

Tensorflow with R

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Tensorflow

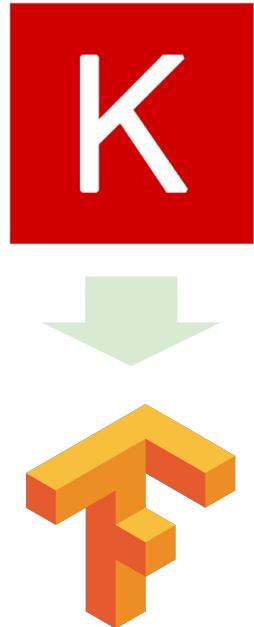
- Open source software library for high performance numerical computation
- Computation can be easily deployed across a variety of platforms (CPUs, GPUs, TPUs), and devices (desktops, servers, mobile)
- Comes with strong support for machine and deep learning
- The computation core is used across other scientific domains



Source: <https://www.tensorflow.org/>

Keras

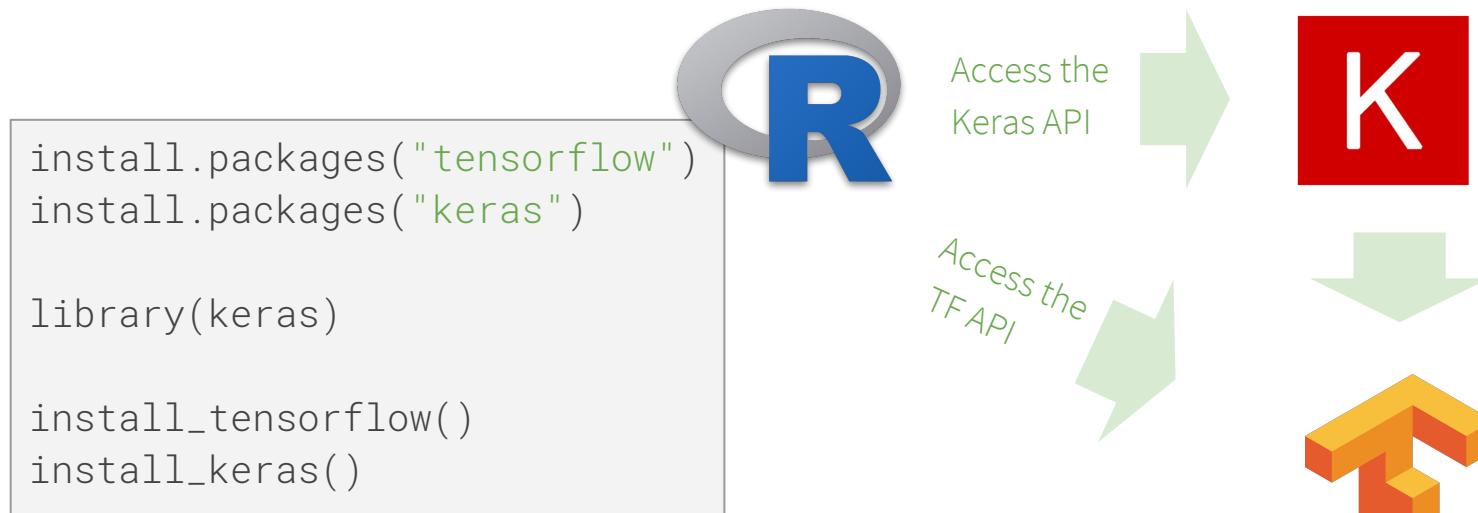
- Keras is a high-level neural networks API
- Allows the same code to run on CPU or on GPU, seamlessly.
- User-friendly API which makes it easy to quickly prototype deep learning models.
- Built-in support for convolutional and recurrent networks
- Supports arbitrary network architectures
- Is capable of running on top of multiple back-ends including **TensorFlow**, CNTK, or Theano.



