

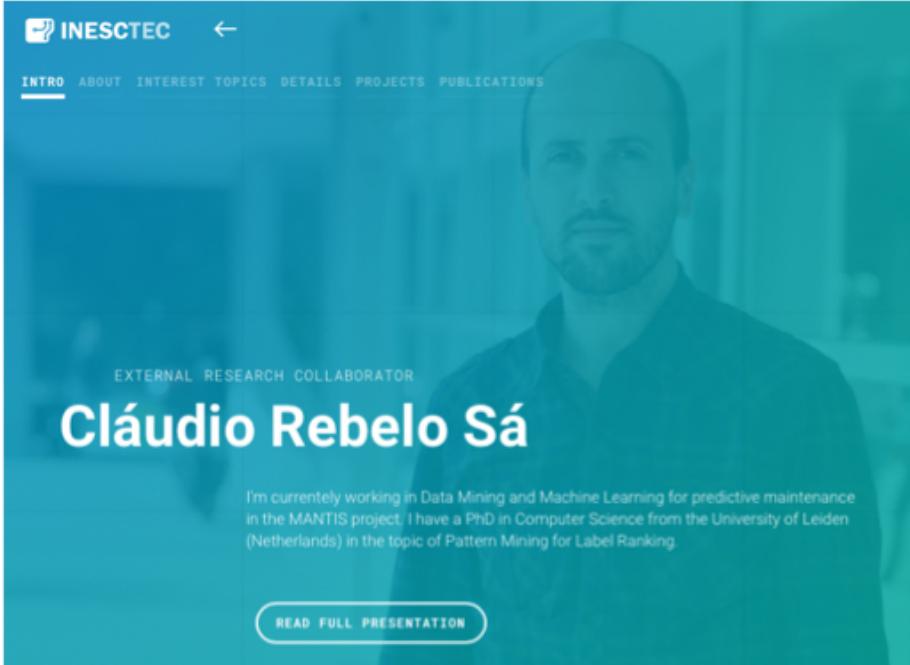
TensorFlow IS NOT machine learning

Carlos Soares

csoares@fe.up.pt



disclaimer: non-co-author



The screenshot shows a profile page for Cláudio Rebelo Sá. At the top left is the INESCTEC logo. Below it is a navigation bar with links: INTRO, ABOUT, INTEREST TOPICS, DETAILS, PROJECTS, and PUBLICATIONS. The main content features a large portrait of Cláudio Rebelo Sá, a man with a beard. Below the portrait, the text "EXTERNAL RESEARCH COLLABORATOR" is displayed. The name "Cláudio Rebelo Sá" is prominently shown in large blue letters. A bio text below states: "I'm currently working in Data Mining and Machine Learning for predictive maintenance in the MANTIS project. I have a PhD in Computer Science from the University of Leiden (Netherlands) in the topic of Pattern Mining for Label Ranking." At the bottom of the profile page is a button labeled "READ FULL PRESENTATION".

<https://www.inesctec.pt/en/people/claudio-rebelo-sa-5527>

helped me prepare this
talk

... but refuses to be
officially associated with it

is this a talk on DL?



ML since 1994

DL since yesterday
evening

Getting Started With TensorFlow

Contents ▾

- TensorFlow Core tutorial
- Importing TensorFlow
- The Computational Graph
- tf.train API

This guide gets you started programming in TensorFlow. Before using this guide, [install TensorFlow](#). To get the most out of this guide, you should know the following:

- How to program in Python.
- At least a little bit about arrays.
- Ideally, something about machine learning. However, if you know little or nothing about machine learning, then this is still the first guide you should read.

https://www.tensorflow.org/get_started/get_started

surgery: the TensorFlow way

Getting Started With a Scalpel

Contents [EXPAND MORE](#)

[TensorFlow Core tutorial](#)

[Importing TensorFlow](#)

[The Computational Graph](#)

[tf.train API](#)

[MORE_HORIZ](#)

