

# Inteligencia Artificial con R

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# Hola!

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⌚ Seattle, WA 🏢 Joined January 2009

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2

Q 1 ↪ 11 ❤ 31 ↑ ⌂

## 1.1 ¿QUÉ ES LA IA?

Hasta ahora sólo se ha comentado lo interesante que es el diseño de probetas, a decir: "Bueno, como tiene que ver con el diseño de probetas en la dirección correcta. Es muy probable que los primitivos alquimistas, de la inmortalidad y del método para convertir plomo en oro, hayan errado el diseño de teorías explícitas para predecir con precisión el movimiento aparente de estrellas y fenómenos del mundo terrestre, tal como la astronomía artificial, de acuerdo con las figuras 1.1 se presentan definiciones así como una ciencia productiva. Estas definiciones varían en torno a dos dimensiones principales. Las que aparecen se refieren a procesos mentales y al razonamiento, en tanto que las de la conducta. Por otra parte, las definiciones de la izquierda miden la condición científicamente creada es el demostrar la imposibilidad de la IA. En el capítulo

# Inteligencia Artificial

Russell  
Norvig

# Inteligencia Artificial

## Un enfoque moderno

### Computer Speech Technology

R O D

THE MOUNTAINHEAD  
AYN RAND

DIAMOND an epromotional

Chocolate

Writing Readiness

MOMO

THE MOUNTAINHEAD  
AYN RAND

<p>"La interesante tarea de lograr que las computadoras piensen... maquinaz con mente, en su amplio sentido literal." (Haugeland, 1985.)</p> <p>"[La autorrealización de] actividades que vinculanos con procesos de pensamiento humano, actividades tales como toma de decisiones, resolución de problemas, aprendizaje..." (Bennman, 1978.)</p>	<p>"El estudio de las facultades mentales mediante el uso de modelos computacionales." (Charniak y McDermott, 1985.)</p> <p>"El estudio de los cálculos que permiten percibir, razonar y actuar." (Winston, 1992.)</p>
<p>"El arte de crear máquinas con capacidad de realizar funciones que realizadas por personas requieren de inteligencia." (Kurzweil, 1990.)</p> <p>"El estudio de cómo lograr que las computadoras realicen tareas que, por el momento, los humanos hacen mejor." (Rich y Knight, 1991.)</p>	<p>"Un campo de estudio que se enfoca a la explotación y emulación de la conducta inteligente en función de procesos computacionales." (Schalkoff, 1990.)</p> <p>"La rama de la ciencia de la computación que se ocupa de la automatización de la conducta inteligente." (Luger y Stubblefield, 1993.)</p>

Figura 1.1 Algunas definiciones de IA. Se agrupan en cuatro categorías:

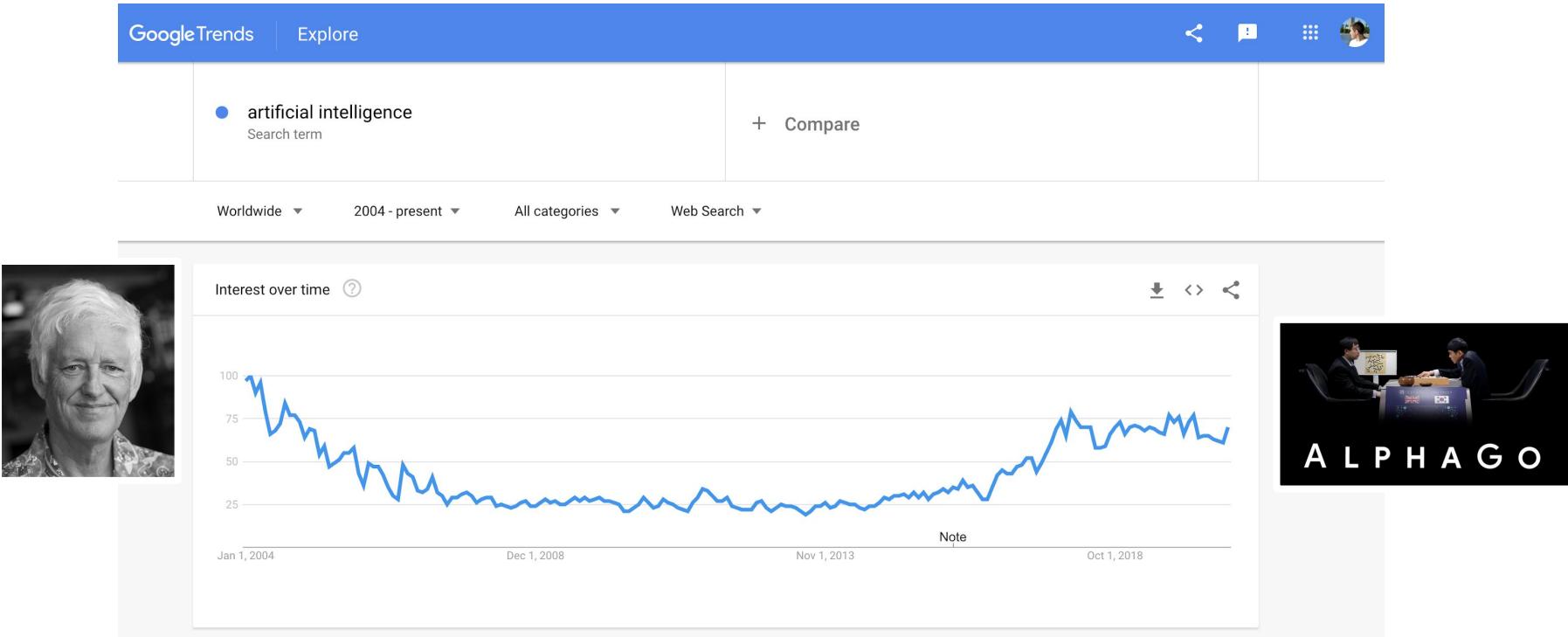
Sistemas que piensan como humanos.	Sistemas que piensan racionalmente.
Sistemas que actúan como humanos.	Sistemas que actúan racionalmente.

deseable en función de *eficiencia humana*, mientras que las de la derecha lo hacen de conformidad con un concepto de *inteligencia ideal*, denominado **racionalidad**. Se considera que un sistema es racional si hace lo correcto. De acuerdo con lo anterior, en la inteligencia artificial existen cuatro posibles objetivos por alcanzar, como se comenta en el pie de página de la figura 1.1.

A lo largo de la historia se han adoptado los cuatro enfoques anteriores. El enfoque centrado en el comportamiento humano, el empleo de hipótesis y de la confiabilidad matemática e in-

¡QUÉ ES LA IA?

Bueno, como tiene que ver la historia de la ciencia para convertir plomo en oro, es muy probable que los astrónomos predecían el movimiento de teorías explicativas. Una ciencia productiva, de las dimensiones principales. Las que aparecen a la izquierda miden la condición





## Mastering the Game of Go with Deep Neural Networks and Tree Search

David Silver<sup>1\*</sup>, Aja Huang<sup>1\*</sup>, Chris J. Maddison<sup>1</sup>, Arthur Guez<sup>1</sup>, Laurent Sifre<sup>1</sup>, George van den Driessche<sup>1</sup>, Julian Schrittwieser<sup>1</sup>, Ioannis Antonoglou<sup>1</sup>, Veda Panneershelvam<sup>1</sup>, Marc Lanctot<sup>1</sup>, Sander Dieleman<sup>1</sup>, Dominik Grewe<sup>1</sup>, John Nham<sup>2</sup>, Nal Kalchbrenner<sup>1</sup>, Ilya Sutskever<sup>2</sup>, Timothy Lillicrap<sup>1</sup>, Madeleine Leach<sup>1</sup>, Koray Kavukcuoglu<sup>1</sup>, Thore Graepel<sup>1</sup>, Demis Hassabis<sup>1</sup>.

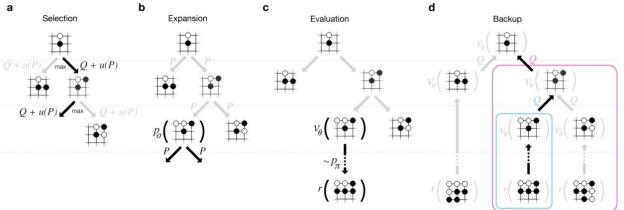


Figure 3: Monte-Carlo tree search in AlphaGo. **a** Each simulation traverses the tree by selecting the edge with maximum action-value  $Q$ , plus a bonus  $u(P)$  that depends on a stored prior probability  $P$  for that edge. **b** The leaf node may be expanded; the new node is processed once by the policy network  $p_\sigma$  and the output probabilities are stored as prior probabilities  $P$  for each action. **c** At the end of a simulation, the leaf node is evaluated in two ways: using the value network  $v_\theta$ ; and by running a rollout to the end of the game with the fast rollout policy  $p_\pi$ , then computing the winner with function  $r(\cdot)$ . **d** Action-values  $Q$  are updated to track the mean value of all evaluations  $r(\cdot)$  and  $v_\theta(\cdot)$  in the subtree below that action.

