

Bootstrapping Machine Learning

Louis Dorard
(@louisdorard)

TRUST ME

I'M A



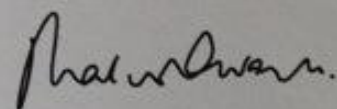
DOCTOR

LOUIS RICHARD MICHEL
DORARD

*having satisfactorily completed the approved course of study and the
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Doctor of Philosophy

Date of award: 28 April 2012



Professor Malcolm Grant
President and Provost
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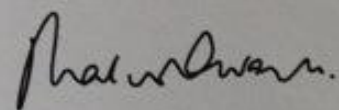


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“Predictive is the ‘killer app’ for
big data.”

–Waqar Hasan, Apigee Insights

“Predictive apps are
the next big thing
in app development.”

–Mike Gualtieri, Principal Analyst at Forrester

Machine Learning

Data

BUT

“A significant constraint on realizing value from big data will be a **shortage of talent**, particularly of people with deep expertise in statistics and machine learning.”

–McKinsey & Co.

**What the @#?~%
is ML?**



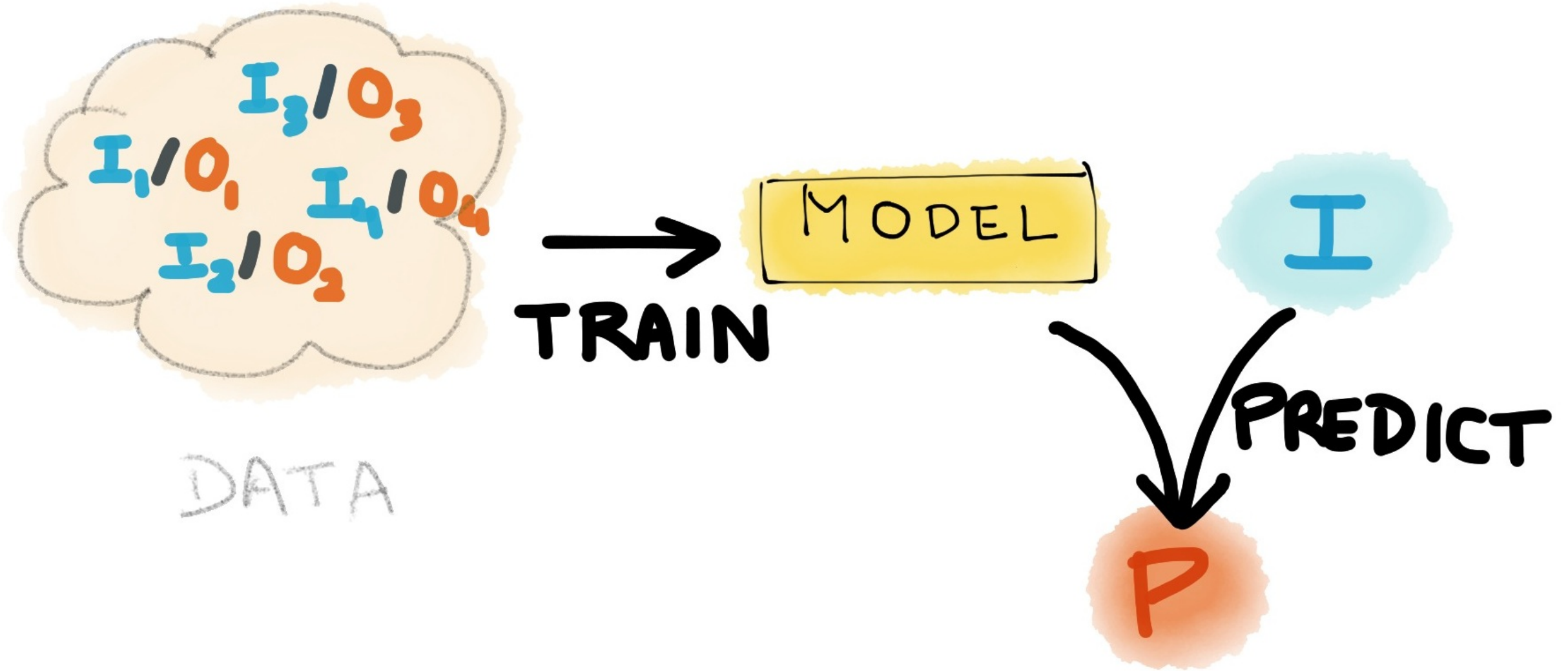
**FOR
SALE**

*“How much is this house worth?
— X \$”*

-> Regression

Bedrooms	Bathrooms	Surface (foot²)	Year built	Type	Price (\$)
3	1	860	1950	house	565,000
3	1	1012	1951	house	
2	1.5	968	1976	townhouse	447,000
4		1315	1950	house	648,000
3	2	1599	1964	house	
3	2	987	1951	townhouse	790,000
1	1	530	2007	condo	122,000
4	2	1574	1964	house	835,000
4			2001	house	855,000
3	2.5	1472	2005	house	
4	3.5	1714	2005	townhouse	
2	2	1113	1999	condo	
1		769	1999	condo	315,000

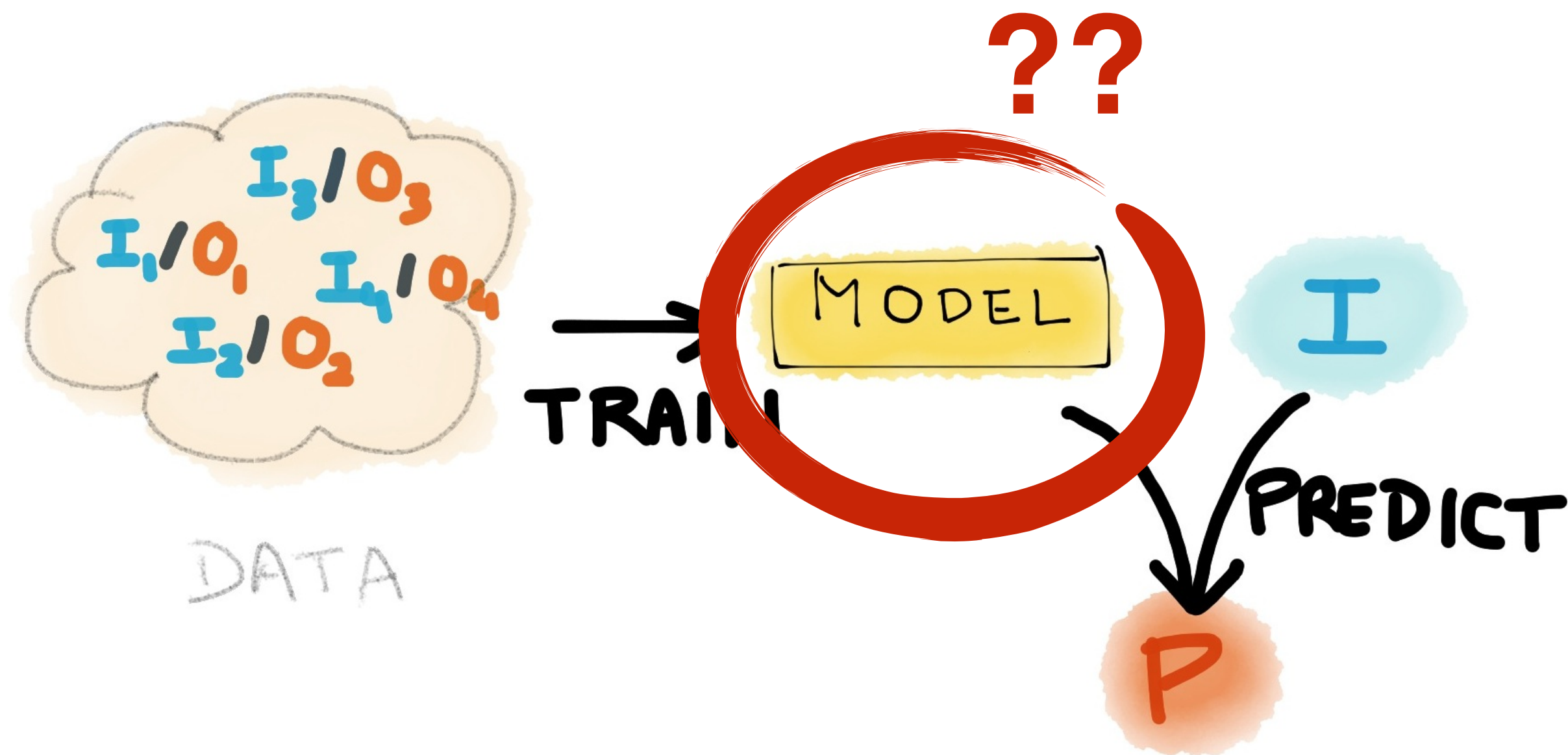
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ML is a set of AI techniques
where “intelligence” is built by
referring to examples