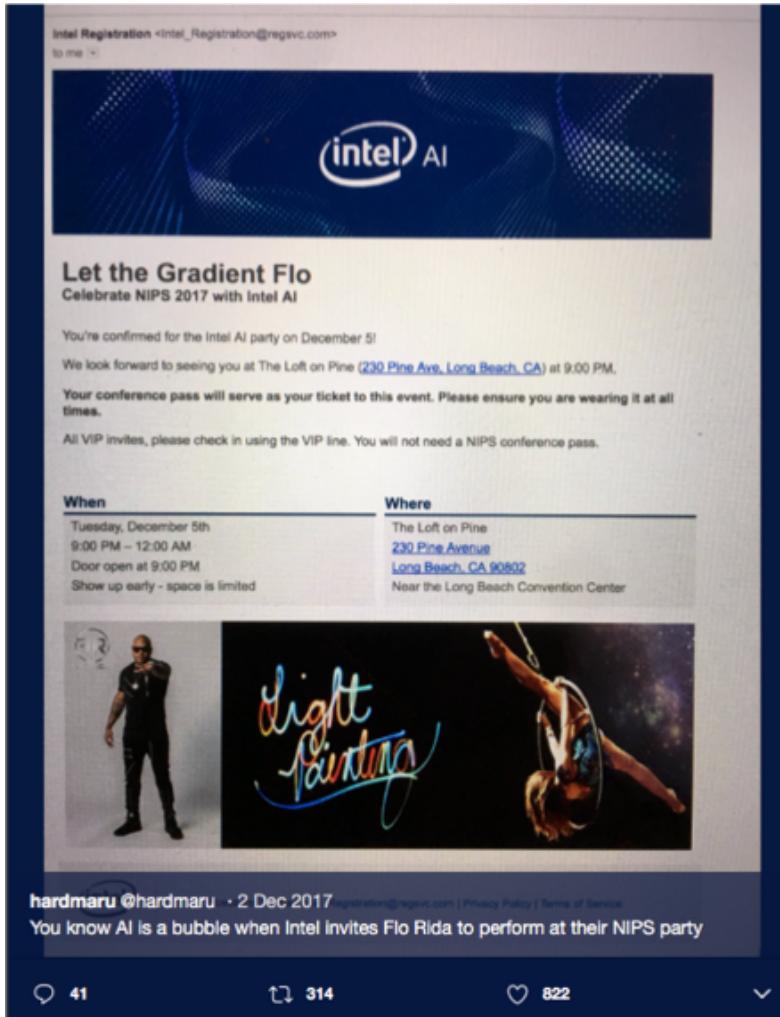


Image from https://www.aventools.com/wp-content/uploads/2016/07/44031_1.jpg

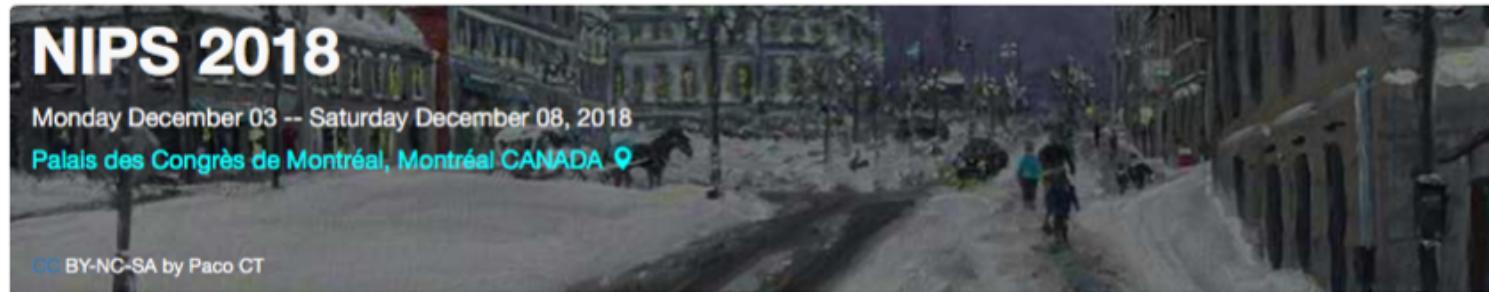
This guide gets you started operating with a Scalpel. Before using this guide, [buy a Scalpel](#). To get the most out of this guide, you should know the following:

- How to use your hands to hold things.
- At least a little bit about human bodies.
- Ideally, something about medicine. However, if you know little or nothing about medicine, then this is still the first guide you should read.

is the hype out of hand?



... yes, it is



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Statement on inappropriate behavior

December 17, 2017

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We are determined to do better in 2018 and beyond. Our immediate actions include: recruiting a Diversity and Inclusion Chair, strengthening our [Code of Conduct](#), and formalizing procedures for reporting and communicating concerns. All chairs, attendees and sponsors will be required to acknowledge and abide by our Code of Conduct.

