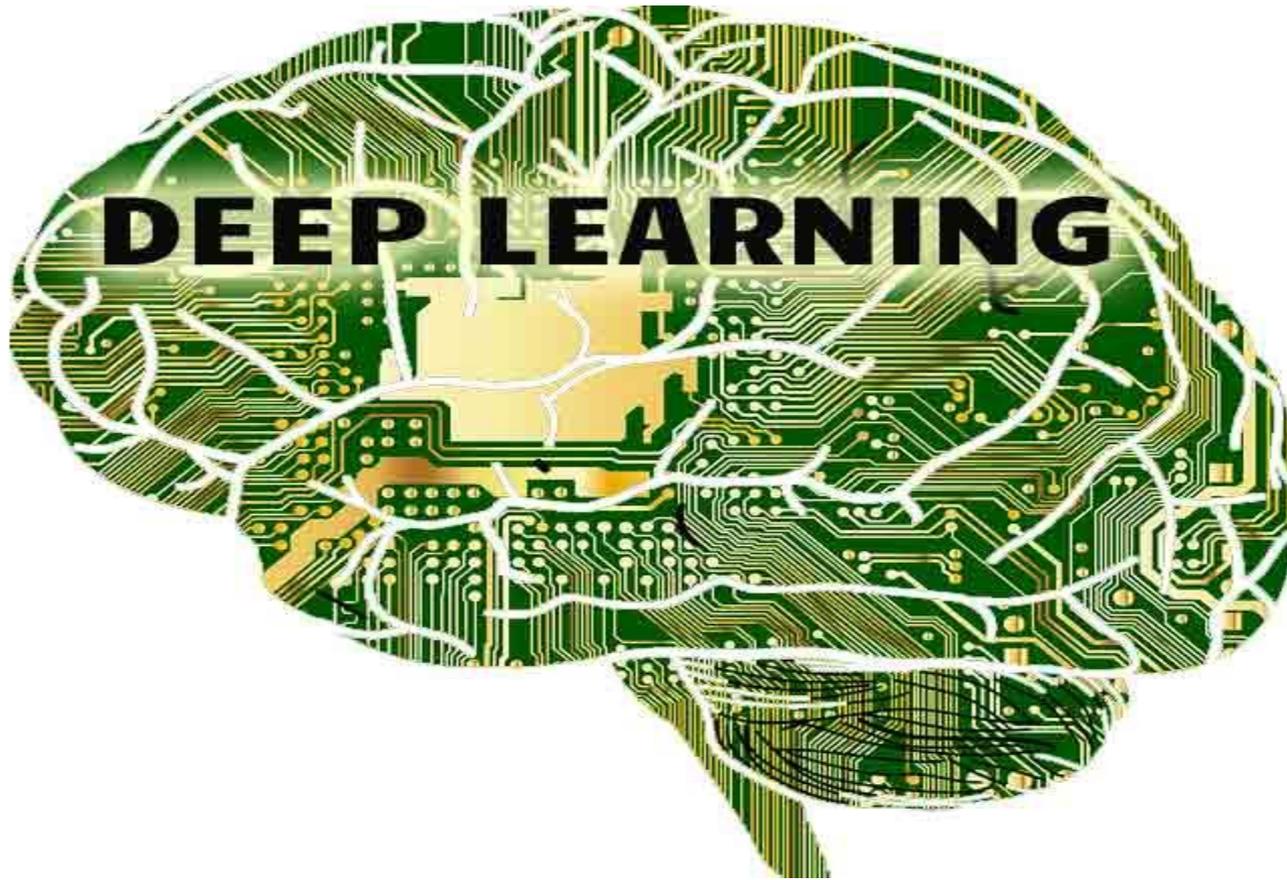
**Artificial Intelligence:** design software applications which exhibit human-like behavior, e.g. speech, natural language processing, reasoning or intuition.



**Machine Learning:** teach machines to learn without being explicitly programmed.



**Deep Learning:** using neural networks, teach machines to learn from data where features cannot be explicitly expressed



**DEEP LEARNING IS THE FASTEST-GROWING  
FIELD IN ARTIFICIAL INTELLIGENCE(AI)**



# MACHINE LEARNING – WHAT IS IT?

- Develop an efficient algorithms to solve the optimization problem.
- Every machine learning algorithm has three components:
  - ✓ Representation
  - ✓ Evaluation
  - ✓ Optimization