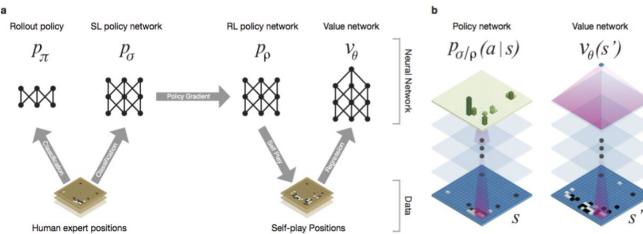


Figure 1: Neural network training pipeline and architecture. **a** A fast rollout policy  $p_\pi$  and supervised learning (SL) policy network  $p_\sigma$  are trained to predict human expert moves in a data-set of positions. A reinforcement learning (RL) policy network  $p_\rho$  is initialised to the SL policy network,

AlphaGo	Search threads	CPUs	GPUs	Elo
Asynchronous	1	48	8	2203
Asynchronous	2	48	8	2393
Asynchronous	4	48	8	2564
Asynchronous	8	48	8	2665
Asynchronous	16	48	8	2778
Asynchronous	32	48	8	2867
Asynchronous	40	48	8	2890
Asynchronous	40	48	1	2181
Asynchronous	40	48	2	2738
Asynchronous	40	48	4	2850
Distributed	12	428	64	2937
Distributed	24	764	112	3079
Distributed	40	1202	176	3140
Distributed	64	1920	280	3168

# ¡QUÉ ES LA IA?

Bueno, como tiene que ver la historia de la ciencia para convertir plomo en oro una ciencia productiva. Es muy probable que los astrónomos predecían el movimiento de teorías explicativas principales. Las que apuntan a su desarrollo, en tanto que las de la ciencia prodigiosa miden la condición



ALPHAGO

## Ciencia de Datos with Deep Neural Networks and Tree Search

David Silver\*, Aja Huang†, Chris J. Maddison‡, Arthur Guez‡, Laurent Sifre‡, George van den Driessche‡, Julian Schrittwieser‡, Dominik Hubert‡, Tomáš Pánek‡, Daan Wierwille‡, Daan Krikhaar‡, Thore Sutskever‡, Timothy

Monte Carlo: “Computational algorithms that relies on repeated random sampling”



Figure 3: Monte-Carlo tree search in AlphaGo. a Each simulation traverses the tree by selecting the edge with maximum action-value  $Q$ , plus a bonus  $u(P)$  that depends on a stored prior probability  $P$  for that edge. b The leaf node may be expanded; the new node is processed once by the policy network  $p_\pi$  and the output probabilities are stored as prior probabilities  $P$  for each action. c At the end of a simulation, the leaf node is evaluated in two ways: using the value network  $v_0$ ; and by running a rollout to the end of the game with the fast rollout policy  $p_r$ , then computing the winner with function  $r$ . d Action-values  $Q$  are updated to track the mean value of all evaluations  $r(\cdot)$  and  $v_0(\cdot)$  in the subtree below that action.

## Deep Learning

“Family of machine learning methods based on artificial neural networks, inspired by information processing nodes in biological systems”

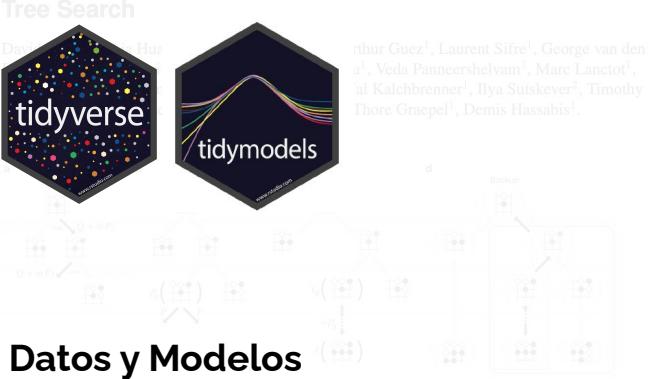
Fast rollout policy  $p_r$  and supervised learning (SL) policy network  $p_\pi$  are trained to predict human expert moves in a data-set of positions. A reinforcement learning (RL) policy network  $p_\pi$  is initialised to the SL policy network,

AlphaGo	Search breadth	CPUs	GPUs	Elo
<b>Computación Distribuida</b>				
Asynchronous	2	48	8	2203
Asynchronous	4	48	8	2393
Asynchronous	8	48	8	2564
Asynchronous	16	48	8	2665
Asynchronous	40	48	1	2781
Distributed	12	428	64	2738
Distributed	24	764	112	3079
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## Ciencia de Datos with Deep Neural Networks and Tree Search



## Datos y Modelos

Figure 3: Monte-Carlo tree search is the edge of a game. a Action-value function  $v_a(s)$  is updated by the leaf node output probability  $p_a(s)$ . b Action-value function  $v_a(s)$  is updated by the leaf node output probability  $p_a(s)$ . c Action-value function  $v_a(s)$  is updated by the leaf node output probability  $p_a(s)$ . d Action-value function  $v_a(s)$  is updated by the leaf node output probability  $p_a(s)$ .



# mlflow

9

## Deep Learning



Figure 1: Neural network training pipeline and architecture. a A fast rollout policy  $p_{\text{rollout}}$  and supervised learning (SL) policy network  $p_{\text{SL}}$  are trained to predict human expert moves in a data-set of positions. A reinforcement learning (RL) policy network  $p_{\text{RL}}$  is initialised to the SL policy network,

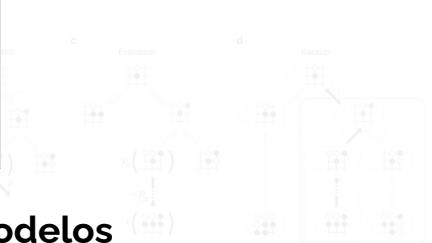
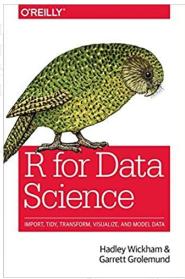
## Computación Distribuida

	AlphaGo	Search breadth	CPUs	GPUs	Elo
Asynchronous	2	48	8	2393	
Asynchronous	4	48	8	2564	
Asynchronous	8	48	8	2665	
Asynchronous	16	48	8	2778	
Asynchronous	32	48	8	2867	
Asynchronous	64	48	8	2890	
Asynchronous	128	48	1	2181	
Asynchronous	256	48	2	2738	
Asynchronous	4096	48	4	2850	
Distributed	12	428	64	2937	
Distributed	24	764	112	3079	
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# ¿QUÉ ES LA IA?

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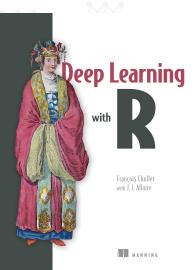
## Ciencia de Datos with Deep Neural Networks and Tree Search



## Datos y Modelos

Figure 3: Monte-Carlo tree search in *AlphaGo*. a) Each simulation traverses the tree by selecting the child node with the highest bonus  $u(P)$  that depends on a stored prior probability  $p_{prior}$ . b) A non-terminal node may be expanded; the new node is processed once by the policy network  $p_\pi$  and the output probabilities are stored as prior probabilities  $P$  for each action. c) At the end of a simulation, the leaf node is evaluated in two ways: using the value network  $v_0$ ; and by running a rollout to the end of the game with the fast rollout policy  $p_\pi$ , then computing the winner with function  $r$ . d) Action-values  $Q$  are updated to track the mean value of all evaluations  $r(\cdot)$  and  $v_0(\cdot)$  in the subtree below that action.

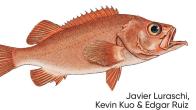
## Deep Learning



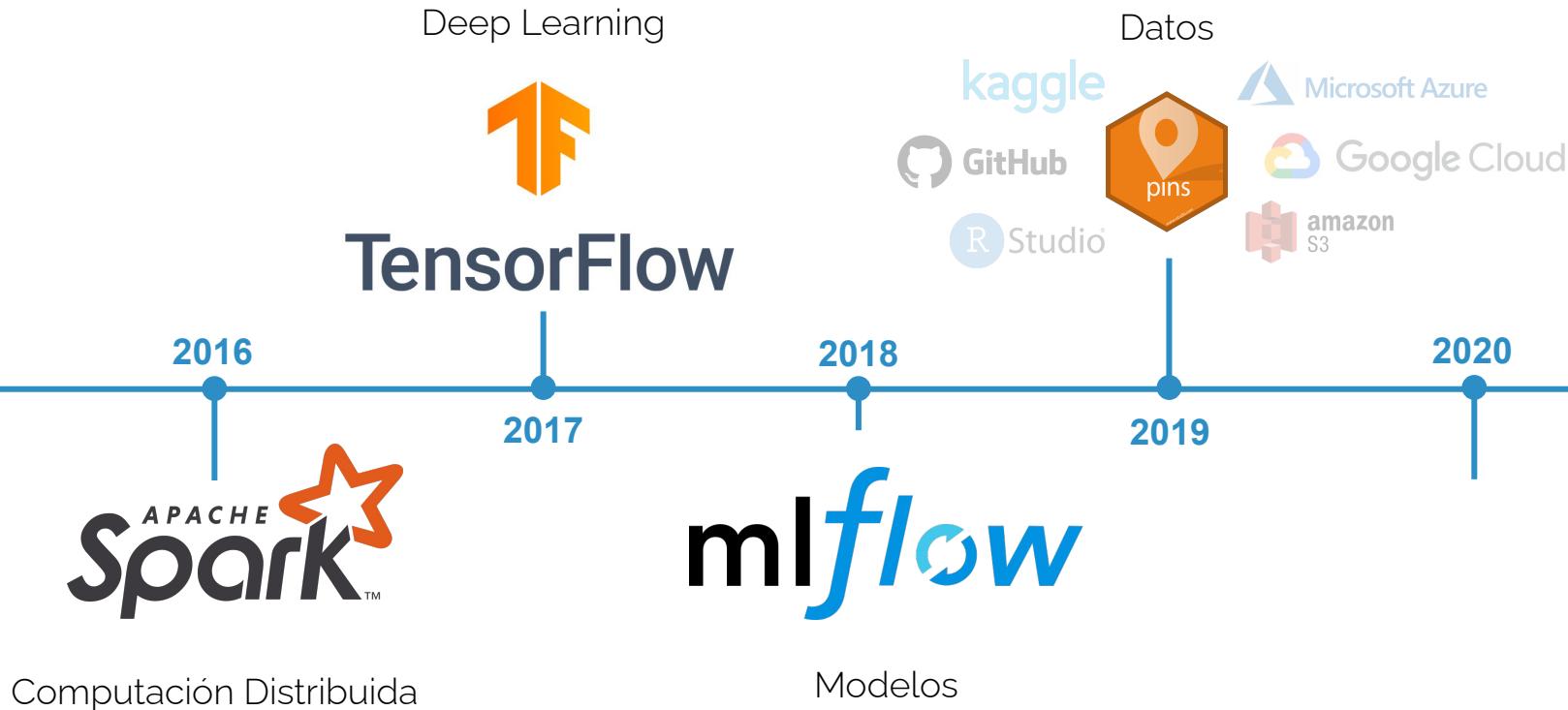
training pipeline and architecture. a) A fast rollout policy  $p_\pi$  and slowly learning value network  $p_\pi$  are trained to predict human expert moves in a data-set of self-play positions. b) The learning (RL) policy network  $p_\pi$  is initialised to the SL policy network,