We welcome comments emailed to comments@nips.cc.

Ulrike von Luxburg and Isabelle Guyon, General Chairs of NIPS 2017

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the ultimate test: deep learning vs deep learners

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PORTUGAL

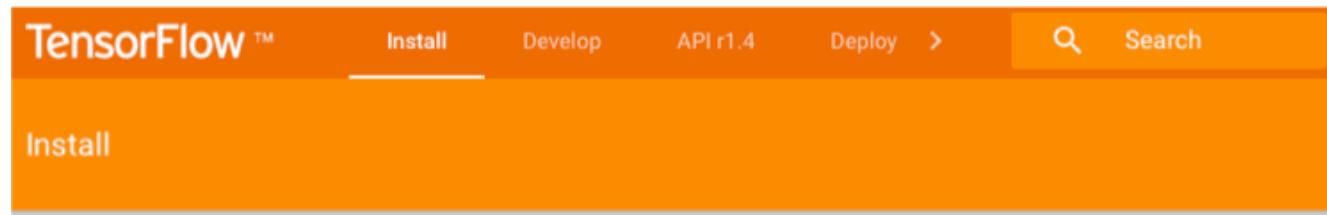
who is a DL expert?



VS



step 1: install tensorflow



The screenshot shows the TensorFlow website's navigation bar with 'Install' selected. Below the bar, a large orange header says 'Install'. The left sidebar lists various installation guides, and the main content area is titled 'Installing TensorFlow on macOS'.

Installing TensorFlow
Installing TensorFlow on Ubuntu
Installing TensorFlow on macOS
Installing TensorFlow on Windows
Installing TensorFlow from Sources

Transitioning to TensorFlow 1.0

Installing TensorFlow for Java
Installing TensorFlow for Go
Installing TensorFlow for C

Installing TensorFlow on macOS

Contents ▾
Determine how to install TensorFlow
Installing with virtualenv
Next Steps
Uninstalling TensorFlow

This guide explains how to install TensorFlow on macOS.