## □ Types of learning

### Supervised Learning



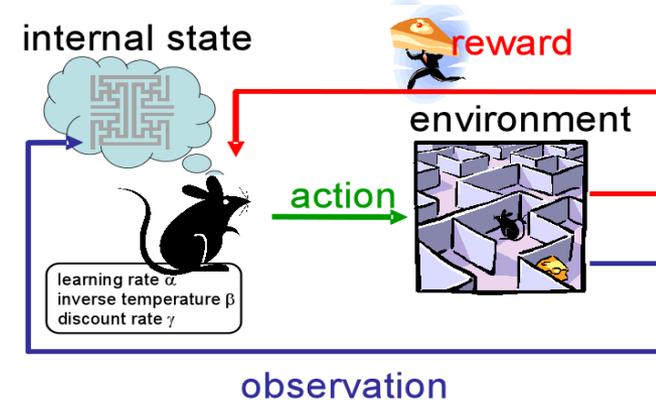
### Unsupervised Learning



Seite 5

Seite 5

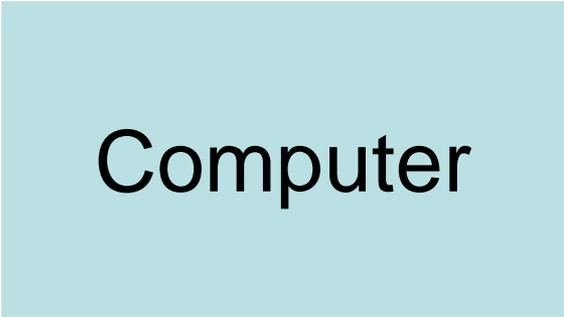
### Reinforcement learning



observation

# Traditional Programming

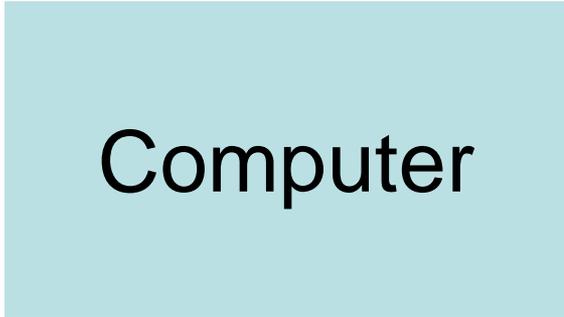
Data  
Program



Output

# Machine Learning

Data  
Output



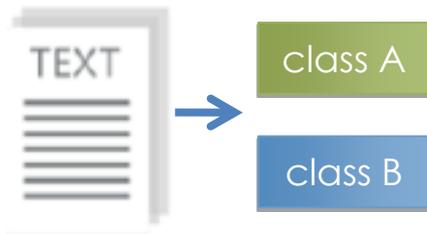
Program

# Types of Learning

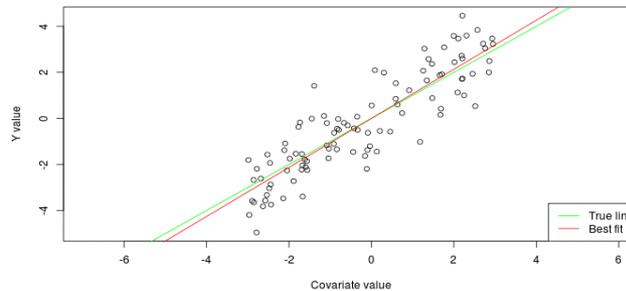
**Supervised:** Learning with a **labeled training** set  
Example: email *classification* with already labeled emails

**Unsupervised:** Discover **patterns** in **unlabeled** data  
Example: *cluster* similar documents based on text

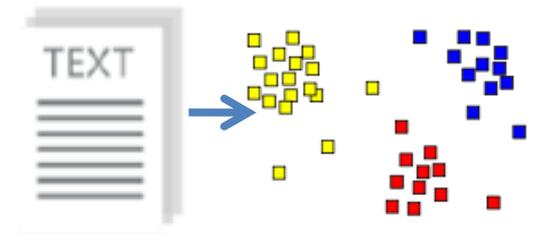
**Reinforcement learning:** learn to **act** based on **feedback/reward**  
Example: learn to play Go, reward: *win or lose*