## Computación Distribuida

	AlphaGo	Search breadth	CPUs	GPUs	Elo
Asynchronous	2	48	8	2393	2203
Asynchronous	4	48	8	2564	2564
O'REILLY		48	8	2665	2665
Mastering Spark with R		48	8	2778	2778
AlphaGo	48	8	2867	2867	2867
Search breadth	48	8	2890	2890	2890
CPUs	48	1	2181	2181	2181
GPUs	48	2	2738	2738	2738
Elo	48	4	2850	2850	2850
AlphaGo	428	64	2937	2937	2937
Search breadth	764	112	3079	3079	3079
CPUs	1202	176	3140	3140	3140
GPUs	1920	280	3168	3168	3168



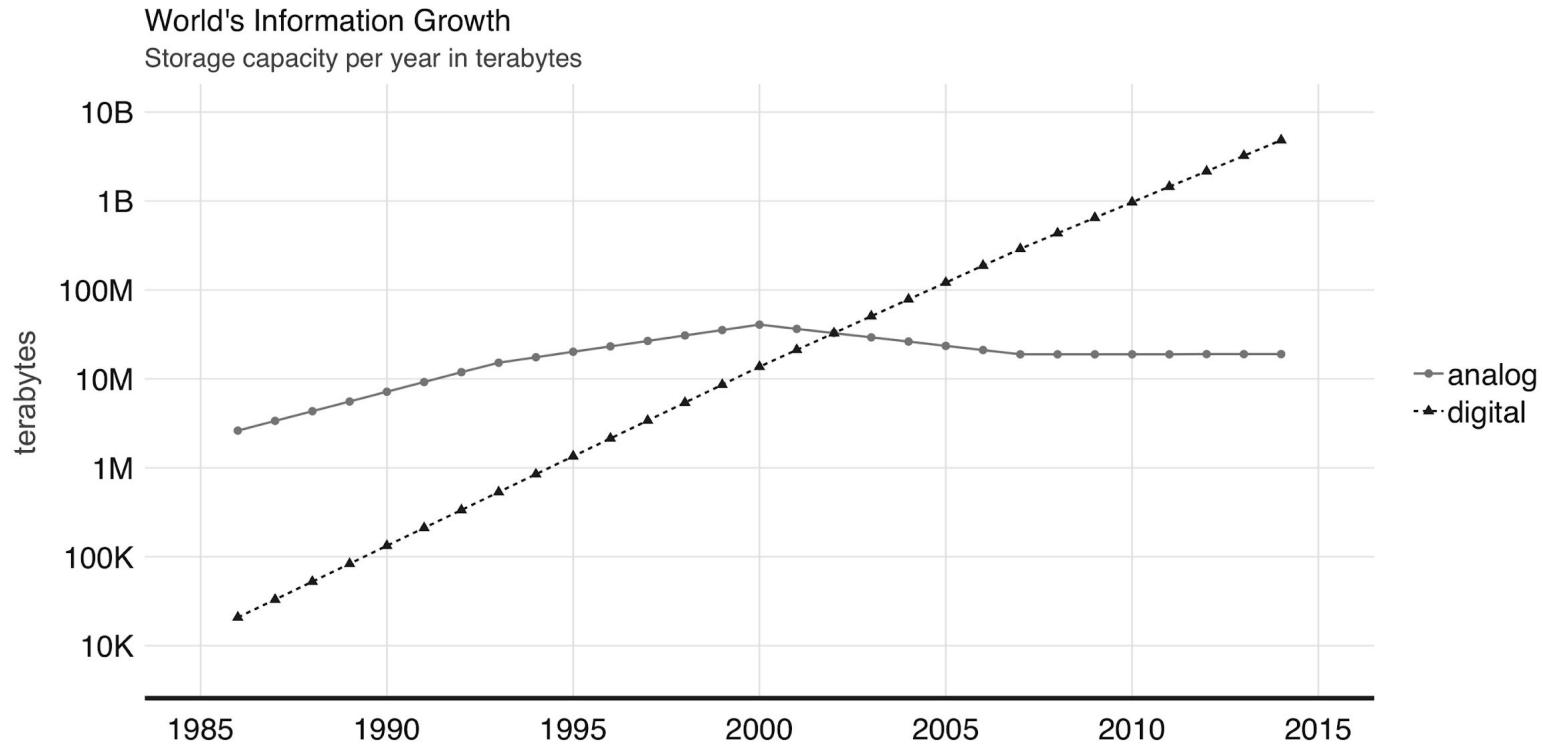
¿QUÉ ES LA IA?  
Bueno, como tiene que ver la historia de la ciencia para convertir plomo en oro una ciencia productiva. Es muy probable que los astrónomos predecían el movimiento de teorías explicativas dimensiones principales. Las que aparecieron en tanto que las de la ingeniería miden la condición