 **Note:** As of version 1.2, TensorFlow no longer provides GPU support on macOS.

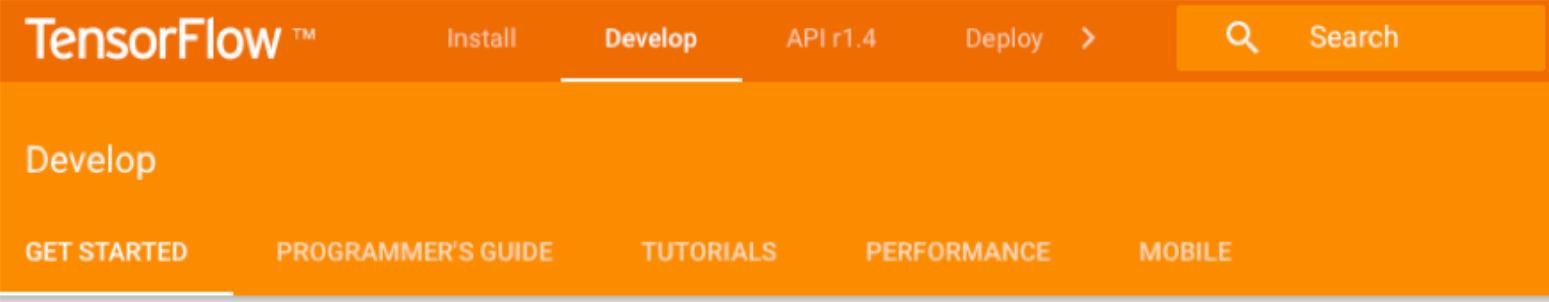
Determine how to install TensorFlow



You must pick the mechanism by which you install TensorFlow. The

https://www.tensorflow.org/install/install_mac

step 2: getting started with tensorflow



The screenshot shows the TensorFlow website's 'Develop' section. The top navigation bar includes links for 'TensorFlow™', 'Install', 'Develop' (which is underlined), 'API r1.4', 'Deploy', a search bar, and a 'Search' button. Below this, a secondary navigation bar has links for 'GET STARTED', 'PROGRAMMER'S GUIDE' (which is underlined), 'TUTORIALS', 'PERFORMANCE', and 'MOBILE'. The main content area is titled 'Getting Started With TensorFlow'. On the left, there's a sidebar with a 'Getting Started' heading and a list of links: 'Getting Started With TensorFlow', 'MNIST For ML Beginners', 'Deep MNIST for Experts', 'TensorFlow Mechanics 101', 'tf.estimator Quickstart', 'Building Input Functions with tf.estimator', 'TensorBoard: Visualizing Learning', 'TensorBoard: Graph Visualization', 'TensorBoard Histogram Dashboard', and 'TensorFlow Versions'. The main content area contains the title 'Getting Started With TensorFlow', a 'Contents' dropdown menu with items like 'TensorFlow Core tutorial', 'Importing TensorFlow', 'The Computational Graph', 'tf.train API', and '...', and a paragraph explaining the guide's purpose and prerequisites.

Getting Started With TensorFlow

Contents ▾

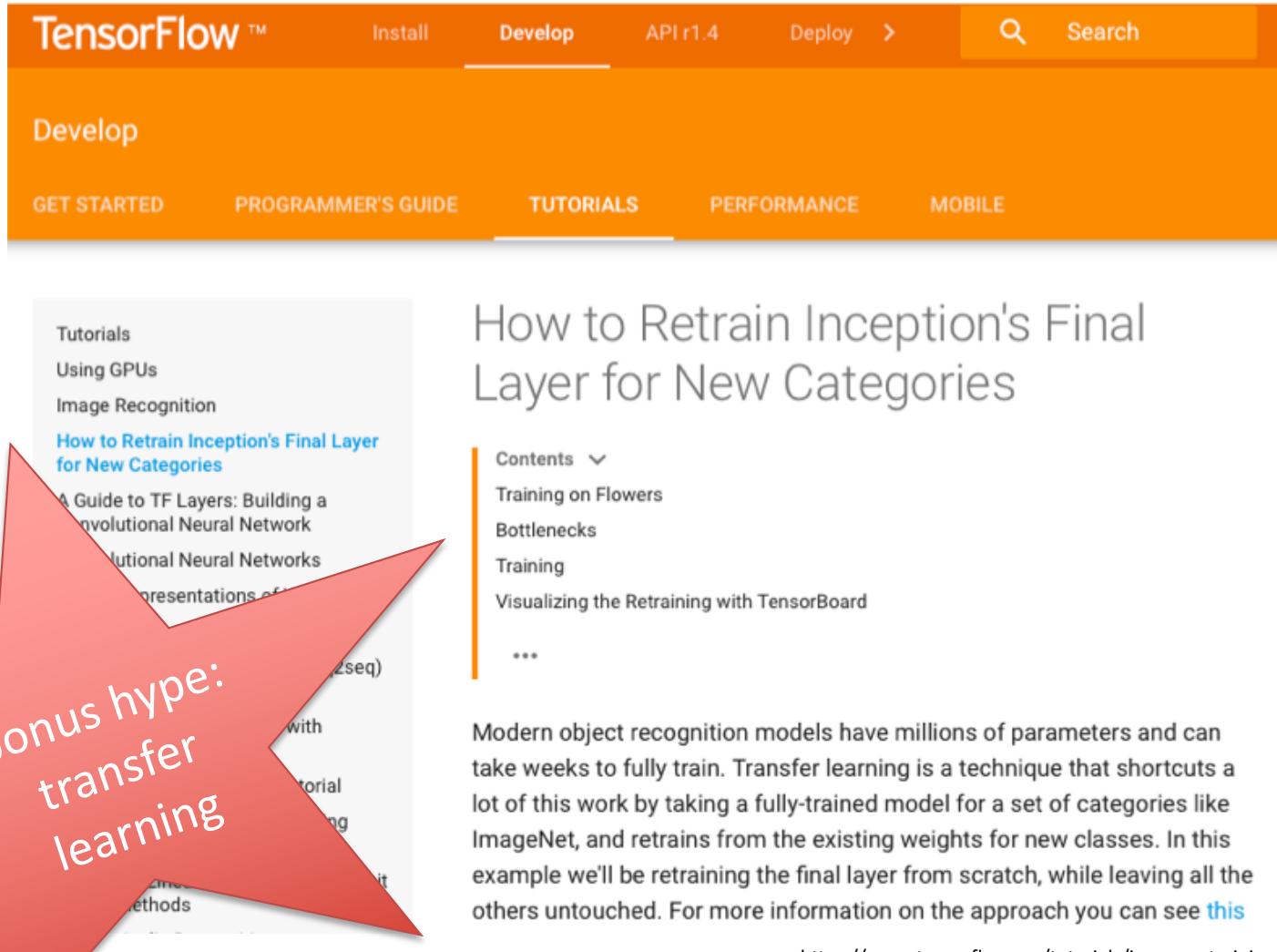
- TensorFlow Core tutorial
- Importing TensorFlow
- The Computational Graph
- tf.train API
- ***

This guide gets you started programming in TensorFlow. Before using this guide, [install TensorFlow](#). To get the most out of this guide, you should know the following:

- How to program in Python.