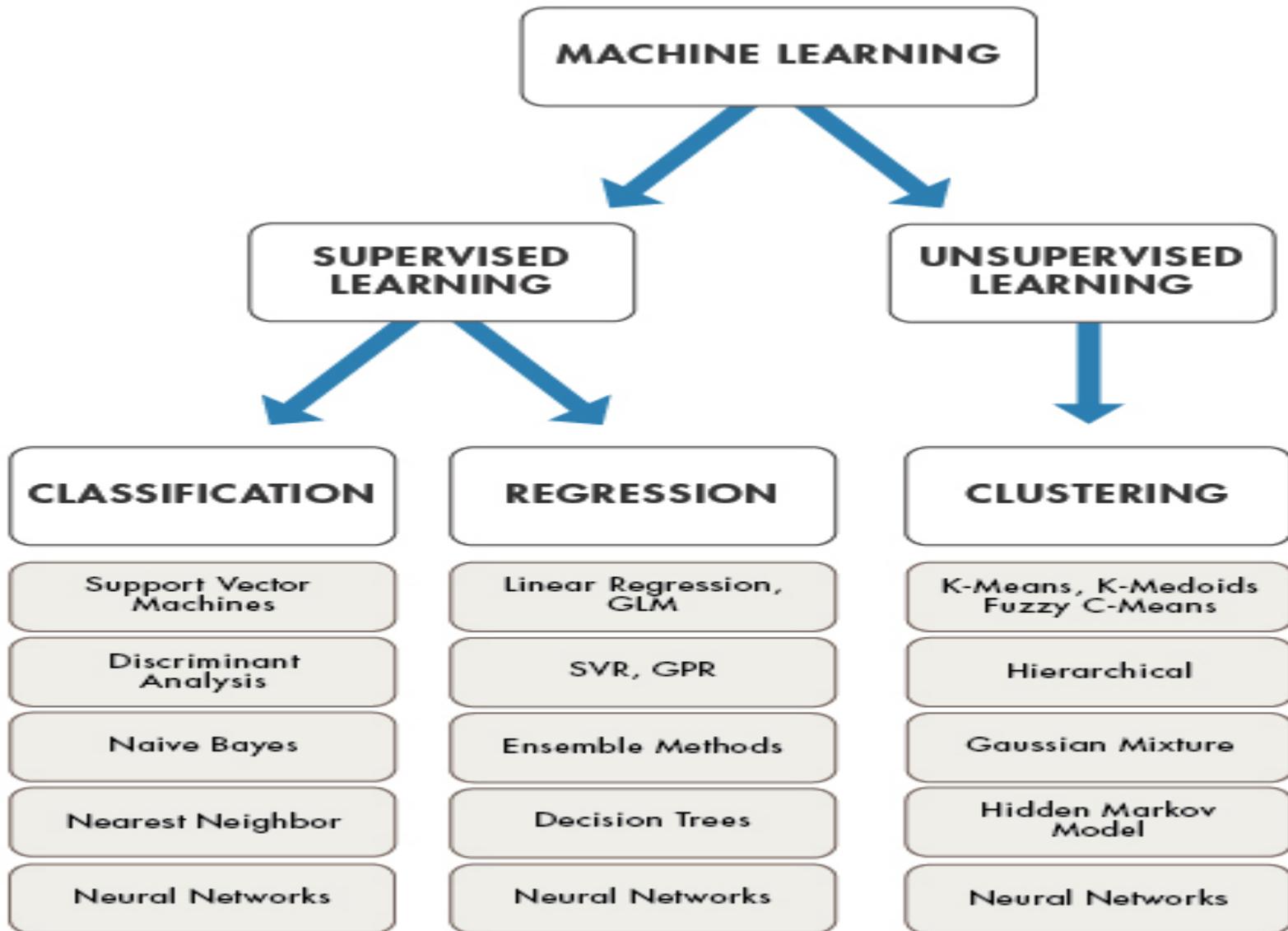
Classification



Regression



Clustering

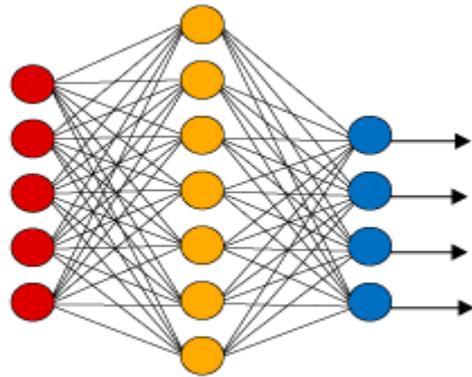


# Deep Learning

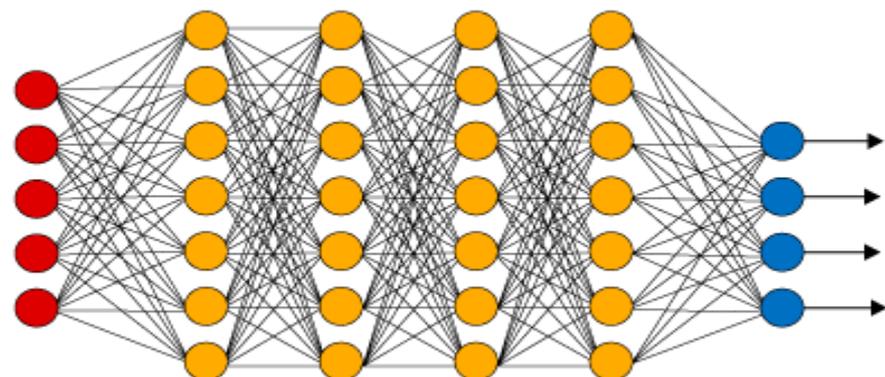
## Definition:

**Deep structured learning** or **hierarchical learning**: is part of a broader family of **machine learning** methods based on **learning** data representations, as opposed to task-specific algorithms.