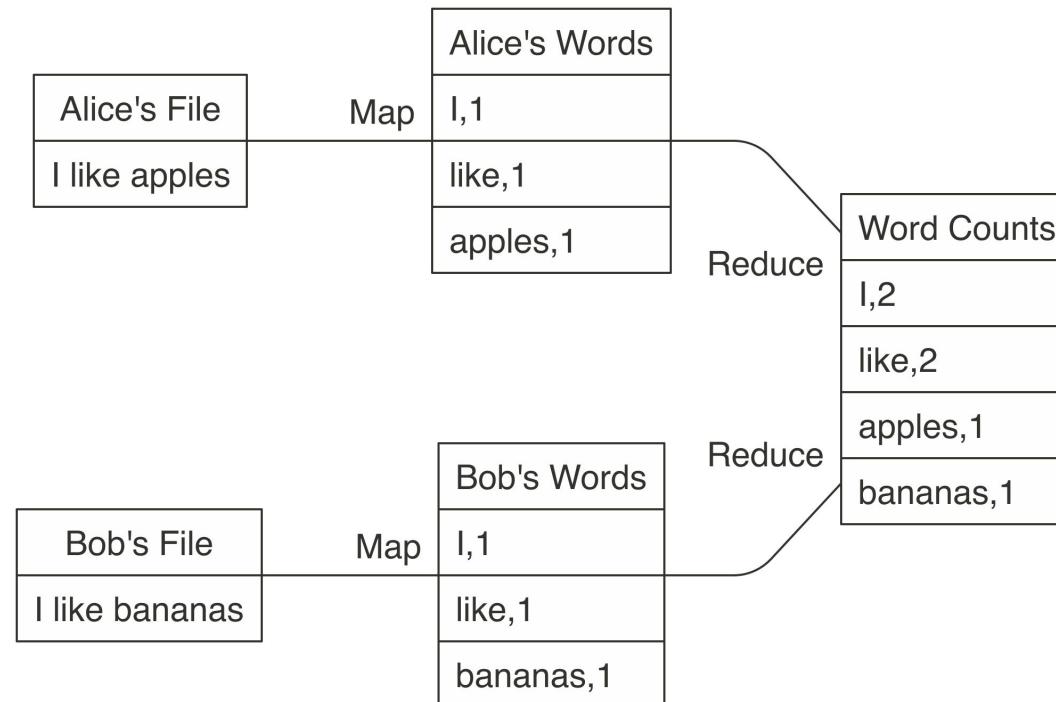


# Computación Distribuida

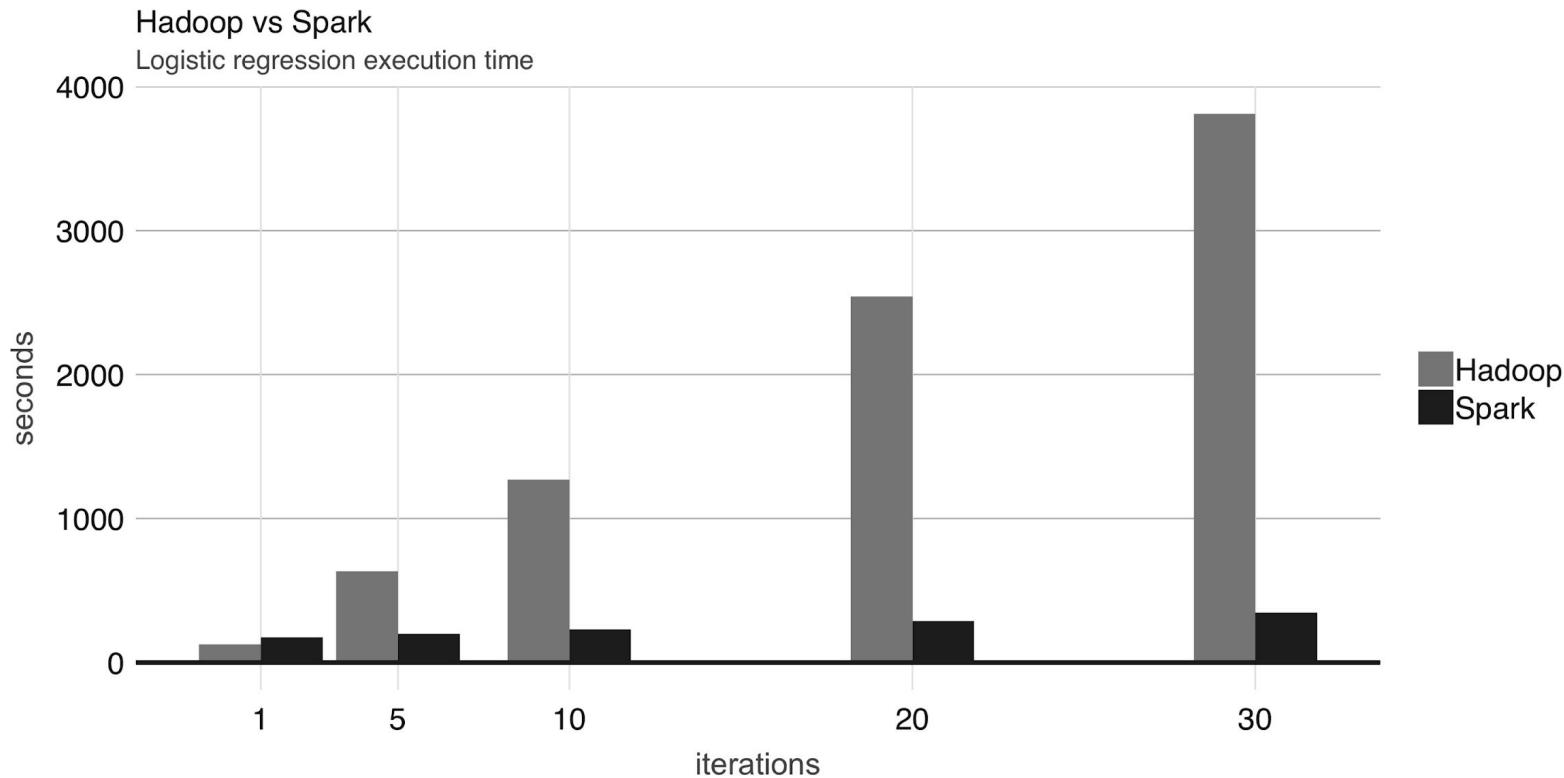
# El crecimiento de informacion



# Que es el procesamiento distribuido?

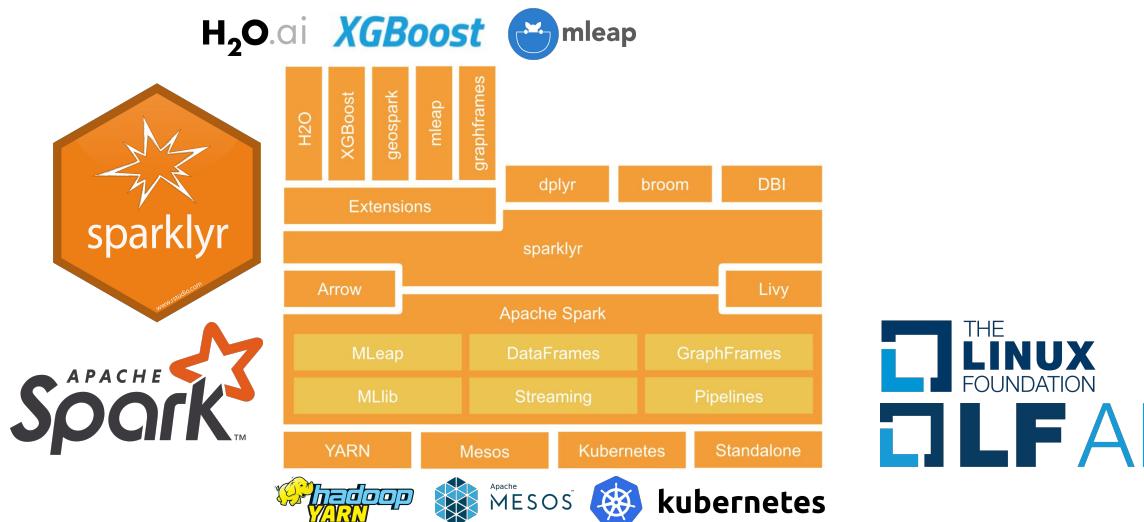


# Spark vs Hadoop



# sparklyr: R Interface to Spark

Sparklyr is an open-source and modern interface to scale data science and machine learning workflows using Apache Spark™ and R.



# Cómo utilizo Spark en R?



```
library(sparklyr)
sc <- spark_connect(master = "local|yarn|mesos|spark|livy")
flights <- copy_to(sc, flights)
```

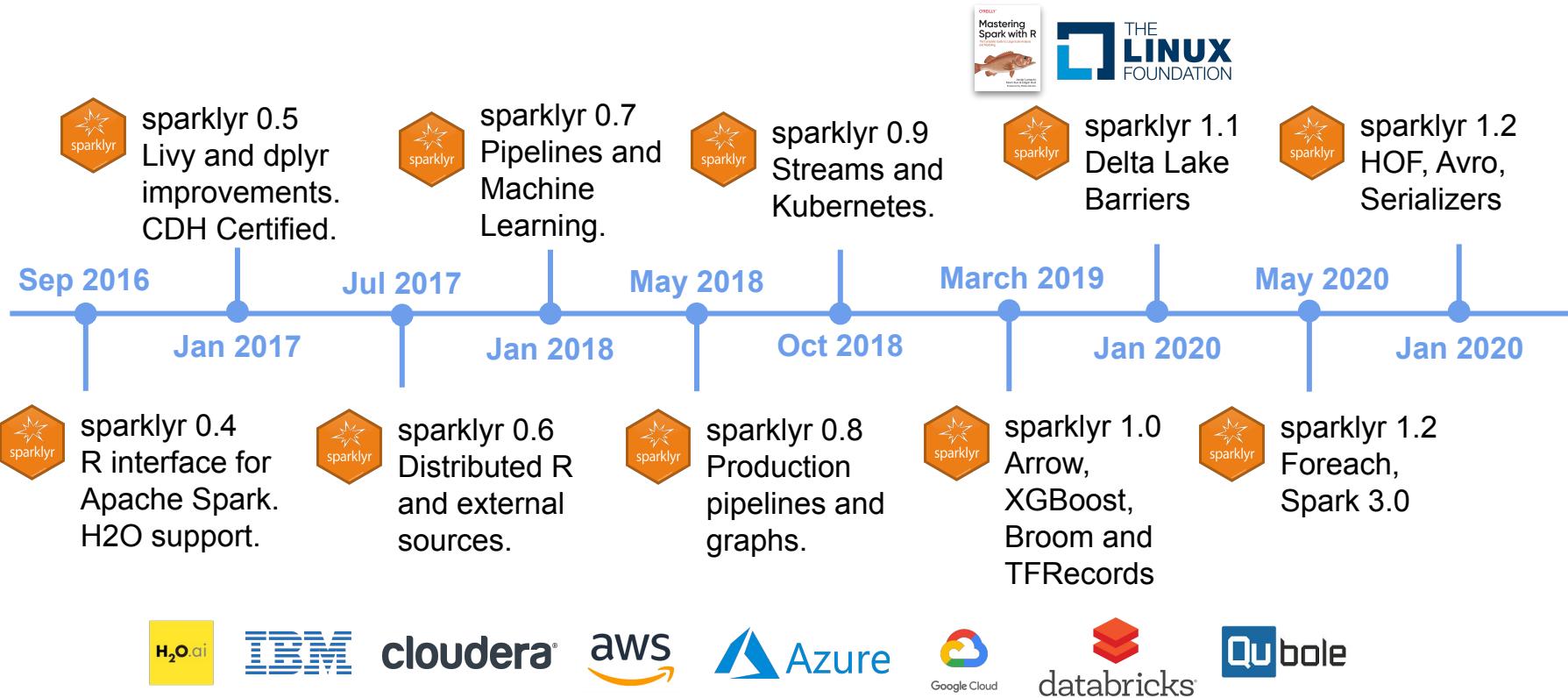


```
library(dplyr)
flights %>%
  group_by(month, day) %>%
  summarise(count = n(), avg_delay = mean(dep_delay)) %>%
  filter(count > 1000)
```

