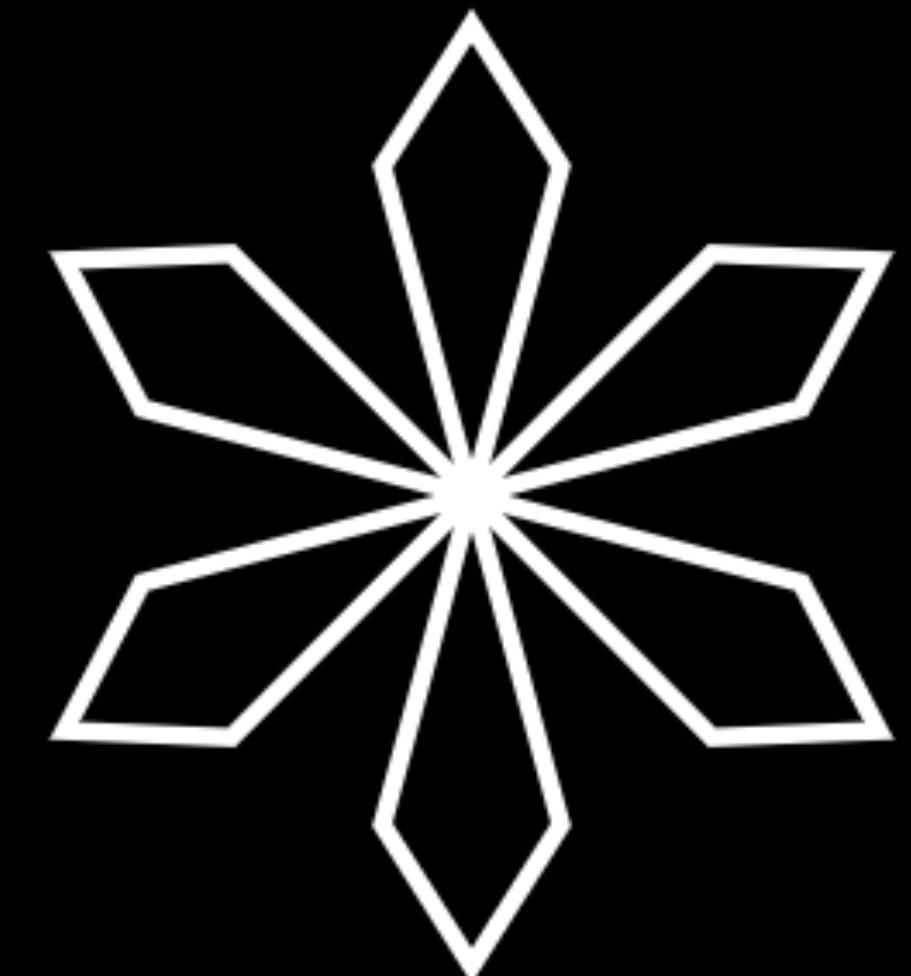


@NataliePis

Captcha Challenge

#1

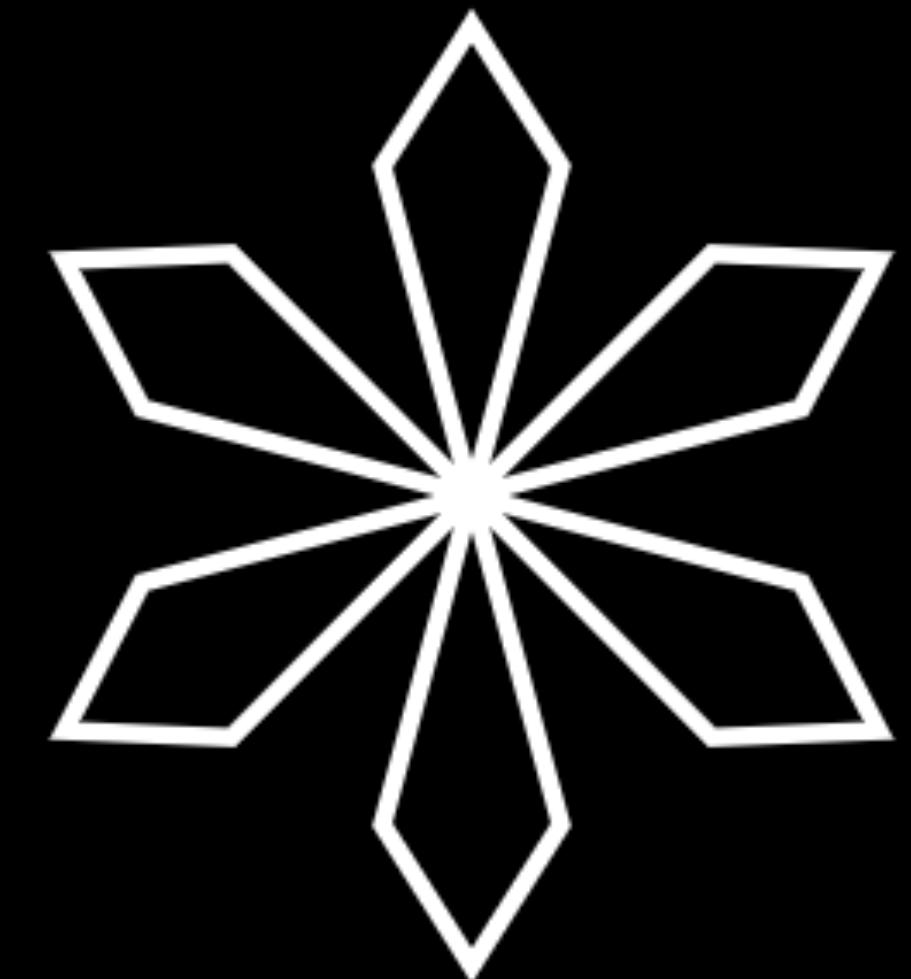




BLACKLIGHT