### Simple Neural Network



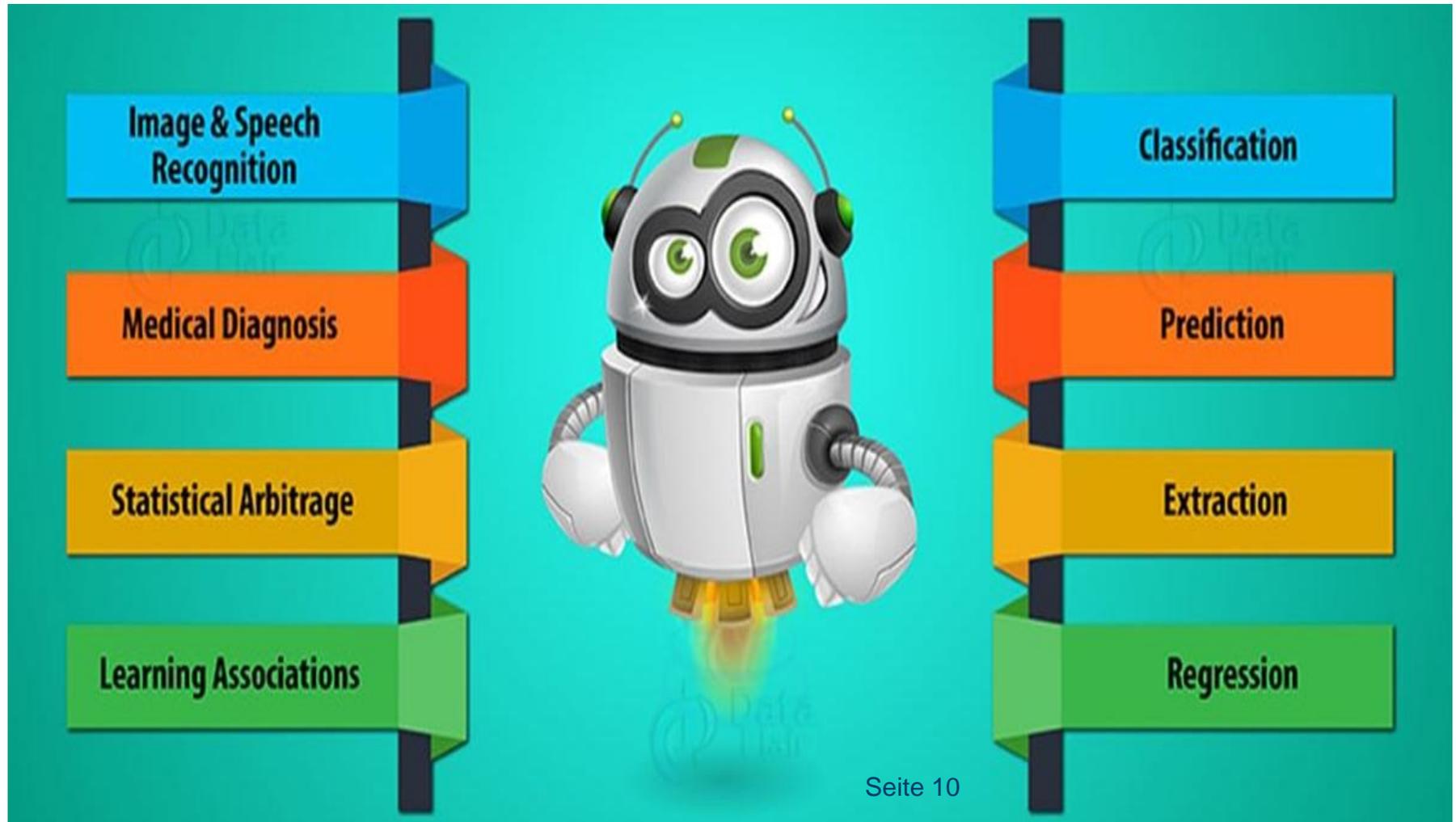
### Deep Learning Neural Network



● Input Layer    ● Hidden Layer    ● Output Layer

Source: "paper of whatever", A. Gomez (2017)