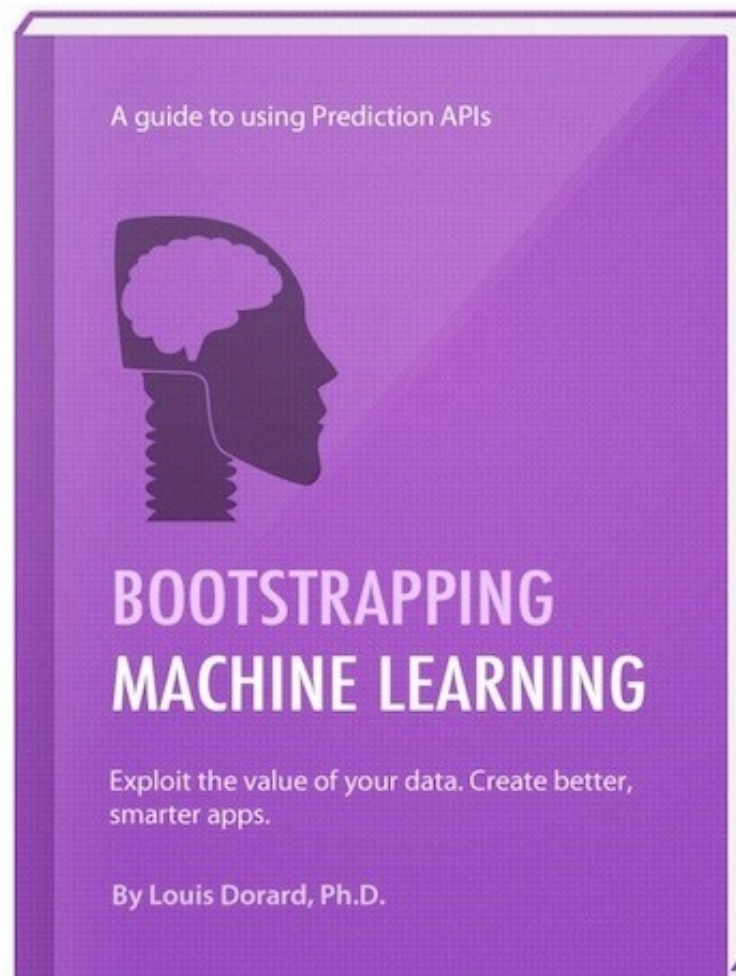




Prediction APIs to the rescue

MAKE YOUR APPS AND YOUR BUSINESS SMARTER

Learn how to use Prediction APIs and make Machine Learning work for you — without hiring an expert.



Are you still wondering what Big Data and Machine Learning can do for you? Feels out of your reach? Don't know how to get started?