blacklight.ai

@blacklightai



BLACKLIGHT

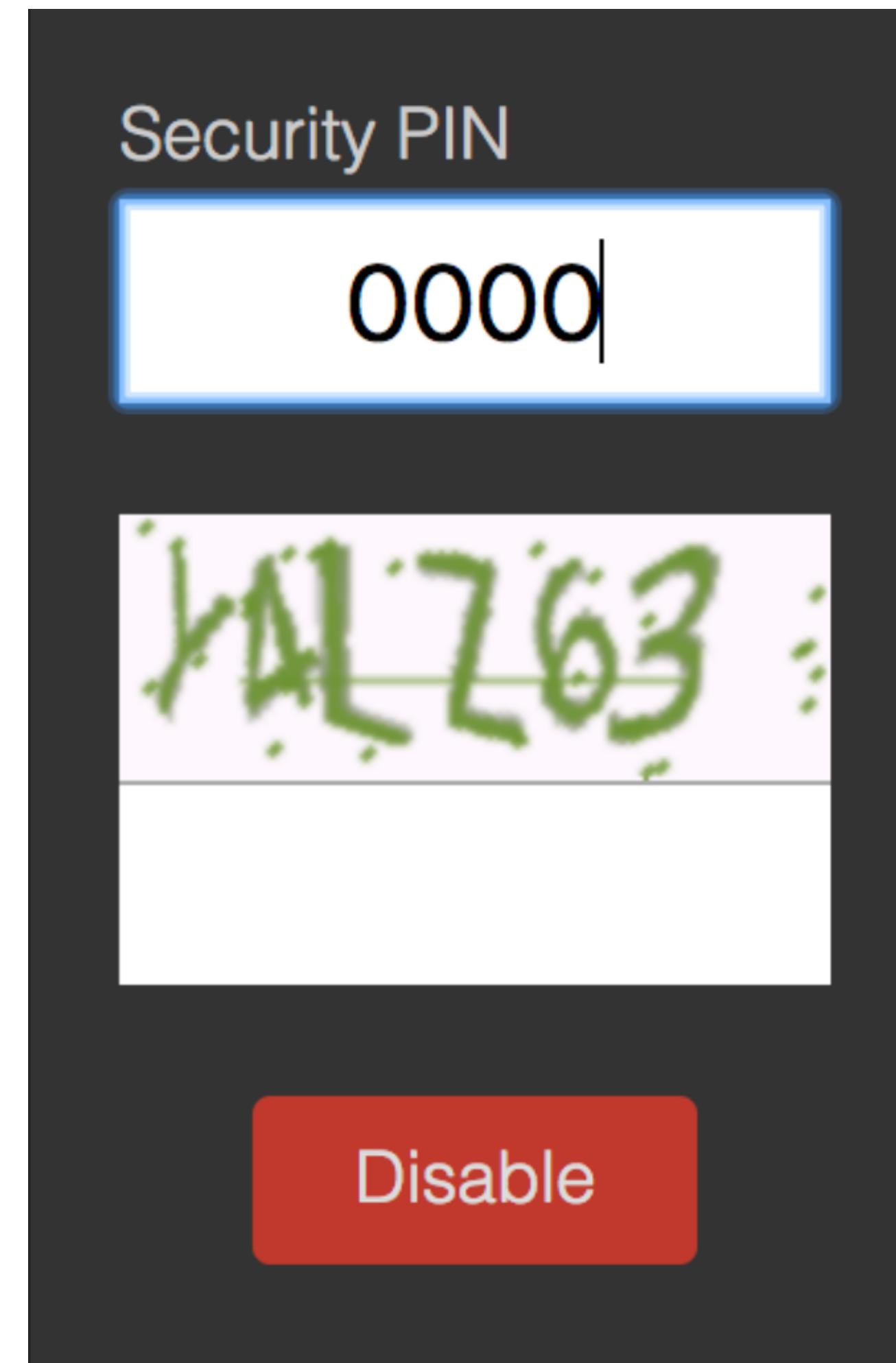
blacklight.ai

@blacklightai

Captcha Challenge