# Applications of deep learning



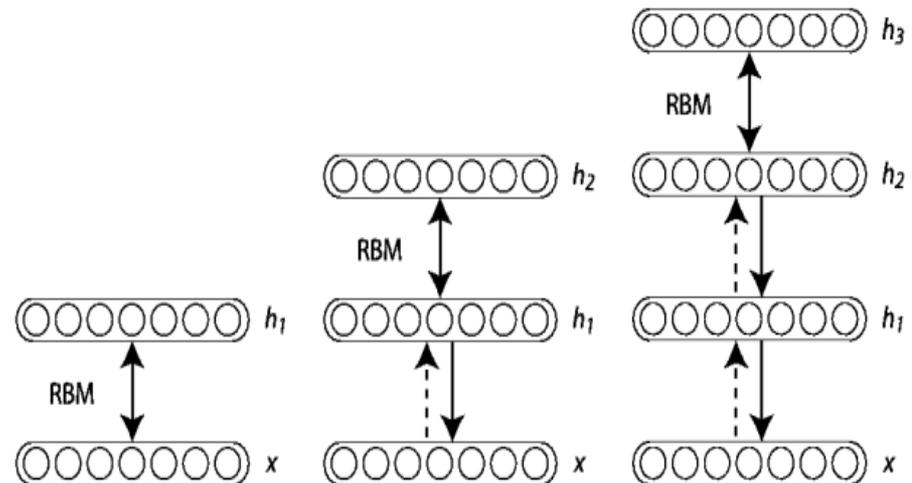
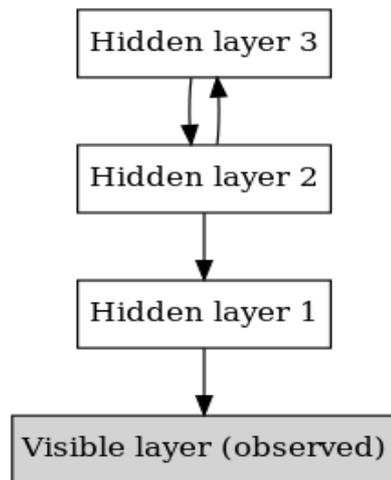
# Deep Learning Architectures

## Major Architectures of Deep Networks:

- ❑ Unsupervised Pretrained Networks (UPNs)
  - ✓ Autoencoders
  - ✓ Deep Belief Networks (DBNs)
  - ✓ Generative Adversarial Networks (GANs)
- ❑ Convolutional Neural Networks (CNNs)
- ❑ Recurrent Neural Networks
- ❑ Recursive Neural Networks

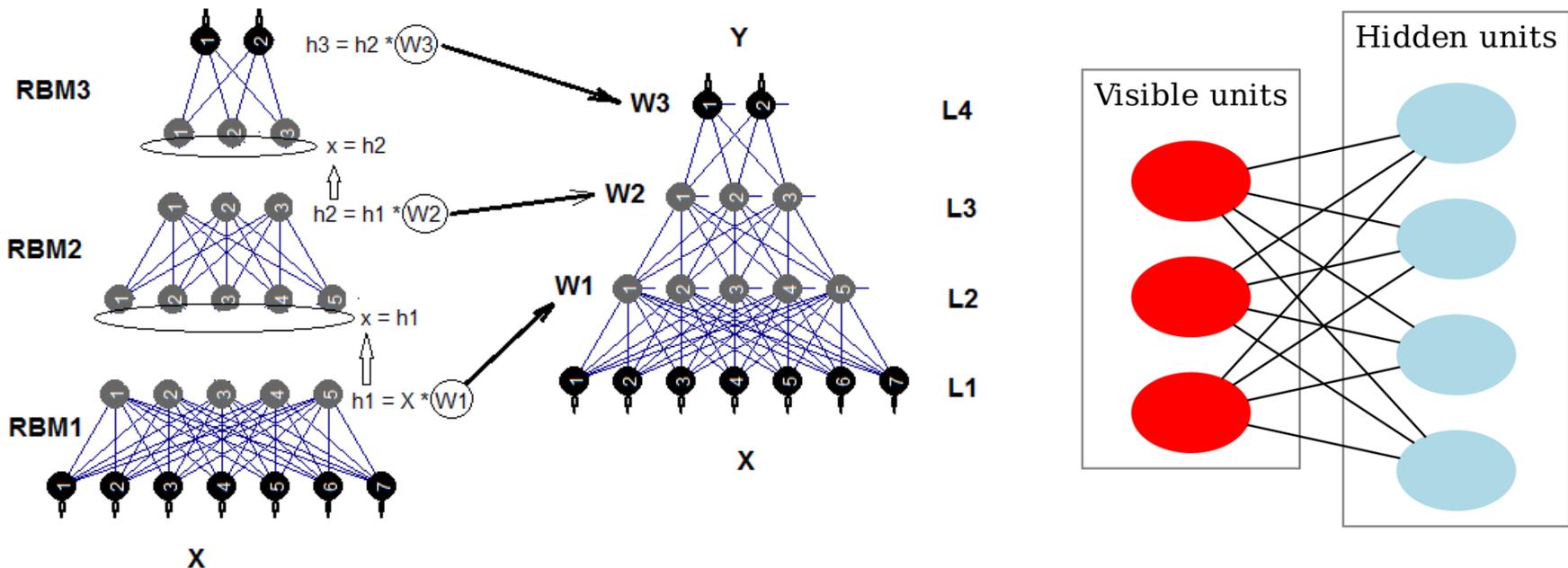
# Deep Belief Networks

- A class of deep neural network, composed of multiple layers of latent variables.
- unsupervised networks such as restricted Boltzmann machines (RBMs).



# Restricted Boltzmann Machine

- RBM: is a generative stochastic artificial neural network that can learn a probability distribution over its set of inputs.