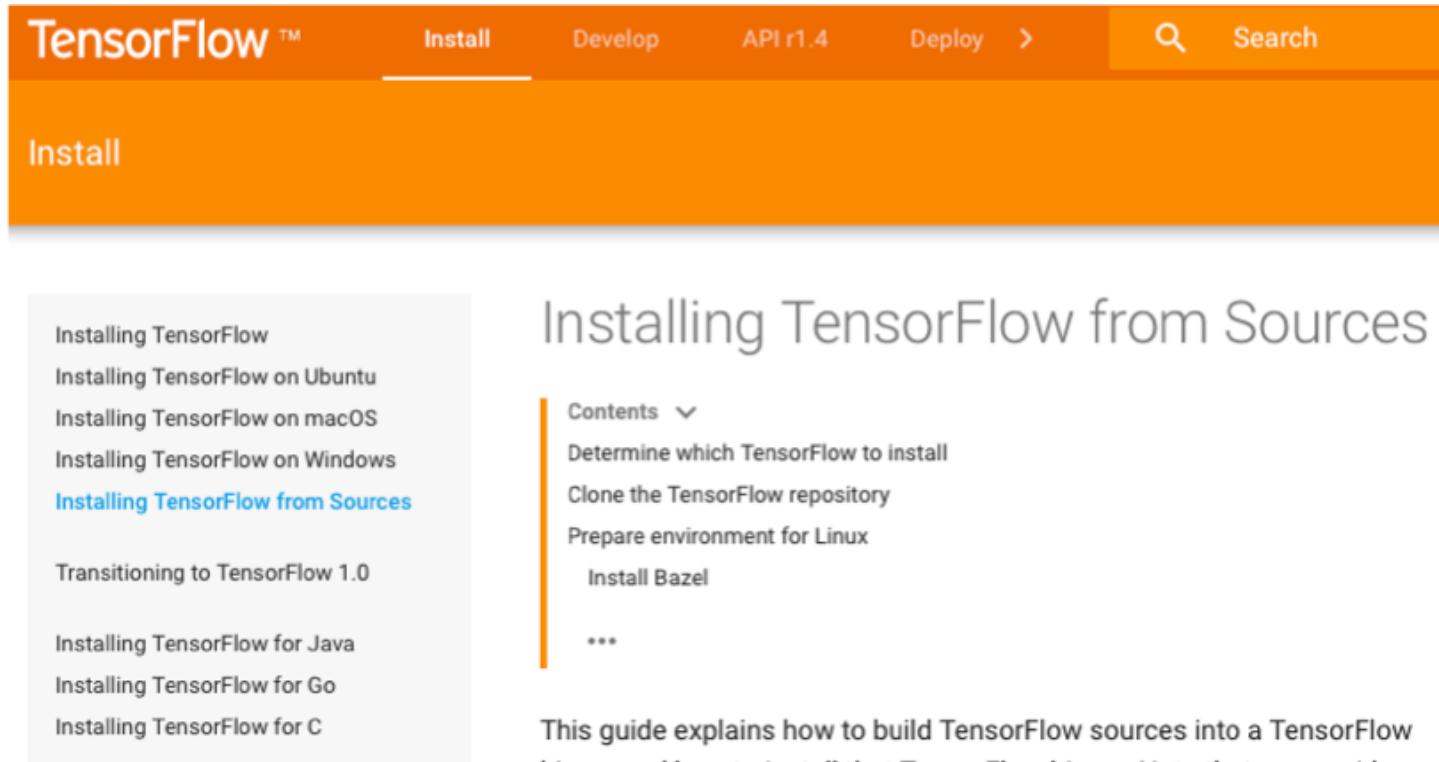
https://www.tensorflow.org/get_started/get_started

step 3: lazy development



The screenshot shows the TensorFlow website's 'Develop' section. The main title is 'How to Retrain Inception's Final Layer for New Categories'. On the left, there's a sidebar with 'Tutorials' and links to 'Using GPUs' and 'Image Recognition'. The main content area has a 'Contents' dropdown menu with items like 'Training on Flowers', 'Bottlenecks', 'Training', and 'Visualizing the Retraining with TensorBoard'. Below the content, a paragraph explains transfer learning, mentioning ImageNet and retraining the final layer from scratch. At the bottom, a link provides the full URL: https://www.tensorflow.org/tutorials/image_retraining.