Captcha Challenge



Captcha Challenge

1. Inspect the model



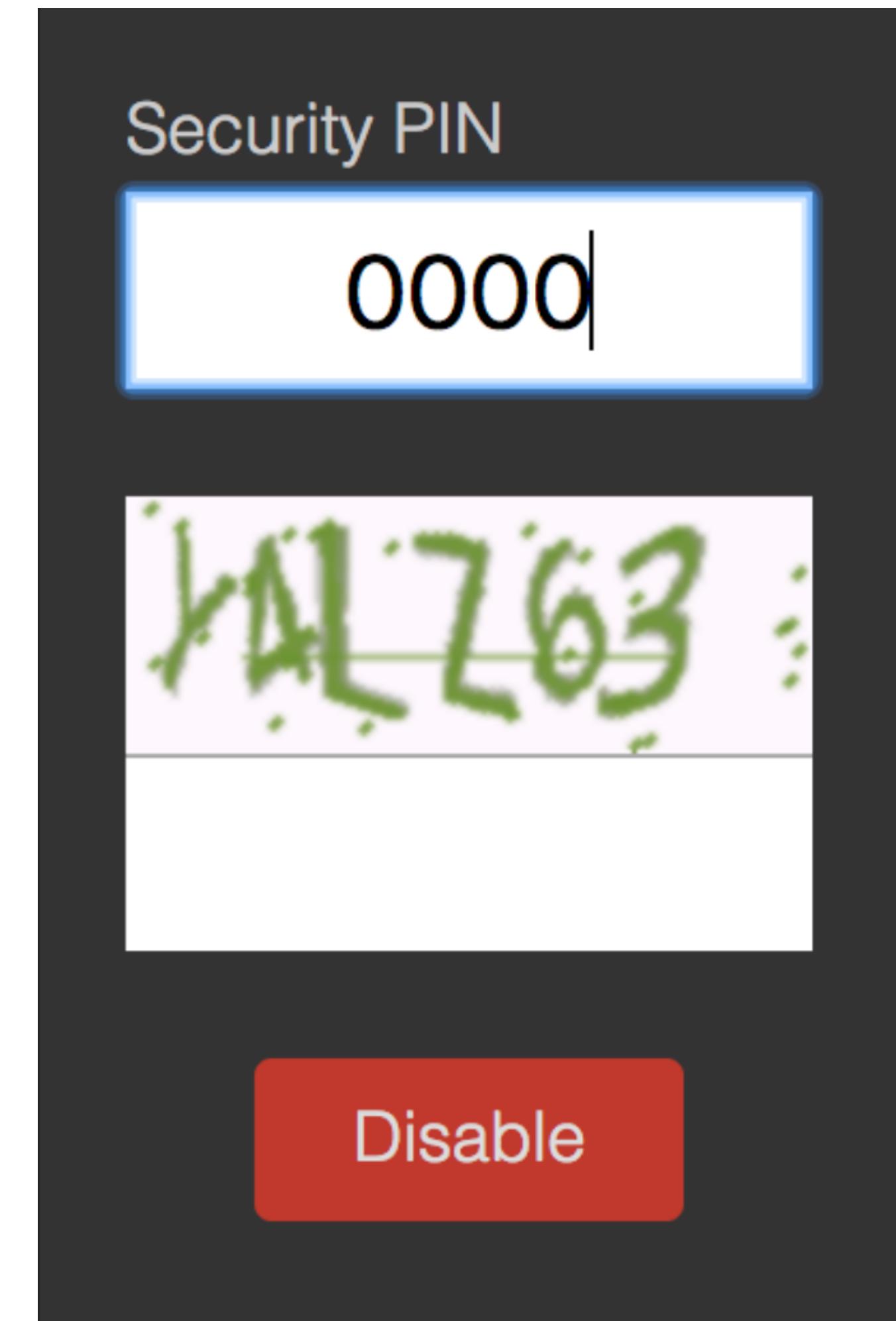
Captcha Challenge

1. Inspect the model