# DBNs

- **Training:** DBNs are first pre-trained in an unsupervised fashion.
- 
- **Structure:** DBNs have no intra-layer or between unit connections among each layer.
- 
- **Problems:** DBNs depend heavily on initialization and can be computationally intractable without effective pre-training.
- 
- **Tasks:** DBNs can serve classification, regression, and other tasks.

# Libraries in Python for RBM

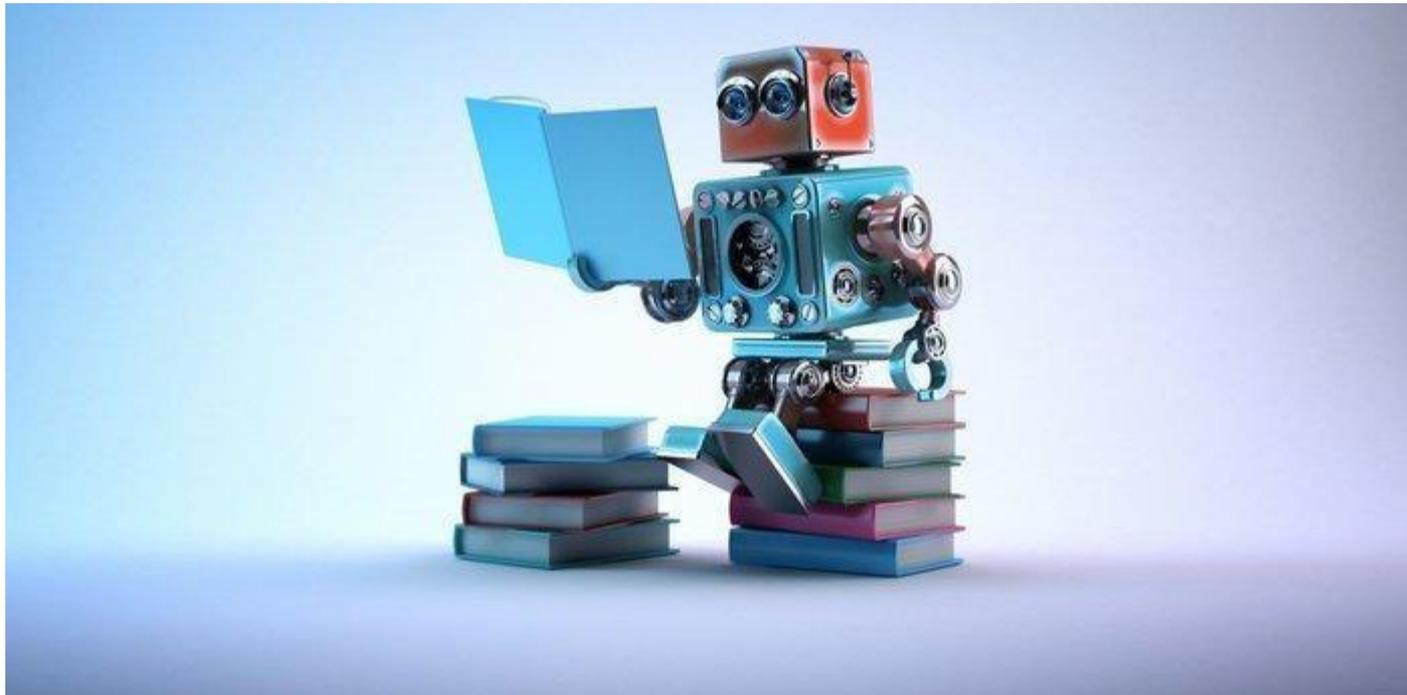
## 1. Sklearn

- ✓ `sklearn.neural_network.BernoulliRBM()`
- ✓
- ✓ `def BernoulliRBM(self, n_components=256, learning_rate=0.1, batch_size=10, n_iter=10, verbose=0, random_state=None)`
- ✓
- ✓ `sklearn.neural_network.RBM()`.