step 3.1: install tensorflow from sources



The screenshot shows the TensorFlow website's navigation bar with 'Install' selected. Below the bar, the word 'Install' is centered on a yellow background. On the left, a sidebar lists various installation guides, with 'Installing TensorFlow from Sources' highlighted in blue. The main content area is titled 'Installing TensorFlow from Sources' and contains a list of steps: 'Contents ▾', 'Determine which TensorFlow to install', 'Clone the TensorFlow repository', 'Prepare environment for Linux', 'Install Bazel', and '***'. At the bottom, a note states: 'This guide explains how to build TensorFlow sources into a TensorFlow binary and how to install that TensorFlow binary. Note that we provide well-tested, pre-built TensorFlow binaries for Linux, Mac, and Windows systems. In addition, there are pre-built TensorFlow docker images. So, don't build a TensorFlow binary yourself unless you are very comfortable building complex packages from source and dealing with the inevitable aftermath should things not go exactly as documented.'

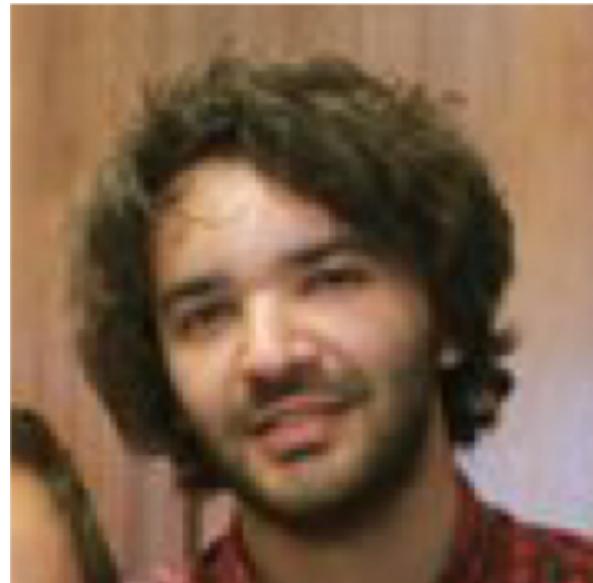
https://www.tensorflow.org/install/install_sources

step 4: ask someone who actually knows how to do it

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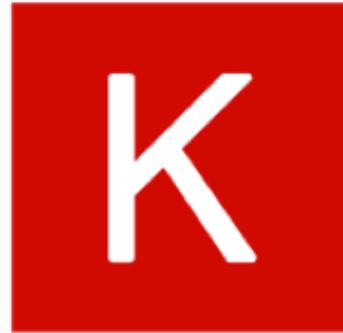


step 4.1: the easy way

Docs » Home

 Edit on GitHub

Keras: The Python Deep Learning library



Keras

You have just found Keras.

Keras is a high-level neural networks API, written in Python and capable of running on top of [TensorFlow](#), [CNTK](#), or [Theano](#). It was developed with a focus on enabling fast experimentation. *Being able to go from idea to result with the least possible delay is key to doing good research.*

Use Keras if you need a deep learning library that:

step 4.1: ... but the old fashioned way



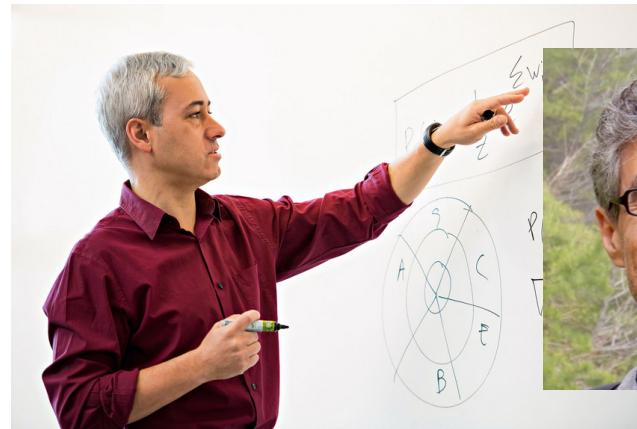
empirical evaluation: 1st trial

- data
 - images
 - 2 classes
 - first authors of NIPS 2017 papers on deep learning
 - ... -ish
 - random people
- setup
 - parameters à la carte
 - not much time to run experiments
- results
 - 100% accurate!