2. Load the model



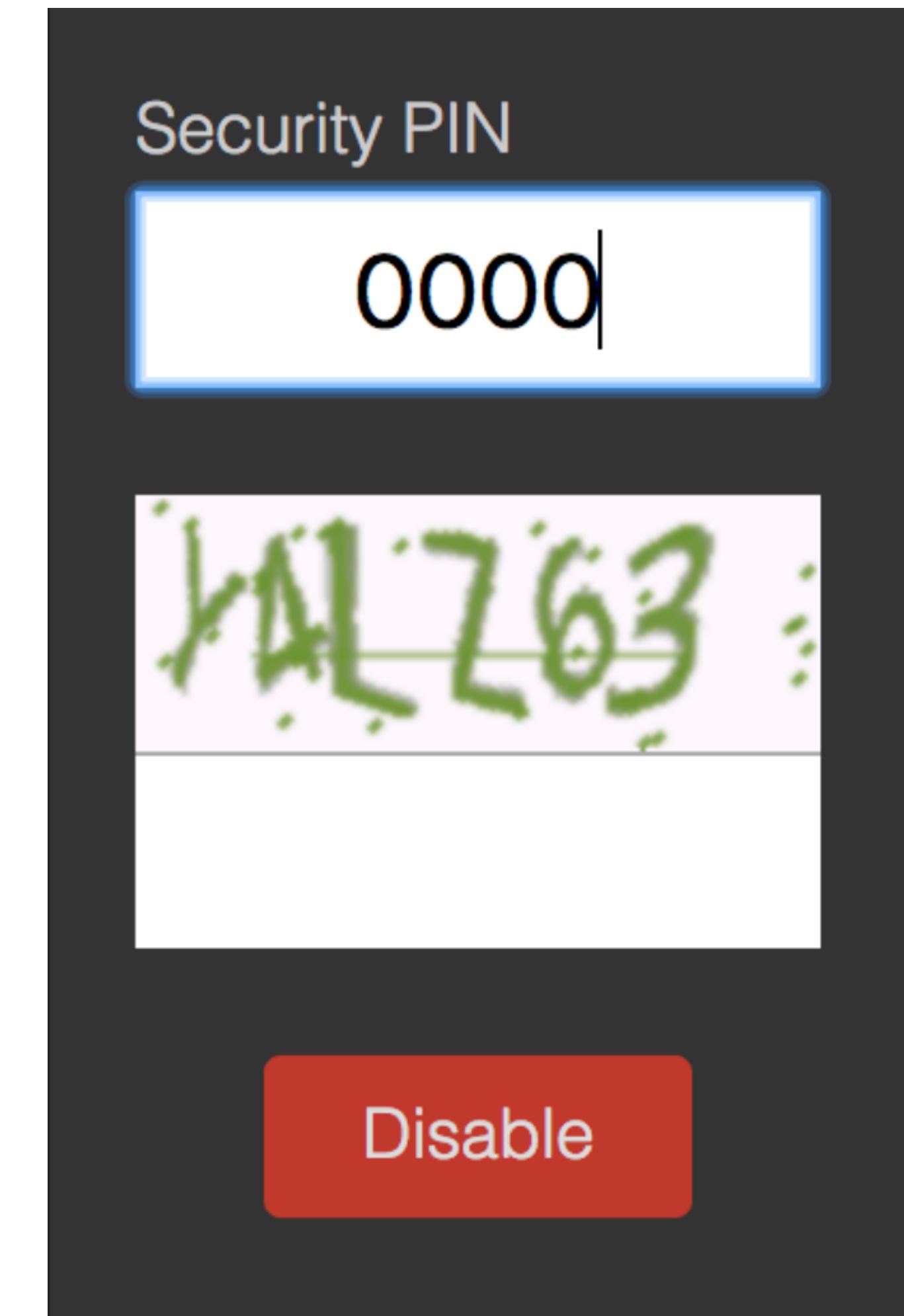
Captcha Challenge

1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:



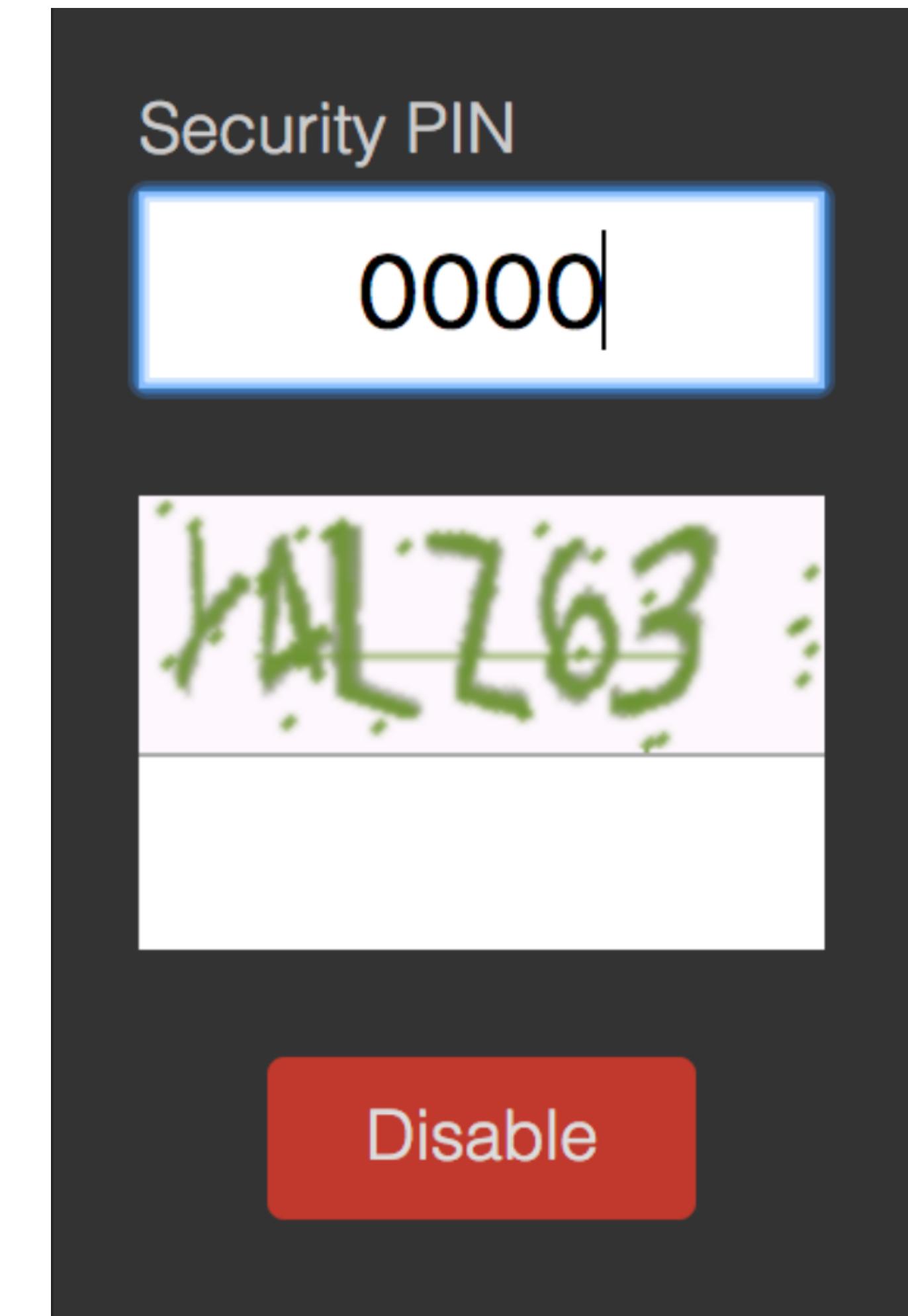
Captcha Challenge

1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:
 - i. Open a cookie jar