# Qué funcionalidad existe?

```
spark_install()  
sc <- spark_connect(master = "local")  
  
cars <- spark_read_csv(sc, "cars", "input/")  
  
summarize(cars, n = n())  
dbGetQuery(sc, "SELECT count(*) FROM cars")  
  
ml_linear_regression(cars, mpg ~ wt + cyl)  
  
ml_pipeline(sc) %>%  
  ft_r_formula(mpg ~ wt + cyl) %>%  
  ml_linear_regression()  
  
spark_context(sc) %>% invoke("version")  
spark_apply(cars, nrow)  
  
stream_read_csv(sc, "input/") %>%  
  filter(mpg > 30) %>%  
  stream_write_json("output/")  
  
# Install local Spark  
# Connect to Spark cluster  
  
# Read data in Spark  
  
# Count records with dplyr  
# Count records with DBI  
  
# Perform linear regression  
  
# Define Spark pipeline  
# Add formula transformation  
# Add model to pipeline  
  
# Extend sparklyr with Scala  
# Extend sparklyr with R  
  
# Define Spark stream  
# Add dplyr transformation  
# Start processing stream
```

# Cual es la historia de sparklyr?



# sparklyr 1.2: foreach

The [foreach](#) package provides the `%dopar%` operator to iterate over elements in a collection in parallel. Using sparklyr 1.2, you can now register Spark as a backend using `registerDoSpark()` and then easily iterate over R objects using Spark:

```
library(sparklyr)
library(foreach)
sc <- spark_connect(master = "local", version = "2.4")
registerDoSpark(sc)
foreach(i = 1:3, .combine = 'c') %dopar% {
  sqrt(i)
}
```

```
[1] 1.000000 1.414214 1.732051
```

Since many R packages are based on `foreach` to perform parallel computation, we can now make use of all those great packages in Spark as well!

# sparklyr 1.3: High Level Order functions

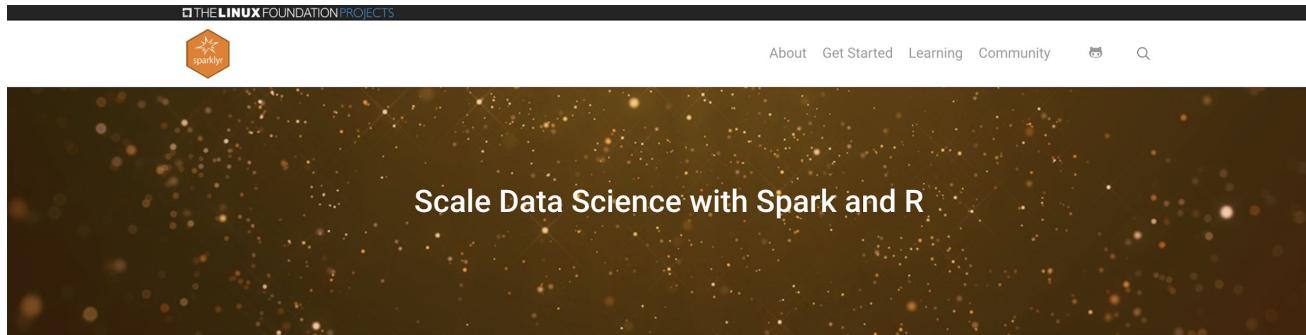
```
result_tbl <- coins_tbl %>%
  hof_zip_with(~ .x * .y, dest_col = total_values) %>%
  dplyr::select(total_values)

result_tbl %>% dplyr::pull(total_values)
```

```
[1] 4000 15000 20000 25000
```

```
result_tbl %>%
  dplyr::mutate(zero = dplyr::sql("CAST (0 AS BIGINT)")) %>%
  hof_aggregate(start = zero, ~ .x + .y, expr = total_values, dest_col = total) %>%
  dplyr::select(total) %>%
  dplyr::pull(total)
```

```
[1] 64000
```



## Scale Data Science with Spark and R

### About

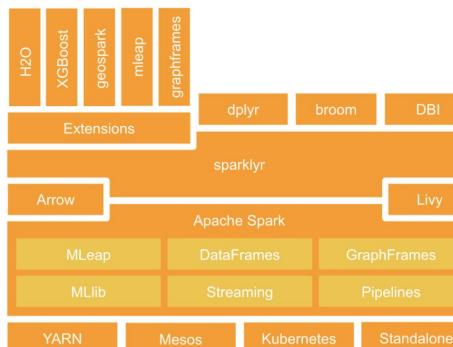
sparklyr is an open-source and modern interface to scale data science and machine learning workflows using [Apache Spark™](#), R, and a rich [extension ecosystem](#).

It enables using Apache Spark with ease using R by providing access to core functionality like installing, connecting and managing Spark and using Spark's [MLlib](#), [Spark Structured Streaming](#) and [Spark Pipelines](#) from R.

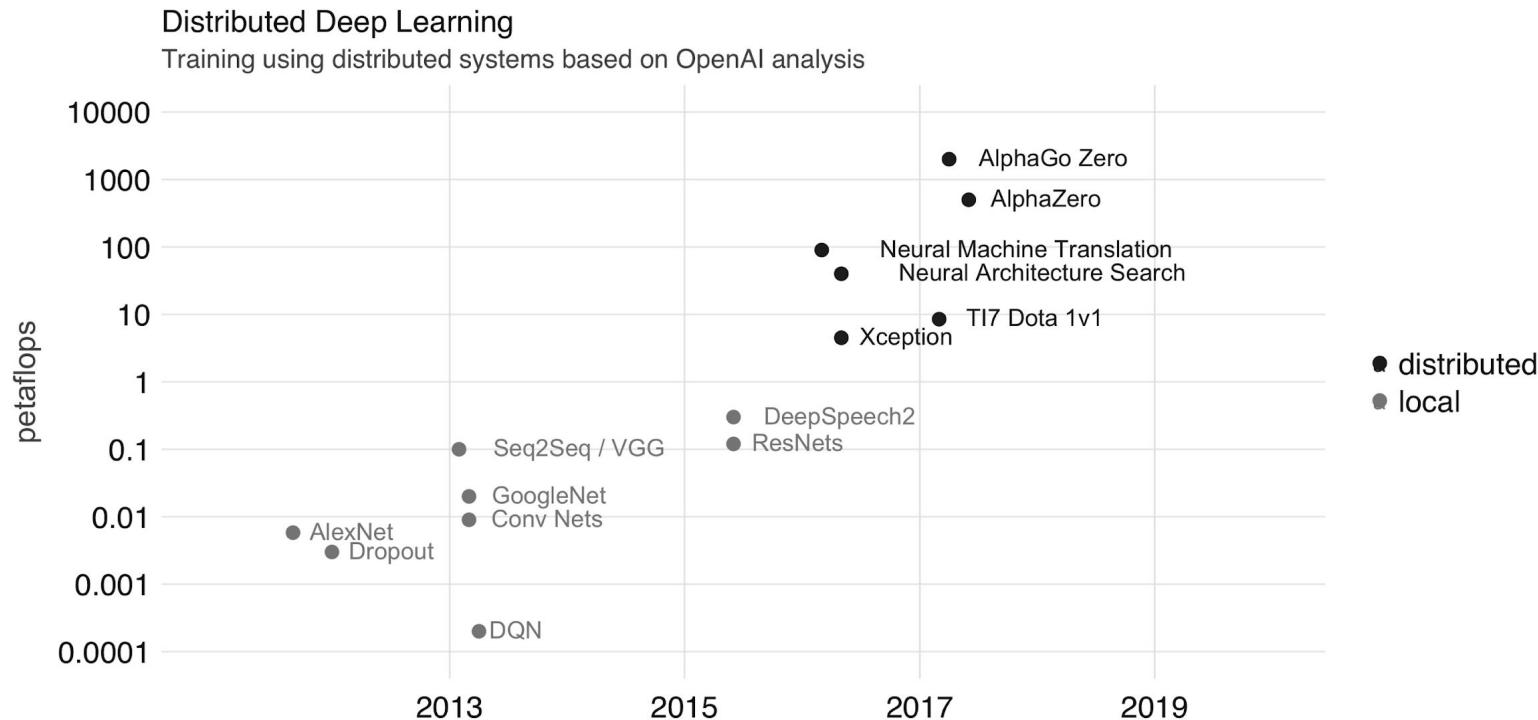
Supports well-known R packages like [dplyr](#), [DBI](#) and [broom](#) to reduce the cognitive overhead from having to re-learn libraries.

And enables a rich-ecosystem of extensions to use in Spark and R: [XGBoost](#), [MLlib](#), [GraphFrames](#), [H2O](#), and optionally enable [Apache Arrow](#) to significantly improve performance.

Through Spark, this allows you to scale your Data Science workflows in [Hadoop YARN](#), [Mesos](#), [Kubernetes](#) or [Apache Livy](#).



# Cómo está esto relacionado con Deep Learning?



# Deep Learning

# Comprehensive Survey on Deep Learning

## II. DEEP NEURAL NETWORK (DNN)

### A. The History of DNN

Below is a brief history of neural networks highlighting key events:

- 1943: McCulloch & Pitts show that neurons can be combined to construct a Turing machine (using ANDs, ORs, & NOTs) [44].
- 1958: Rosenblatt shows that perceptron's will converge if what they are trying to learn can be represented [45].
- 1969: Minsky & Papert show the limitations of perceptron's, killing research in neural networks for a decade [46].
- 1985: The backpropagation algorithm by Geoffrey Hinton et al [47] revitalizes the field.
- 1988: Neocognitron: a hierarchical neural network capable of visual pattern recognition [48].
- 1998: CNNs with Backpropagation for document analysis by Yan LeCun [49].
- 2006: The Hinton lab solves the training problem for DNNs [50,51].
- 2012 : AlexNet by Alex Krizhevsky in 2012 [7].