Source: <https://github.com/rstudio/keras>

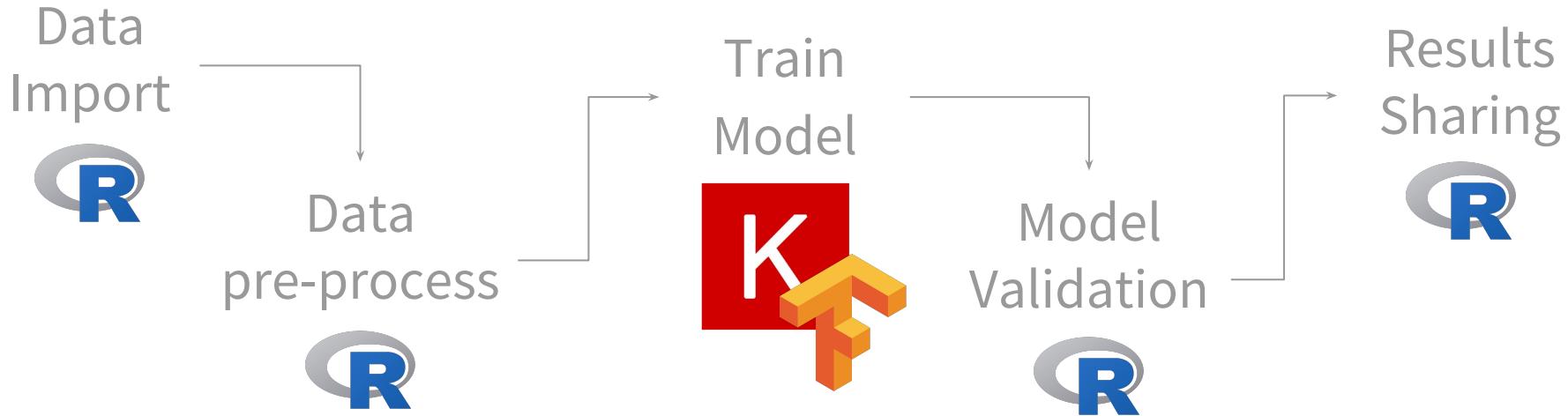
Integrating R

The `tensorflow` and `keras` R packages integrate with the new computing APIs



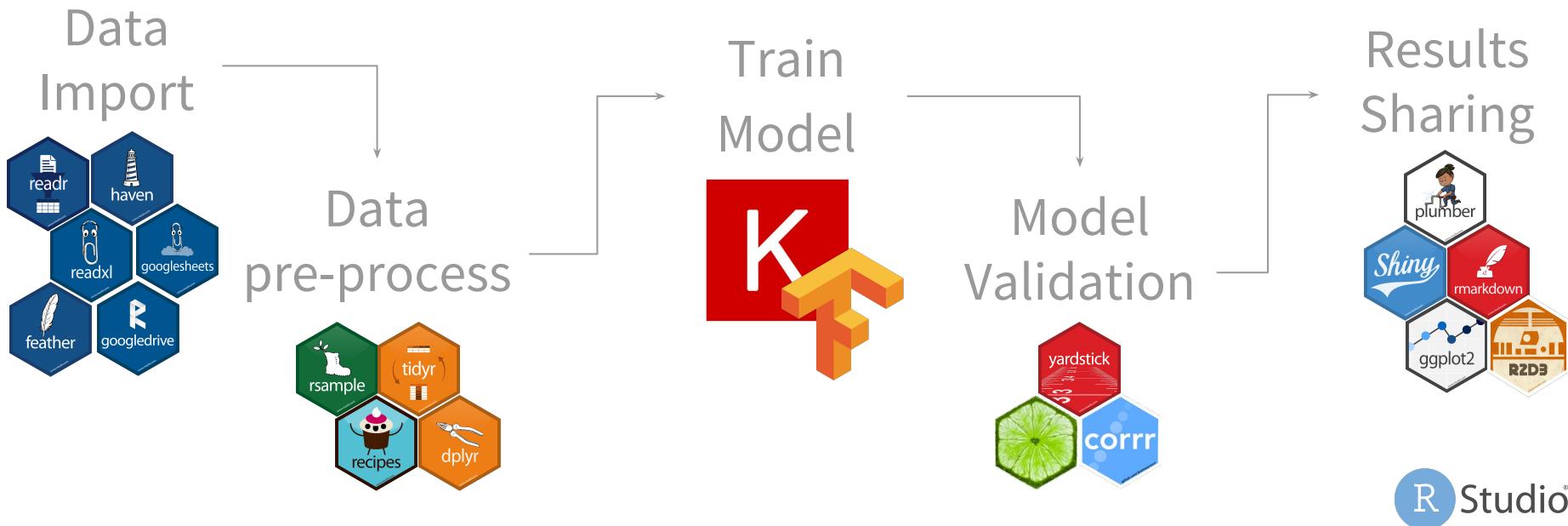
Why use them together?

Training the model is only one of the multi-step Machine Learning process. R can be used to execute all steps.



Furthermore...

R's ecosystem of specialized packages already deliver a rock solid framework for ML development