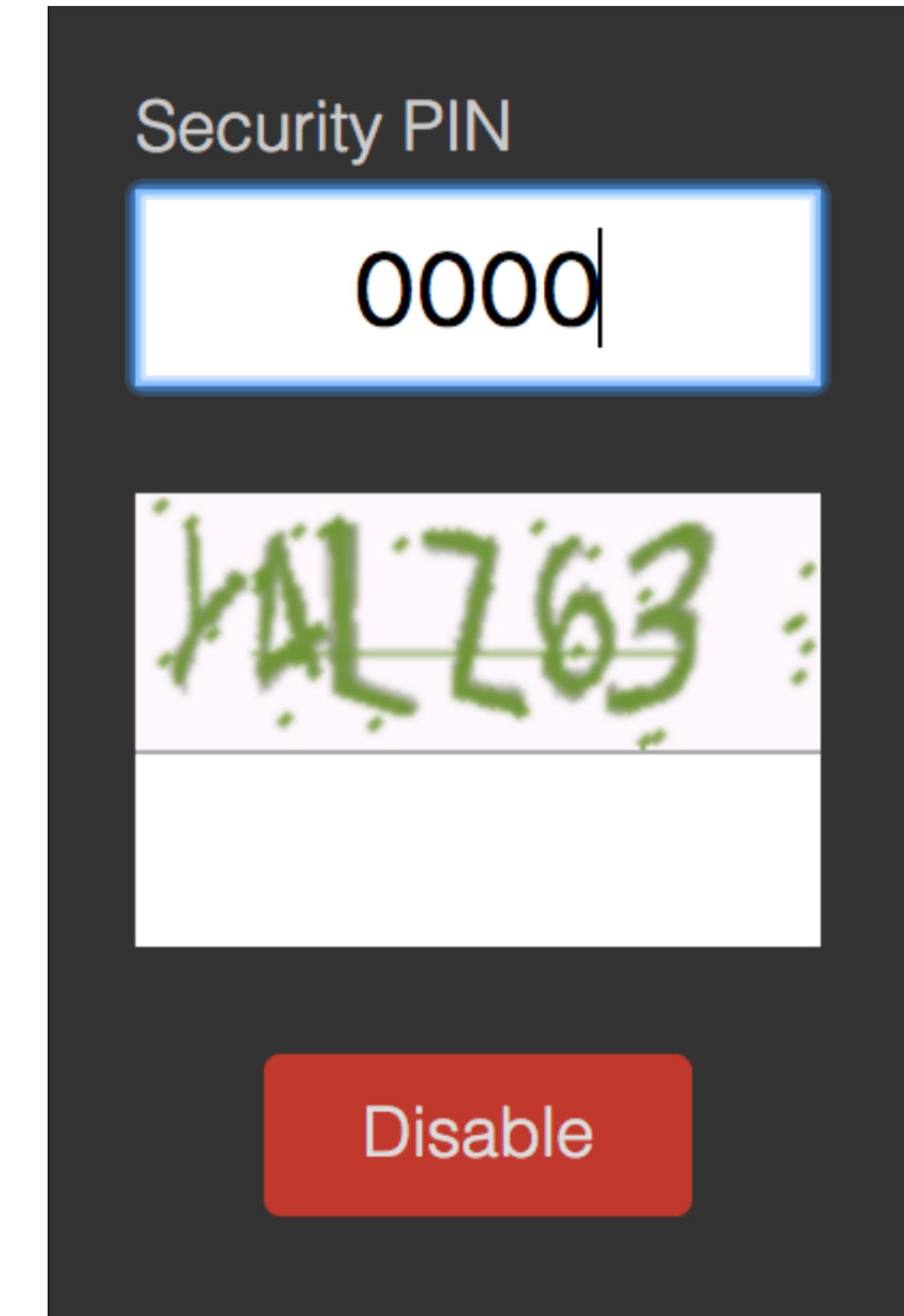
Captcha Challenge

1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:
 - i. Open a cookie jar
 - ii. Get the CAPTCHA image