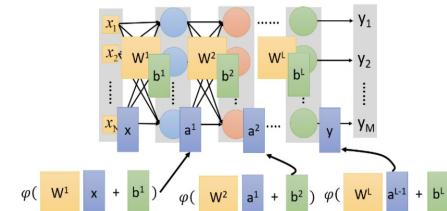
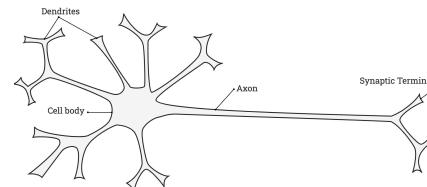


Fig. 10. Neural network model with multiple layers perceptron

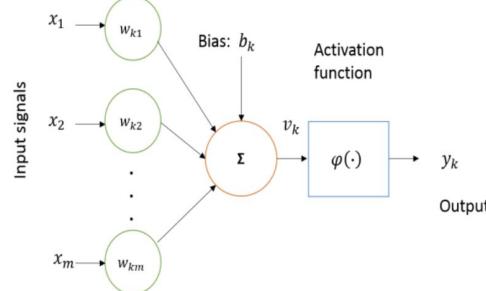


Fig. 9. Basic model of a neuron

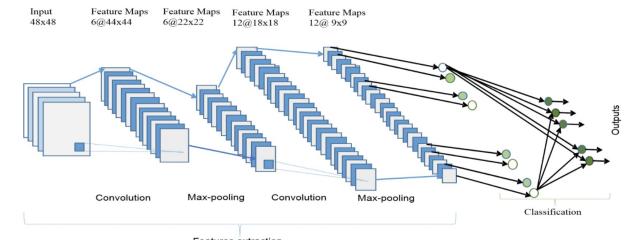
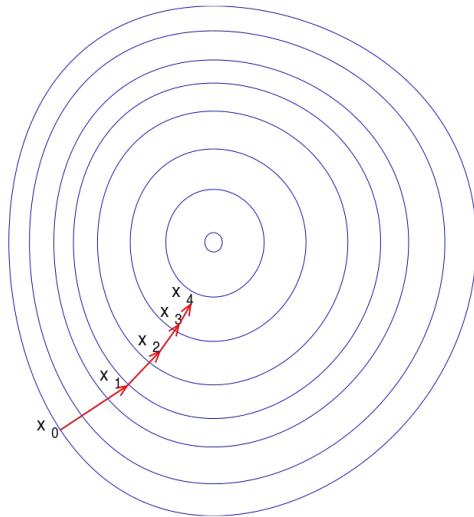


Fig. 11. The overall architecture of the CNN includes an input layer, multiple alternating convolution and max-pooling layers, one fully-connected layer and one classification layer.

# Functionality in Deep Learning Frameworks



Automatic Differentiation



Graphic Processing Units (GPUs)

# Intro to TensorFlow with Keras

```
library(keras)

mnist <- dataset_mnist()
mnist$train$x <- mnist$train$x/255
mnist$test$x <- mnist$test$x/255

model <- keras_model_sequential() %>%
  layer_flatten(input_shape = c(28, 28)) %>%
  layer_dense(units = 128, activation = "relu") %>%
  layer_dropout(0.2) %>%
  layer_dense(10, activation = "softmax")

model %>% compile(loss = "sparse_categorical_crossentropy",
                      optimizer = "adam",
                      metrics = "accuracy")

model %>% fit(x = mnist$train$x, y = mnist$train$y,
                 epochs = 5, validation_split = 0.3, verbose = 2)

predict(model, mnist$test$x)
```

# TensorFlow 2.0: Eager Execution

```
| library(tensorflow)
| tf$math$cumprod(1:5)
```

```
Tensor("Cumprod:0", shape=(5,), dtype=int32)
```

```
| tf$math$cumprod(1:5)
```

```
tf.Tensor([ 1  2   6  24 120], shape=(5,), dtype=int32)
```

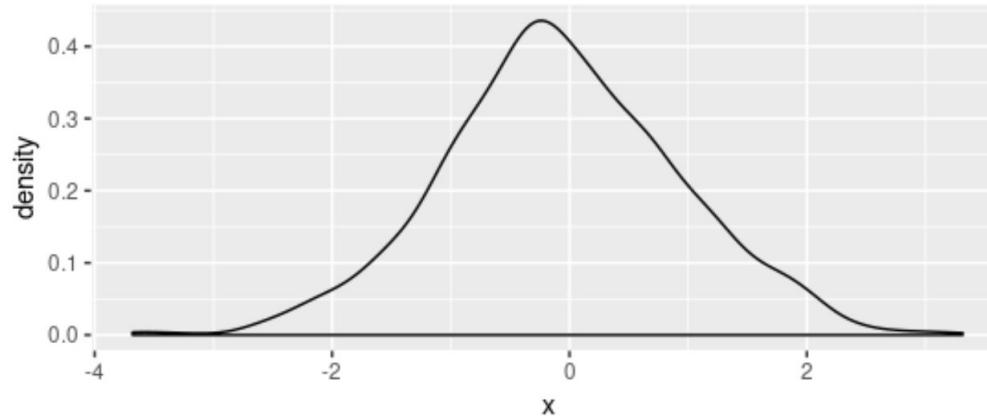
# tfprobability: R Interface to TensorFlow Probability

```
library(tfprobability)
library(tensorflow)
tfe_enable_eager_execution()

library(ggplot2)

b <- tfb_normal_cdf()
u <- runif(1000)
x <- b %>% tfb_inverse(u) %>% as.numeric()

x %>% data.frame(x = .) %>% ggplot(aes(x = x)) + geom_density()
```



# tfdatasets: R Interface to TensorFlow Dataset API

## MAPPING

You can map arbitrary transformation functions onto dataset records using the `dataset_map()` function. For example, to transform the “Species” column into a one-hot encoded vector you would do this:

```
dataset <- dataset %>%
  dataset_map(function(record) {
    record$Species <- tf$one_hot(record$Species, 3L)
    record
  })
```

# Deep Learning y Computación Distribuida

Aug. 24, 2020

## Training ImageNet with R

This post explores how to train large datasets with TensorFlow and R. Specifically, we present how to download and repartition ImageNet, followed by training ImageNet across multiple GPUs in distributed environments using TensorFlow and Apache Spark.



```
library(sparklyr)
sc <- spark_connect("yarn!mesos!etc", config = list("sparklyr.shell.num-executors" = 16))

sdf_len(sc, 16, repartition = 16) %>%
  spark_apply(function(df, barrier) {
    library(tensorflow)

    Sys.setenv(TF_CONFIG = jsonlite::toJSON(list(
      cluster = list(
        worker = paste(
          gsub("[0-9]+$", "", barrier$address),
          8000 + seq_along(barrier$address), sep = ":")),
        task = list(type = 'worker', index = barrier$partition)
      ), auto_unbox = TRUE)))

    if (is.null(tf_version())) install_tensorflow()

    strategy <- tf$distribute$MultiWorkerMirroredStrategy()

    result <- alexnet::imagenet_partition(partition = barrier$partition) %>%
      alexnet::alexnet_train(strategy = strategy, epochs = 10, parallel = 6)

    result$metrics$accuracy
  }, barrier = TRUE, columns = c(accuracy = "numeric"))
```

## R Interface to Tensorflow

Build, deploy and experiment easily with  
TensorFlow from R



TensorFlow

### Installation

Get started with TensorFlow by following our  
detailed installation guide.

### Tutorials

In the tutorials section you will find  
documentation for solving common Machine  
Learning problems using TensorFlow.

### Guide

The guide section contains documents with in  
depth explanations of how TensorFlow works.