empirical evaluation: 2nd trial

- data
 - images
 - 2 classes
 - first authors of NIPS 2017 papers on deep learning
 - ... -ish
 - random people
- setup
 - **hold-out estimation**
 - parameters à la carte (**still**)
 - not much time to run experiments
- results
 - 88% accurate...

a closer look: deep learners



R: 0.99

DL: 0.93

R: 0.584

R: 0.99

a closer look: random-ish people

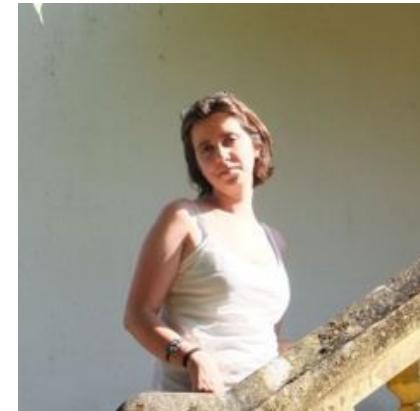
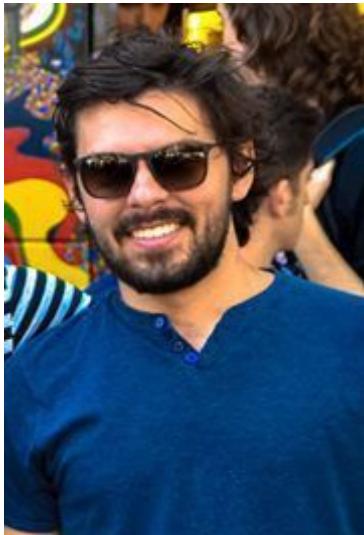


R: 0.976

R: 0.643

DL: 0.558

a closer look: DSPT (1/2)

