Intro to Deep Learning with Keras

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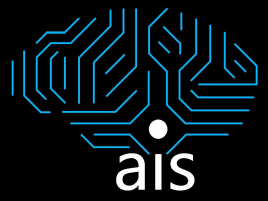


How this workshop is going to work...

- First - a very brief intro to machine learning and deep learning concepts.
- Second - a deep dive into deep learning theory and how to use Keras for deep learning.

Resources for this Workshop - on GitHub

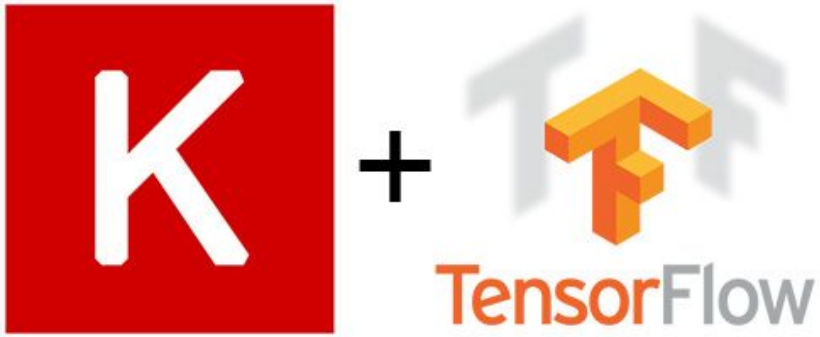
https://github.com/AmolMavuduru/IntroToDeepLearning

Includes slides, code, and images used for examples.

Software Dependencies

You will need the following libraries to run the code:

- Anaconda distribution of Python
- Keras and TensorFlow.



What is machine learning?

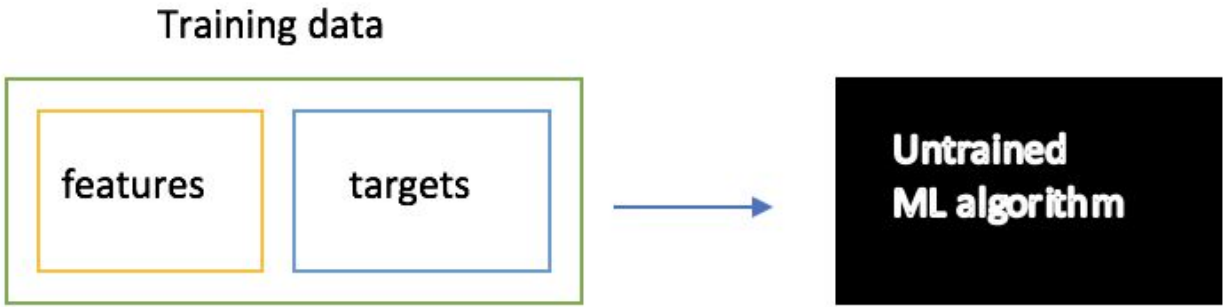
- Machine learning is an area of **artificial intelligence** that is focused on using **mathematical** and **statistical** techniques to **“give machines the ability to learn”** without being explicitly programmed.
- Usually involves **some form of data** with **examples** to learn from.

How Supervised ML Works

1. Start with training data
2. Train an algorithm on the training data.
3. Test the algorithm’s performance on test data.
4. Repeat steps 2-3 with improved algorithms.

Supervised ML - Training Phase

- Training data has examples with **features** (inputs) and **targets** (outputs/what you want to predict).
- Example:
  - features - temperature during last 10 days
  - target - temperature for the next day

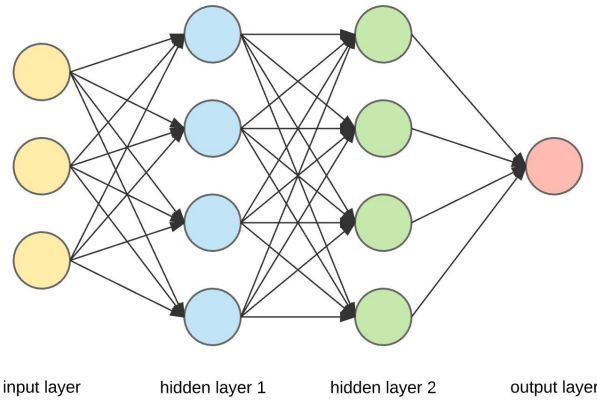


Supervised ML - Testing Phase

- Test data also has features and targets.
- Except this time, we are trying to predict the targets using the features and evaluate our predicts.

What is Deep Learning?

- A form of machine learning inspired by human learning.
- Uses algorithms called neural networks.
- Based on a lot of math!



MNIST - Recognizing Handwritten Digits

- In this workshop we will see how to train a neural network to perform a human task - recognizing handwritten digits!
- We will see a neural network reach human-level performance in just a few minutes of training!