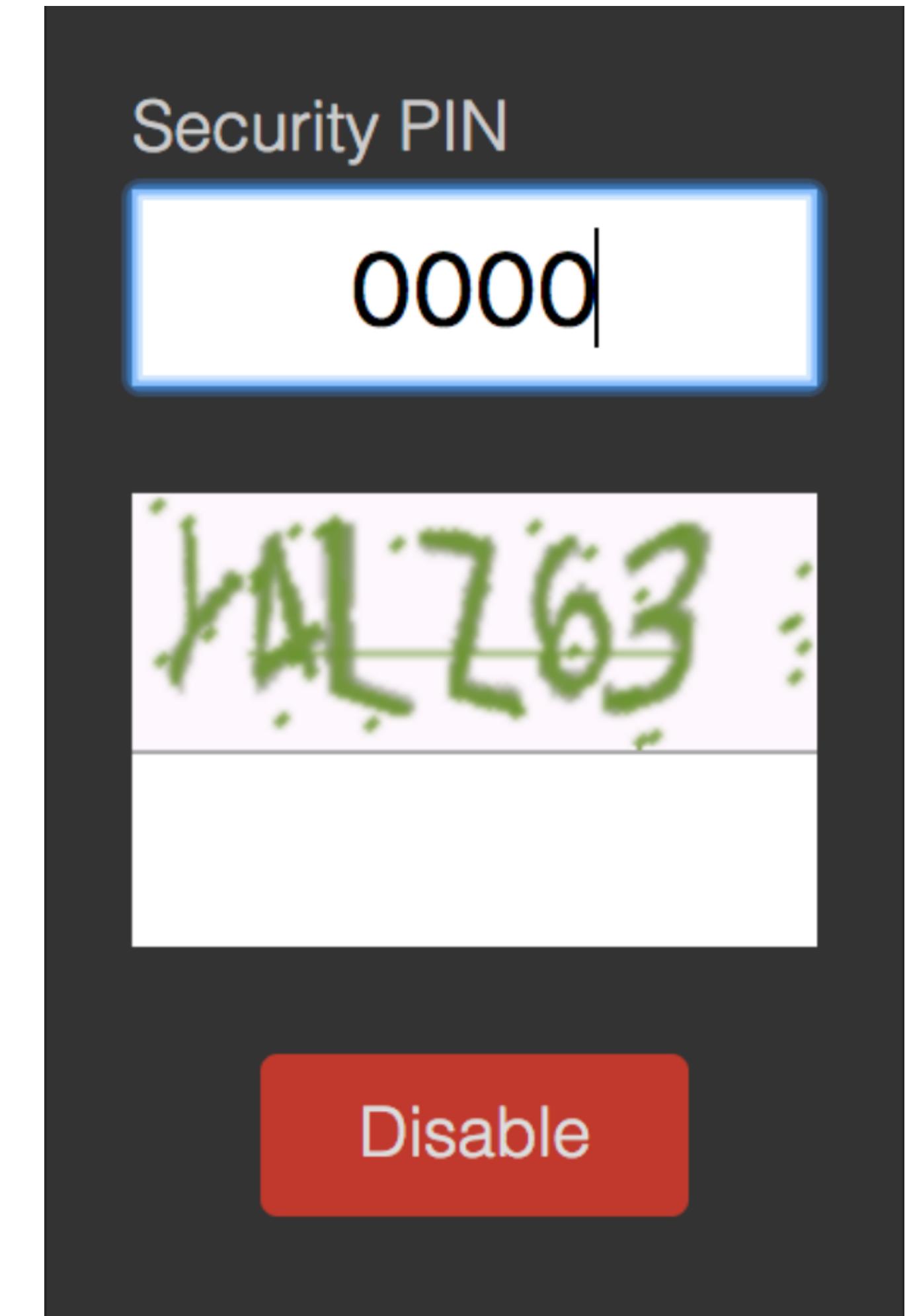
Captcha Challenge

1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:
 - i. Open a cookie jar
 - ii. Get the CAPTCHA image
 - iii. Predict CAPTCHA using ML