### About TensorFlow

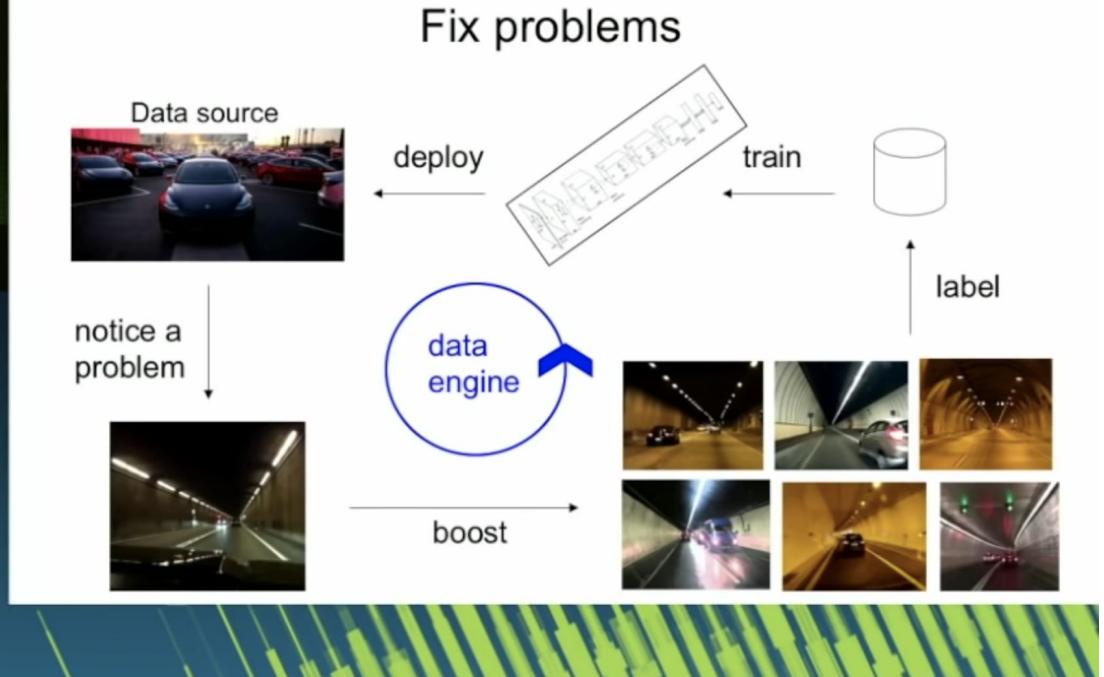
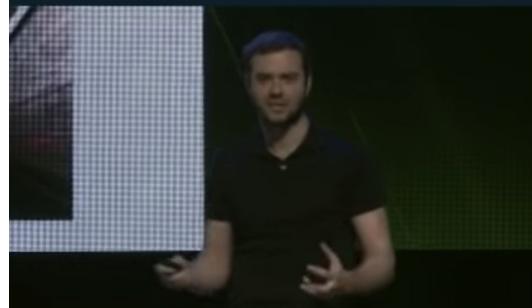
TensorFlow™ is an open source software library for numerical computation using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them. The flexible architecture allows you to deploy computation to one or more CPUs or GPUs in a desktop, server, or mobile device with a single API. TensorFlow was originally developed by researchers and engineers working on the Google Brain Team





# Modelos

# Como Tesla administra sus modelos?



# Que es MLflow?



MLflow is an open source platform to manage the ML lifecycle, including experimentation, reproducibility, deployment, and a central model registry. MLflow currently offers four components:

## MLflow Tracking

Record and query experiments: code, data, config, and results

[Read more](#)

## MLflow Projects

Package data science code in a format to reproduce runs on any platform

[Read more](#)

## MLflow Models

Deploy machine learning models in diverse serving environments

[Read more](#)

## Model Registry

Store, annotate, discover, and manage models in a central repository

[Read more](#)

# MLflow con R

```
library(mlflow)
with(mlflow_start_run(), {
    # set experiments tags
    mlflow_set_tag("project", "wines")

    # log parameters
    mlflow_log_param("lambda", 0.5)

    # compute model
    lm(train, quality ~ .)

    # log metrics
    mlflow_log_metric("aic", metrics$aic())
})
```

# Interface Web de MLflow

MLflow

/Shared/experiments/DiabetesModel

Experiment ID: 2289408      Artifact Location: dbfs:/databricks/mlflow/2289408

Search Runs: metrics.rmse < 1 and params.model = "tree"      State: Active      [Search](#)

Filter Params: alpha, lr      Filter Metrics: rmse, r2      [Clear](#)

3 matching runs      [Compare](#)      [Delete](#)      [Download CSV](#)      [☰](#)

Date	User	Run Name	Source	Version	Parameters	Metrics
2019-02-08 11:47:49	[REDACTED]	MLflow...	MLflow...	1	alpha: 0.01 l1_ratio: 1.0	mae: 51.051826040... r2: 0.39518095989... rmse: 63.2466677787...
2019-02-08 11:47:46	[REDACTED]	MLflow...	MLflow...	2	alpha: 0.01 l1_ratio: 0.75	mae: 53.7591482843... r2: 0.35547047607... rmse: 65.2899490639...
2019-02-08 11:47:43	[REDACTED]	MLflow...	MLflow...	3	alpha: 0.01 l1_ratio: 0.01	mae: 60.0912483956... r2: 0.22911306400... rmse: 71.4036257102...

Default > Run ed089cf2d5d24b8880446761987b7ac2

Date: 2019-10-16 22:49:25      Source: train\_predict.py  
User: sid.murching      Duration: 6.2s

Git Commit: fcfelec0ff830c43dc8cd048b83ac92fd8d5d7e

Notes: None

Parameters:

Metrics:

Tags:

Name	Value	Actions
No tags found.		

Add Tag

Artifacts:

model Full Path: /tmp/swagger/ed089cf2d5d24b8880446761987b7ac2/artifacts/model  
Size: 0B      [Register Model](#)

Plot Settings

Points:  Step

Line Smoothness: 0.00

X-axis: Step

Y-axis: foo

Log Scale:



← → ⌂ mlflow.org/docs/latest/quickstart.html ⭐ 9+ ⏪ ⏴ ⏵ ⏹ ⏺ ⏻

Search

## Using the Tracking API

The [MLflow Tracking API](#) lets you log metrics and artifacts (files) from your data science code and see a history of your runs. You can try it out by writing a simple Python script as follows (this example is also included in `quickstart/mlflow_tracking.py`):

Python R

```
library(mlflow)

# Log a parameter (key-value pair)
mlflow_log_param("param1", 5)

# Log a metric; metrics can be updated throughout the run
mlflow_log_metric("foo", 1)
mlflow_log_metric("foo", 2)
mlflow_log_metric("foo", 3)

# Log an artifact (output file)
writeLines("Hello world!", "output.txt")
mlflow_log_artifact("output.txt")
```

## Viewing the Tracking UI

By default, wherever you run your program, the tracking API writes data into files into a local `./mlruns` directory. You can then run MLflow's Tracking UI:

Python R

# Datos



# "Those who own data own the future" -- Yuval Noah Harari

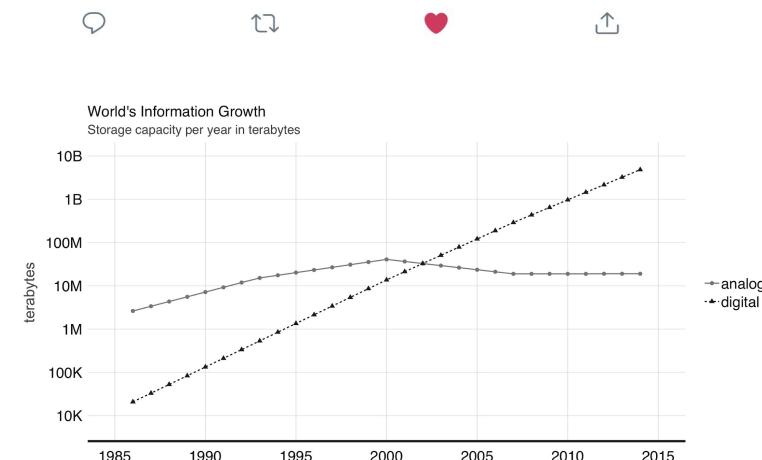


Hadley Wickham   
@hadleywickham

"It takes a big man to admit his data is small" — @jcheng

12:01 PM · Feb 23, 2015 · Echofon

82 Retweets 7 Quote Tweets 123 Likes



## Dataism

From Wikipedia, the free encyclopedia

Not to be confused with [Dadaism](#).

**Dataism** is a term that has been used to describe the mindset or [philosophy](#) created by the emerging significance of [Big data](#). It was first used by David Brooks in *The New York Times* in 2013.<sup>[1]</sup> More recently, the term has been expanded to describe what social scientist Yuval Noah Harari has called an emerging ideology or even a new form of religion, in which 'information flow' is the 'supreme value'.<sup>[2]</sup>

### Contents [hide]

- 1 History
- 2 Criticism
- 3 See also
- 4 References
- 5 External links

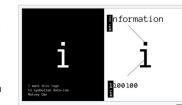
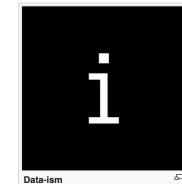
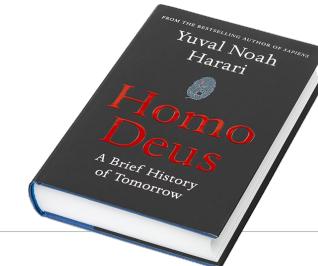
### History [edit]

"If you asked me to describe the rising philosophy of the day, I'd say it is Data-ism", wrote David Brooks in *The New York Times* in February 2013.<sup>[1]</sup> Brooks argued that in a world of increasing complexity, relying on data could reduce cognitive biases and "illuminate patterns of behavior we haven't yet noticed".<sup>[1]</sup>

In 2015, Steve Lohr's book 'Data-ism' looked at how Big Data is transforming society, using the term to describe the Big Data revolution.<sup>[3][4]</sup>

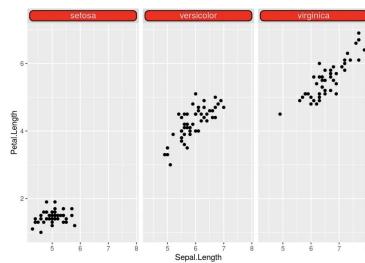
In his 2016 book *Homo Deus: A Brief History of Tomorrow*, Yuval Noah Harari argues that all competing political or social structures can be seen as data processing systems: "Dataism declares that the universe consists of data flows, and the value of any phenomenon or entity is determined by its contribution to data processing" and "we may interpret the entire human species as a single data processing system, with individual humans serving as its chips".<sup>[5][6]</sup>

According to Harari, a Dataist should want to "maximize dataflow by connecting to more and more media". Harari predicts that the logical conclusion of this process is that eventually humans will give algorithms the authority to make the most important decisions in their lives, such as whom to marry and which career to pursue.<sup>[6][7]</sup> Harari argues that Aaron Swartz could be called the "first martyr" of Dataism.<sup>[8]</sup>

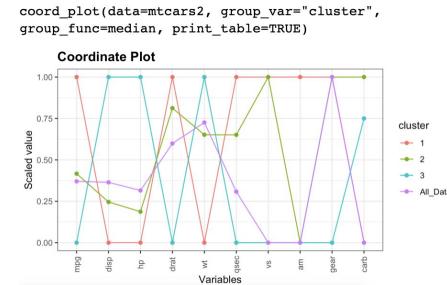


# Qué problemas estamos resolviendo?

June 16th posts in R-bloggers use iris, mtcars, have missing data paths and require manually downloading datasets.