Deep Learning With Keras To Predict Customer Churn

Demo

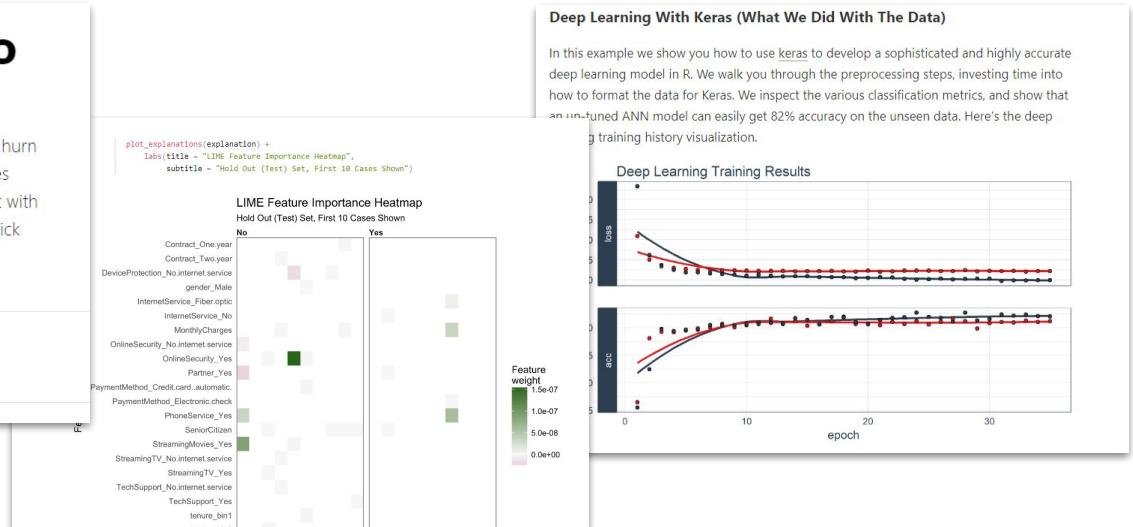
Background

Recreate the example in the “Deep Learning With Keras To Predict Customer Churn” post, published by Matt Dancho in the Tensorflow R package’s blog

Deep Learning With Keras To Predict Customer Churn

Using Keras to predict customer churn based on the IBM Watson Telco Customer Churn dataset. We also demonstrate using the lime package to help explain which features drive individual model predictions. In addition, we use three new packages to assist with Machine Learning: recipes for preprocessing, rsample for sampling data and yardstick for model metrics.

AUTHOR	AFFILIATION	PUBLISHED	CITATION
Matt Dancho	Business Science	Jan. 10, 2018	Dancho, 2018



<https://blogs.rstudio.com/tensorflow/posts/2018-01-11-keras-customer-churn/>

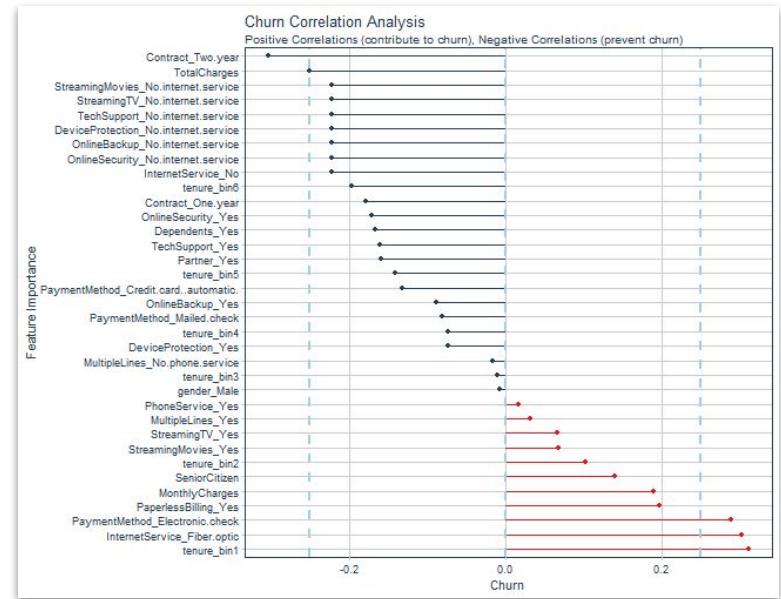
Exercise objective

Analyze the Telco
Customer Churn Data
using R with Keras and
Tensorflow.



WA_Fn-UseC_-Telco-Customer-Churn.csv - Excel

A1	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	
1	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	OnlineSecurity	OnlineBackup	DeviceProtection	TechSupport	StreamingTV	StreamingMovies	Contract	PaperlessBilling	PaymentMethod	MonthlyCharges	Churn	
2	7590-VHVEG	Female	0	Yes	No	1	No	No	phone	DSL	No	Yes	No	No	No	No	Month-to-month	Electronic check	29.85	29.85	No
3	5575-GNVDE	Male	0	No	No	34	Yes	No	DSL	Yes	No	Yes	No	No	No	No	One year	Mailed check	56.95	1889.5	No
4	3668-QPYBK	Male	0	No	No	2	Yes	No	DSL	Yes	Yes	No	No	No	No	No	Month-to-month	Mailed check	53.85	108.15	Yes
5	7795-CFOCV	Male	0	No	No	45	No	No	phone	DSL	Yes	No	Yes	Yes	No	No	One year	Bank transfer	42.3	1840.75	No



R packages

Showcase where and how these packages can be used during the ML project



Publish on RStudio Connect



Now for real...

Demo

Try it on your phone!

rstd.io/churn