In an age of overflowing data, Machine Learning and Data Science seem to be all the rage. By analyzing data, computers are able to "learn" and generalize from examples of things happening in the real world, in the same way a human would do. They can make predictions and answer questions such as "how much?" and "which?". Using these machine-powered predictions makes us create smarter apps.

Prediction APIs are making Machine Learning accessible to everyone and this book is the first that teaches how to use them. You will learn the possibilities offered by these APIs, how to formulate your own Machine Learning problem, and what are the key concepts to grasp — not how algorithms work, so it doesn't take a university degree to understand.

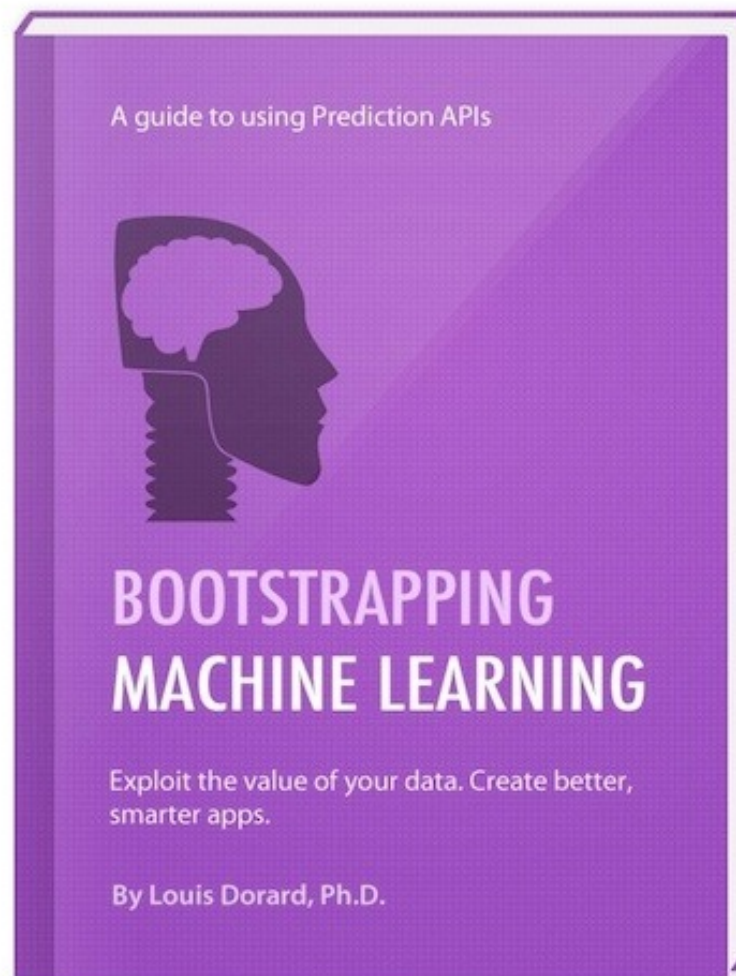
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MAKE YOUR APPS AND YOUR BUSINESS SMARTER