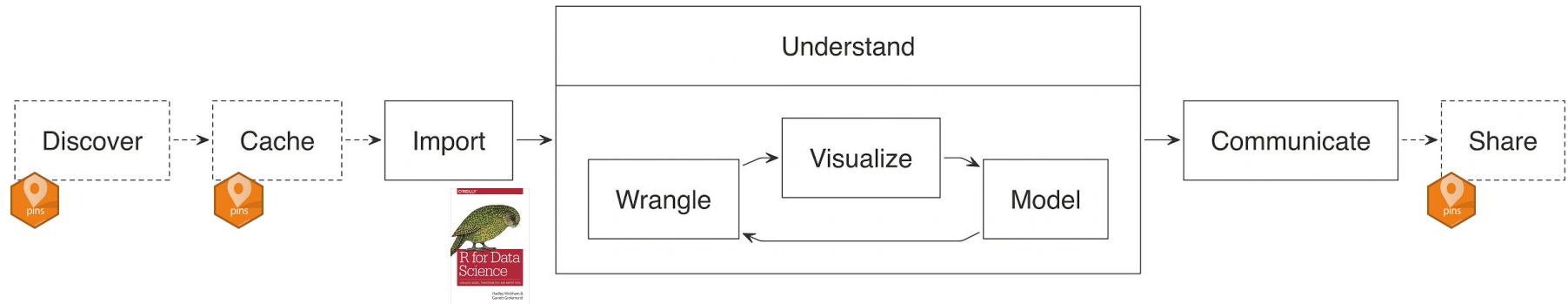
```
##### IMPORT RAW DATA
log_info("Loading data")
mydat = fread(data_path)
```



```
# https://www.data.gouv.fr/fr/datasets/donnees-
hospitalieres-relatives-a-lepidemie-de-covid-19/
fichier_covid <- "donnees/covid.csv"
```

# Por qué necesitamos un nuevo paquete?

It is often also required for us to discover which dataset to use, cache it locally, and share our datasets with colleagues.



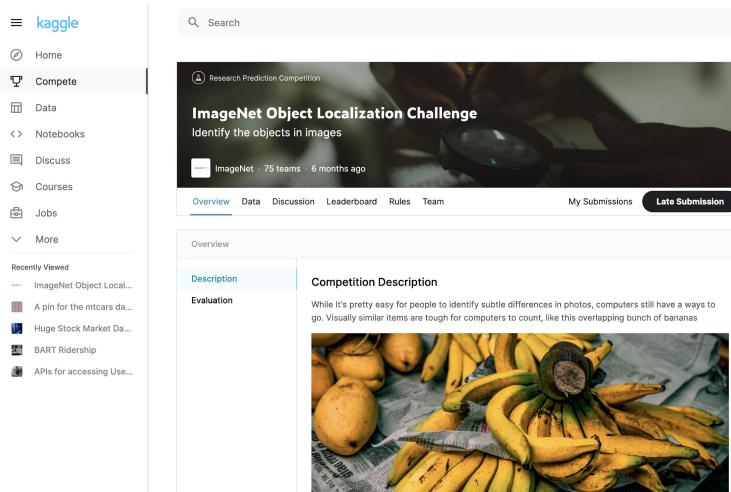
# Pin, discover and share

**Pin** remote resources locally with `pin()`, work offline and cache results. **Discover** new resources across different boards using `pin_find()`. **Share** resources in local folders, GitHub, Kaggle, and RStudio Connect by registering new boards with `board_register()`.

```
board_register("_____")  
  
pin(1:10, name = "numbers", board = "_____")  
pin_get("numbers")  
  
pin("http://cs231n.stanford.edu/tiny-imagenet-200.zip",  
    name = "tinyimagenet", board = "_____")  
pin_get("tinyimagenet")  
  
pin_find()
```



# Usando pins para descargar ImageNet

A screenshot of the Kaggle website. On the left is a sidebar with navigation links: Home, Compete (selected), Data, Notebooks, Discuss, Courses, Jobs, and More. Below this is a 'Recently Viewed' section with links to the ImageNet Object Localization challenge, a pin for the mtcars dataset, a huge stock market dataset, BART Ridership, and APIs for accessing Use... The main content area shows a competition titled 'ImageNet Object Localization Challenge' with a sub-instruction 'Identify the objects in images'. It features a thumbnail image of a bunch of bananas and a pear. Below the thumbnail is a 'Competition Description' which reads: 'While it's pretty easy for people to identify subtle differences in photos, computers still have a ways to go. Visually similar items are tough for computers to count, like this overlapping bunch of bananas'. There are tabs for Overview, Description, and Evaluation.

```
library(pins)
board_register("kaggle", token = "kaggle.json")

pin_get("c/imagenet-object-localization-challenge", board = "kaggle")[1] %>%
  untar(exdir = "/localssd/imagenet/")
```

El siguiente código descarga **ImageNet**, un dataset de 150GB sobre clasificación de imágenes, de **Kaggle** usando el paquete **pins**.



pins

Home

Articles

Use Cases

Reference

News

Blog



## pins: Pin, Discover and Share Resources

### Overview

You can use the `pins` package to:

- **Pin** remote resources locally with `pin()`, work offline and cache results.
- **Discover** new resources across different boards using `pin_find()`.
- **Share** resources in local folders, GitHub, Kaggle, and RStudio Connect by registering new boards with `board_register()`.



### Installation

```
# Install the released version from CRAN:  
install.packages("pins")
```

To get a bug fix, or use a feature from the development version, you can install pins from GitHub.

```
# install.packages("remotes")  
remotes::install_github("rstudio/pins")
```

### Usage

```
library(pins)
```

### Links

Download from CRAN at

<https://cloud.r-project.org/package=pins>

Browse source code at

<https://github.com/rstudio/pins>

Report a bug at

<https://github.com/rstudio/pins/issues>

### License

Apache License 2.0

### Developers

Javier Luraschi

Author, maintainer

[All authors...](#)

### Dev status

build passing

CRAN 0.4.1

codecov 77%

downloads 3954/month

lifecycle maturing

chat on gitter

stars 107



[https://colab.research.google.com/drive/1NdiNgn\\_a7NEvFpjPDvxKTshrSWgxZK5?usp=sharing](https://colab.research.google.com/drive/1NdiNgn_a7NEvFpjPDvxKTshrSWgxZK5?usp=sharing)

# Gracias!

[blogs.rstudio.com/ai](https://blogs.rstudio.com/ai)



@dfalbel



@yl790



@javierluraschi



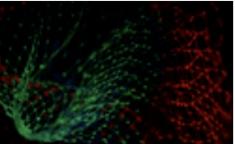
@zkajdan

## RStudio AI Blog

Sept. 7, 2020

### Introducing sparklyr.flint: A time-series extension for sparklyr

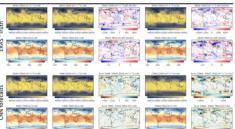
We are pleased to announce that `sparklyr.flint`, a sparklyr extension for analyzing time series at scale with Flint, is now available on CRAN. Flint is an open-source library for working with time-series in Apache Spark which supports aggregates and joins on time-series datasets.



Sept. 1, 2020

### An introduction to weather forecasting with deep learning

A few weeks ago, we showed how to forecast chaotic dynamical systems with deep learning, augmented by a custom constraint derived from domain-specific insight. Global weather is a chaotic system, but of much higher complexity than many tasks commonly addressed with machine and/or deep learning. In this post, we provide a practical introduction featuring a simple deep learning



Aug. 24, 2020

### Training ImageNet with R

This post explores how to train large datasets with TensorFlow and R. Specifically, we present how to download and repartition ImageNet, followed by training ImageNet across multiple GPUs in distributed environments using TensorFlow and Apache Spark.



Aug. 18, 2020

### Deepfake detection challenge from R

A couple of months ago, Amazon, Facebook, Microsoft, and other contributors initiated a challenge consisting of telling apart real and AI-generated ("fake") videos. We show how to approach this challenge from R.



July 31, 2020

### FNN-VAE for noisy time series forecasting

In the last part of this mini-series on forecasting with false nearest neighbors (FNN) loss, we replace the LSTM autoencoder from the previous post by a convolutional VAE, resulting in equivalent prediction performance but significantly lower training time. In addition, we find that FNN regularization is of great help when an underlying deterministic process is obscured by substantial noise.



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