✓

## 2. Tensorflow “widely used in deep learning”.

# DEEP LEARNING APPLICATIONS IN ENGLISH EDUCATION

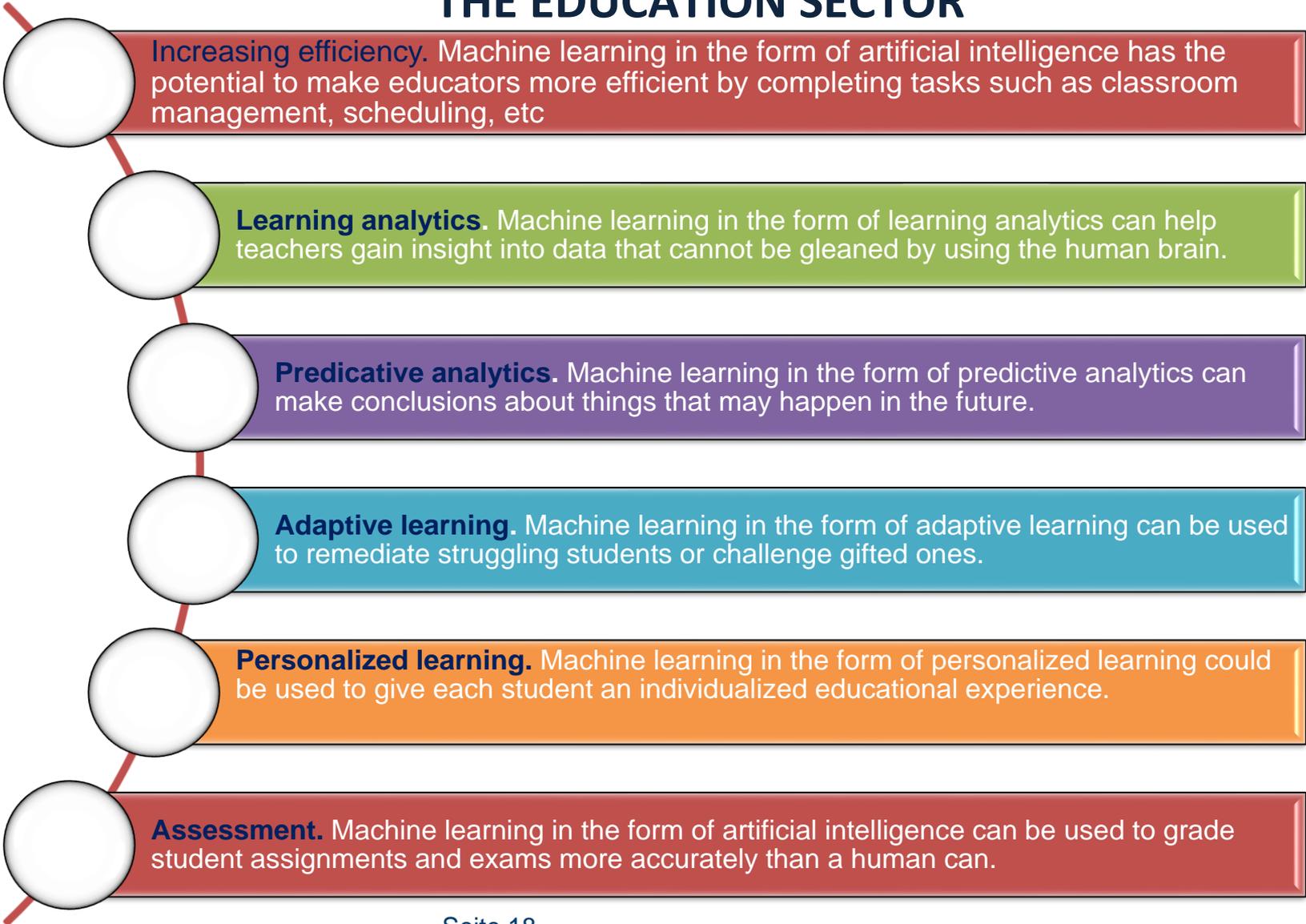


# What is deep learning in education?

Students learn to self-direct their own **education** and to adopt what is known as academic mindsets,' and they learn to be lifelong **learners**.

**Deeper learning** is the process of **learning** for transfer, meaning it allows a student to take what's learned in one situation and apply it to another.

# 6 WAYS MACHINE AND DEEP LEARNING WILL REVOLUTIONIZE THE EDUCATION SECTOR



**Increasing efficiency.** Machine learning in the form of artificial intelligence has the potential to make educators more efficient by completing tasks such as classroom management, scheduling, etc

**Learning analytics.** Machine learning in the form of learning analytics can help teachers gain insight into data that cannot be gleaned by using the human brain.

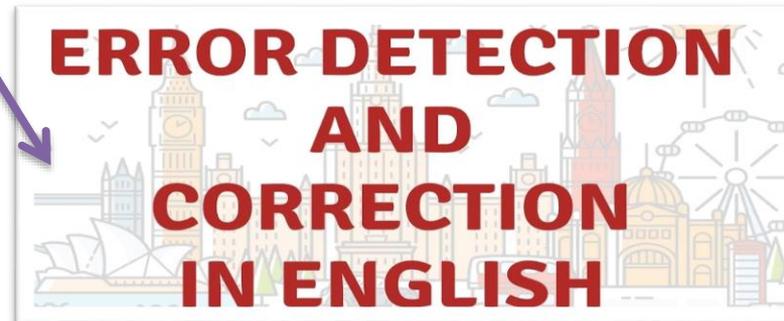
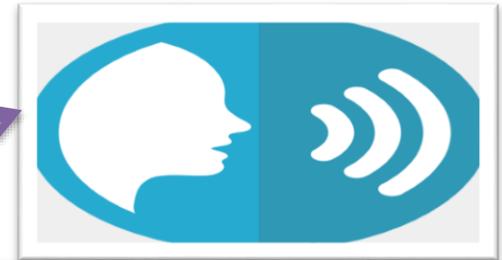
**Predicative analytics.** Machine learning in the form of predicative analytics can make conclusions about things that may happen in the future.