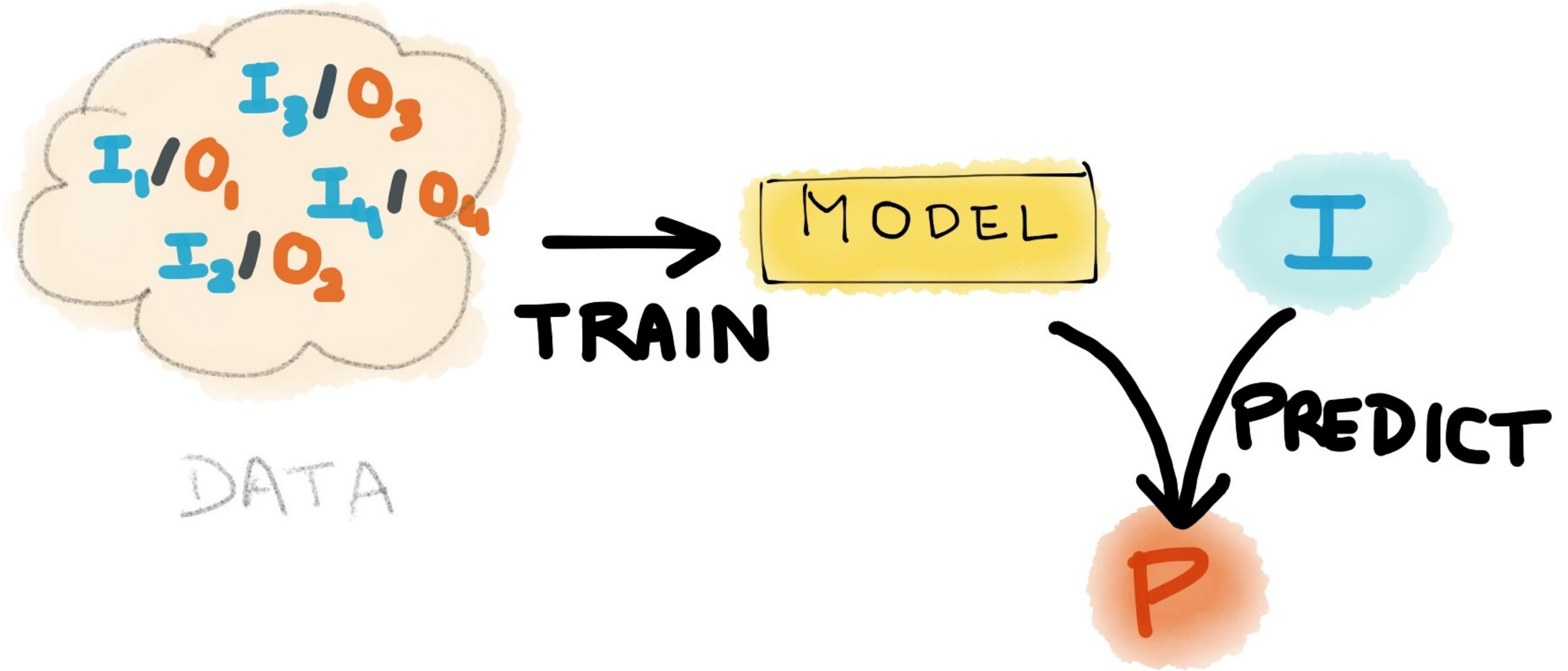
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The two phases of machine learning:

- **TRAIN** a model
- **PREDICT** with a model

The two methods of prediction APIs:

- **TRAIN** a model
- **PREDICT** with a model

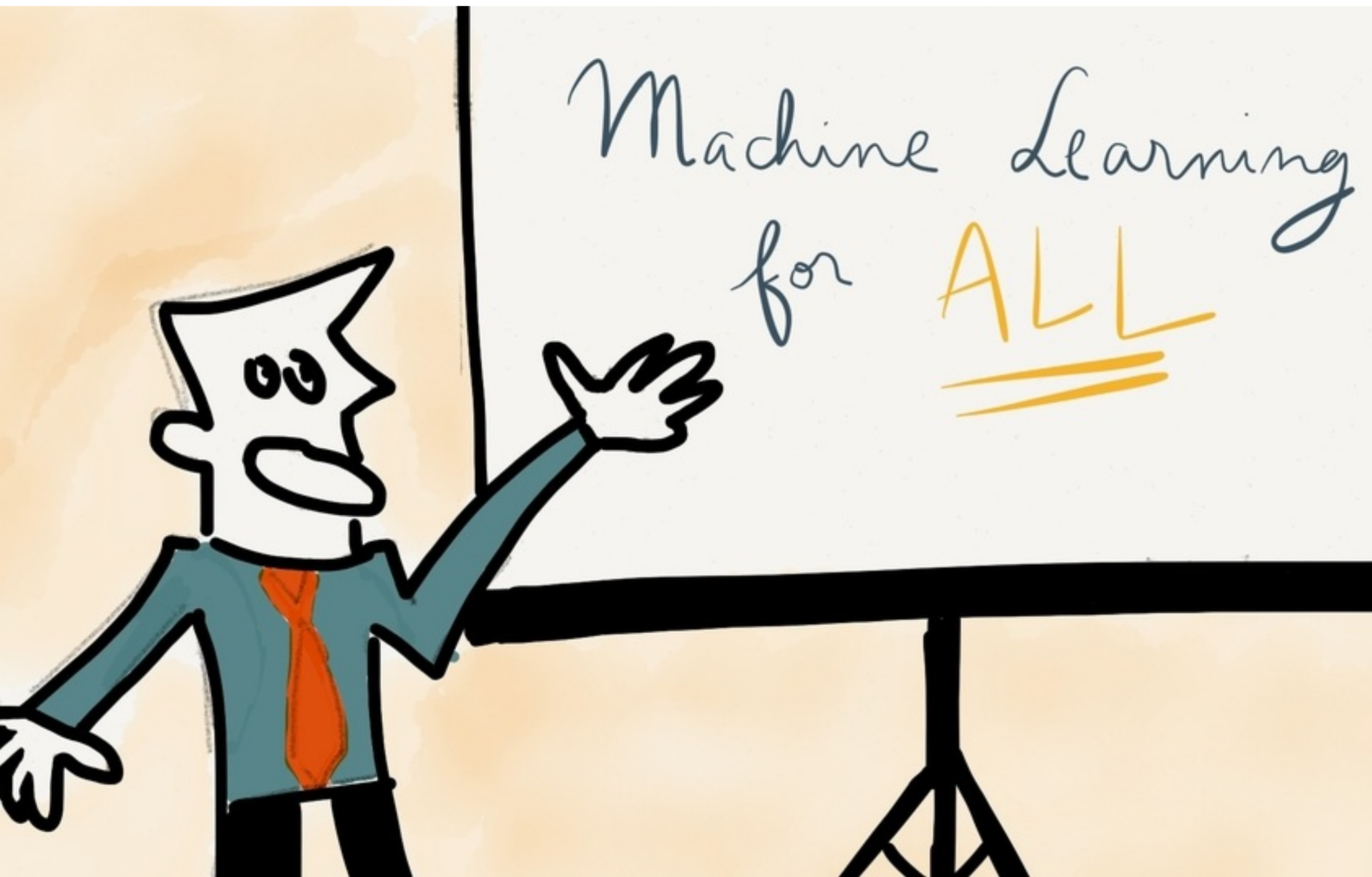
The two methods of prediction APIs:

- `model = create_model(dataset)`
- `predicted_output = create_prediction(model, new_input)`

```
from bigml.api import BigML

# create a model
api = BigML()
source =
api.create_source('training_data.csv')
dataset = api.create_dataset(source)
model = api.create_model(dataset)

# make a prediction
prediction =
api.create_prediction(model, new_input)
print "Predicted output value:
", prediction['object']['output']
```



Automated Prediction APIs:

- BigML.com
- Google Prediction API
- WolframCloud.com

Good Data

- List assumptions (e.g. big houses are expensive)
- Browse data
- Plot data (with BigML for instance)

bit.ly/5minPandas

Model building

bit.ly/5minML

Evaluation:

- Train/test split
- Predictions accuracy
- Impact on app / UX /business
- Cross validation
- Time taken: training and predictions

Recap

- Classification and regression
- 2 phases in ML: train and predict
- Prediction APIs make it easy to build models, but need to work on data
- Evaluation: split data, measure accuracy, time, impact
- Limitations: # data points, # features and noise

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