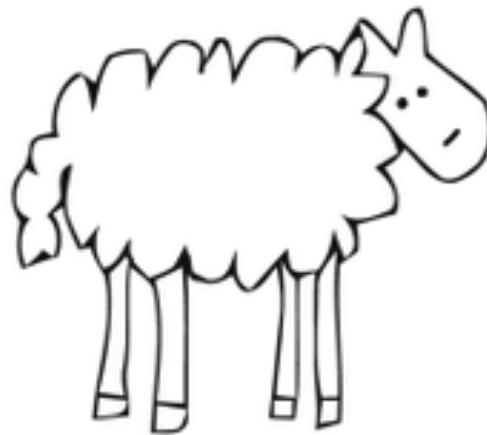


DL: 0.996

R: 0.536

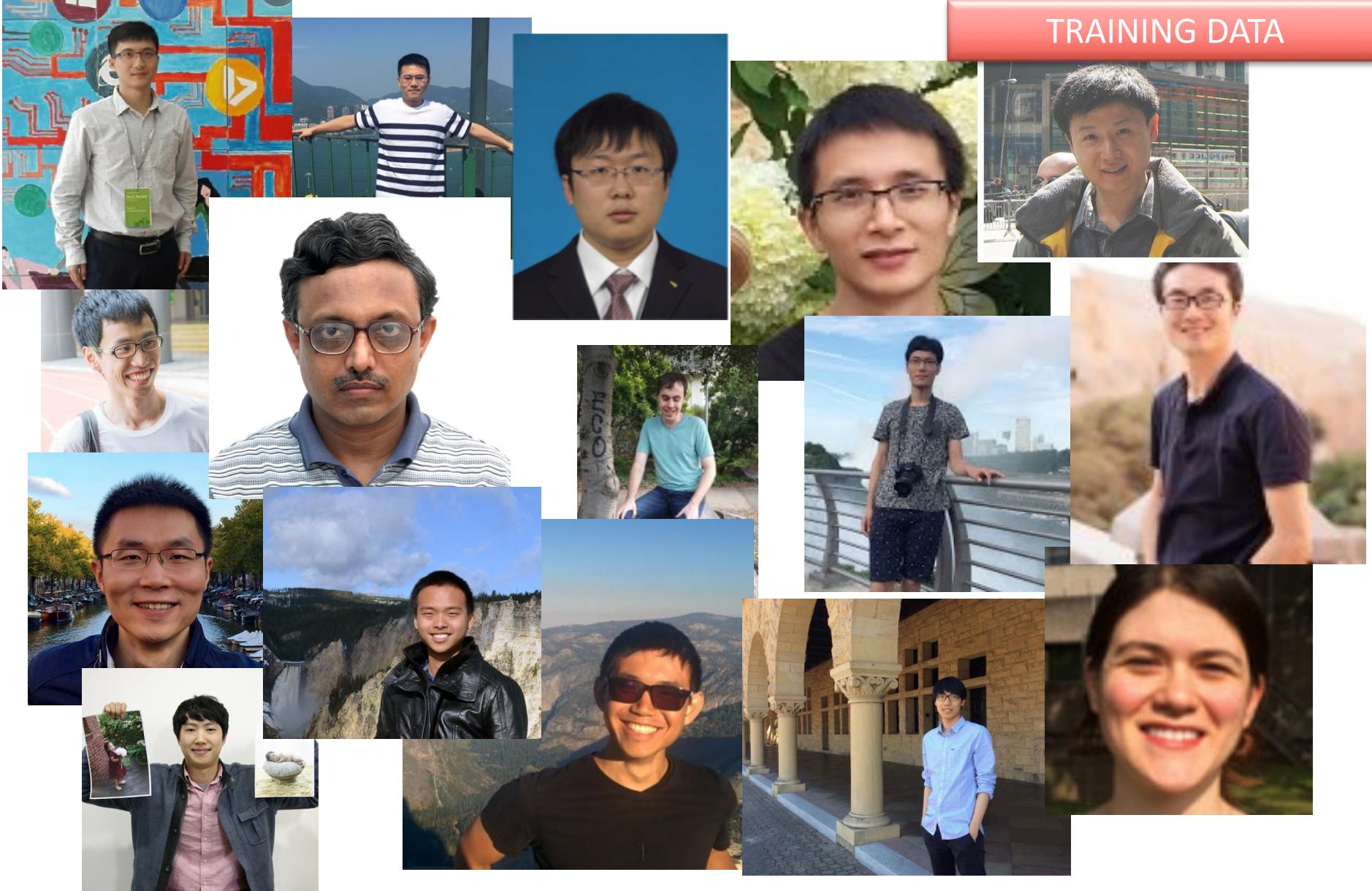
DL: 1.0

a closer look: DSPT (2/2)



R: 0.981

the end of the world as we dreamed?!

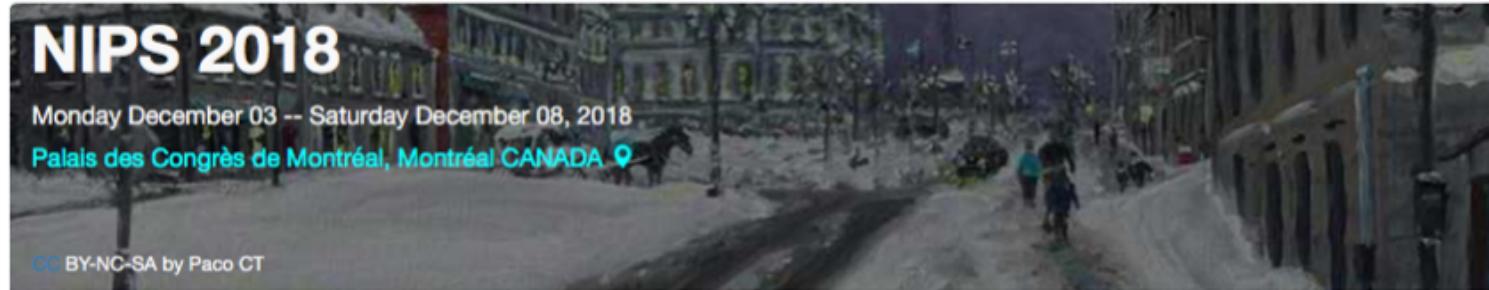


so, tensorflow is not machine learning

it's a tool, stupid!

- go learn ML!!
 - And some statistics, while you're at it...

or maybe I'm just jealous...



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