**Adaptive learning.** Machine learning in the form of adaptive learning can be used to remediate struggling students or challenge gifted ones.

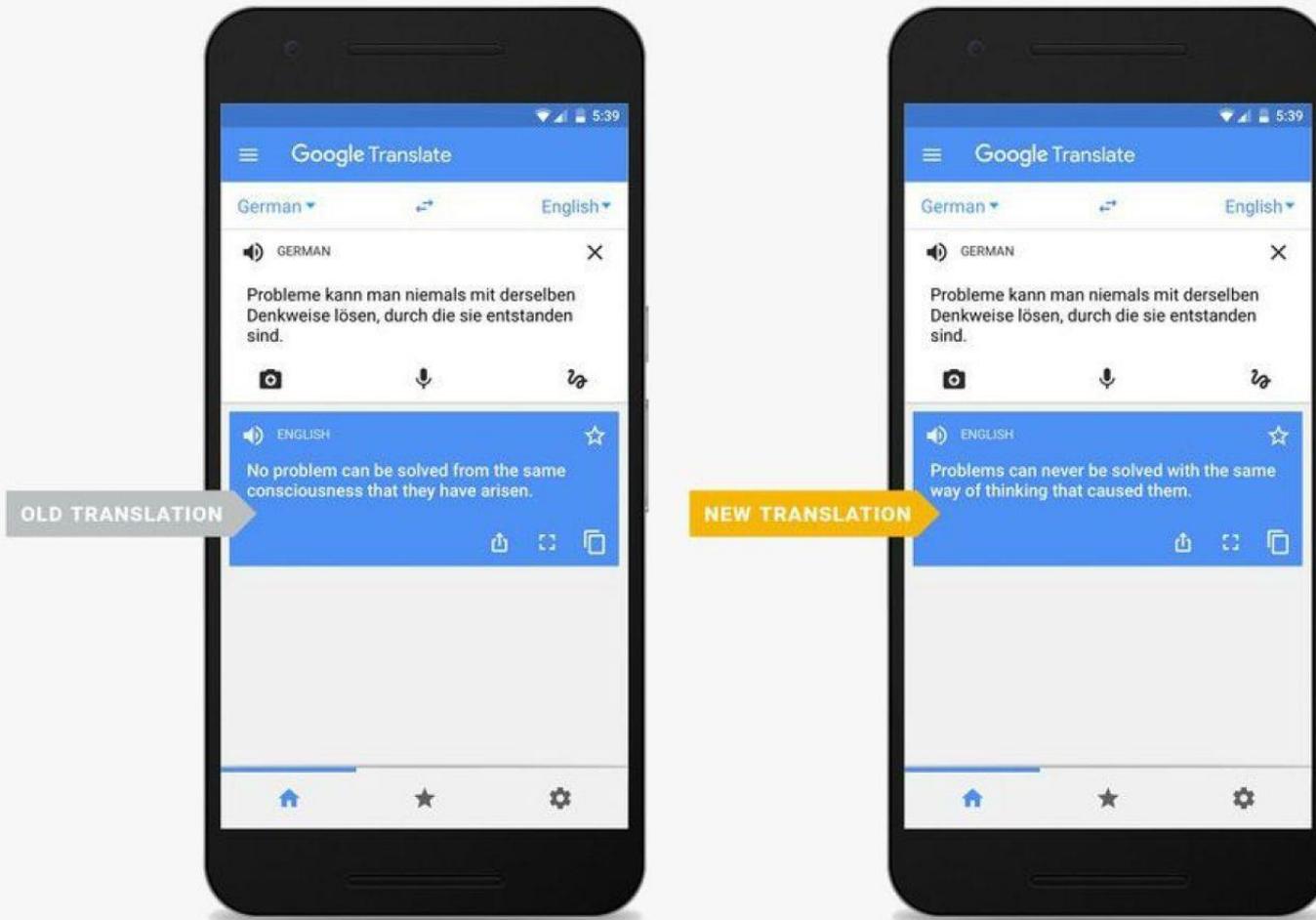
**Personalized learning.** Machine learning in the form of personalized learning could be used to give each student an individualized educational experience.

**Assessment.** Machine learning in the form of artificial intelligence can be used to grade student assignments and exams more accurately than a human can.

# DEEP LEARNING APPLICATIONS IN ENGLISH EDUCATION



# GOOGLE TRANSLATE USING MACHINE AND DEEP LEARNING APPROACHES TO IMPROVE TRANSLATION



# Resources

<https://aws.amazon.com/machine-learning>

<https://aws.amazon.com/blogs/ai>

<https://www.nvidia.com/en-us/deep-learning-ai/>

<https://www.nvidia.fr/dli>

<https://www.nvidia.fr/data-center/volta-gpu-architecture/>

<https://aws.amazon.com/ec2/instance-types/p3/>

<https://medium.com/@julsimon>

# Thank you for listening