Captcha Challenge

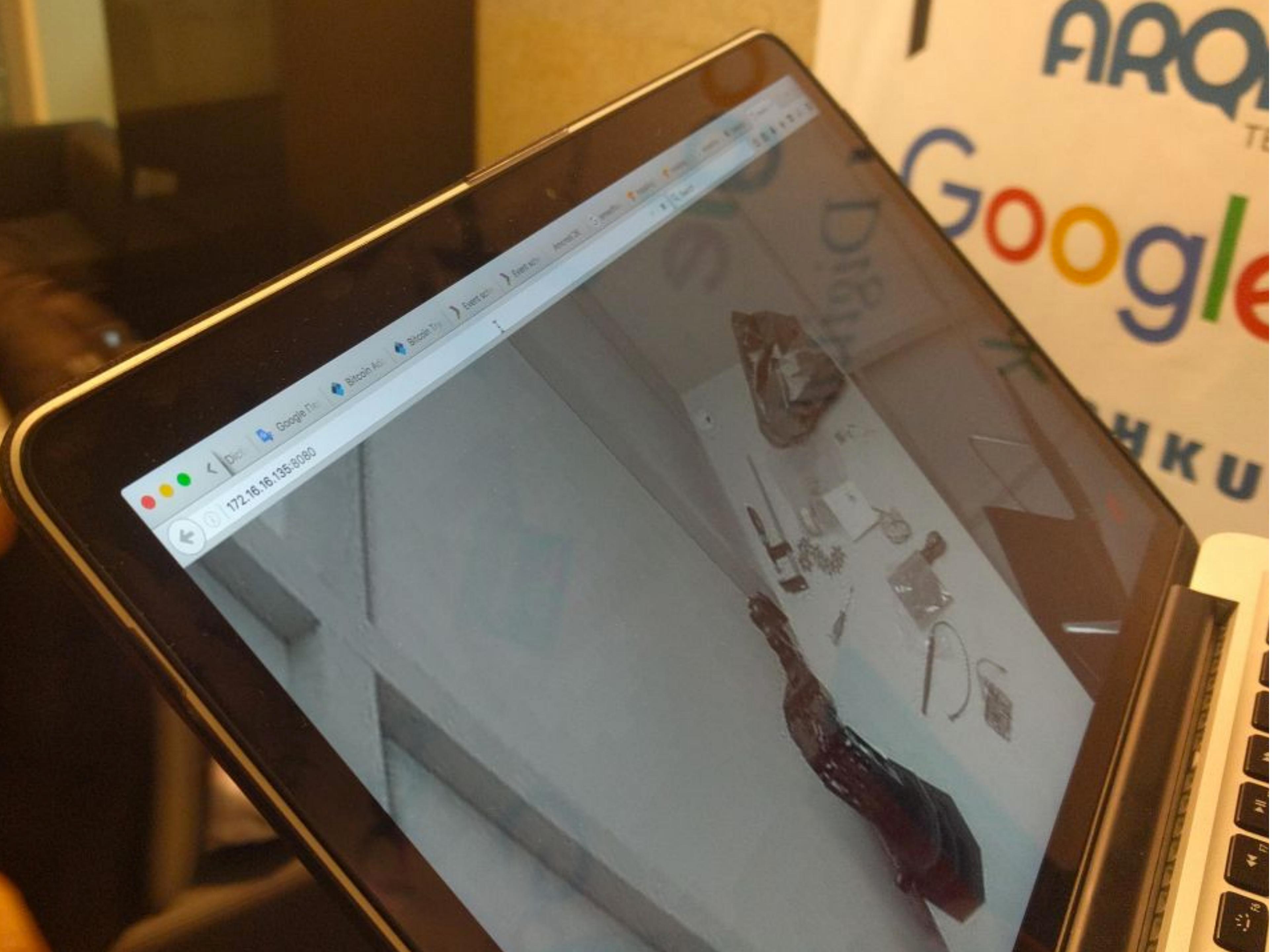
1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:
 - i. Open a cookie jar
 - ii. Get the CAPTCHA image
 - iii. Predict CAPTCHA using ML
 - iv. Guess the PIN + CAPTCHA



Captcha Challenge

1. Inspect the model
2. Load the model
3. Attempt logging in with the PIN:
 - i. Open a cookie jar
 - ii. Get the CAPTCHA image
 - iii. Predict CAPTCHA using ML
 - iv. Guess the PIN + CAPTCHA
 - a. if false CAPTCHA,
fall back to (ii)



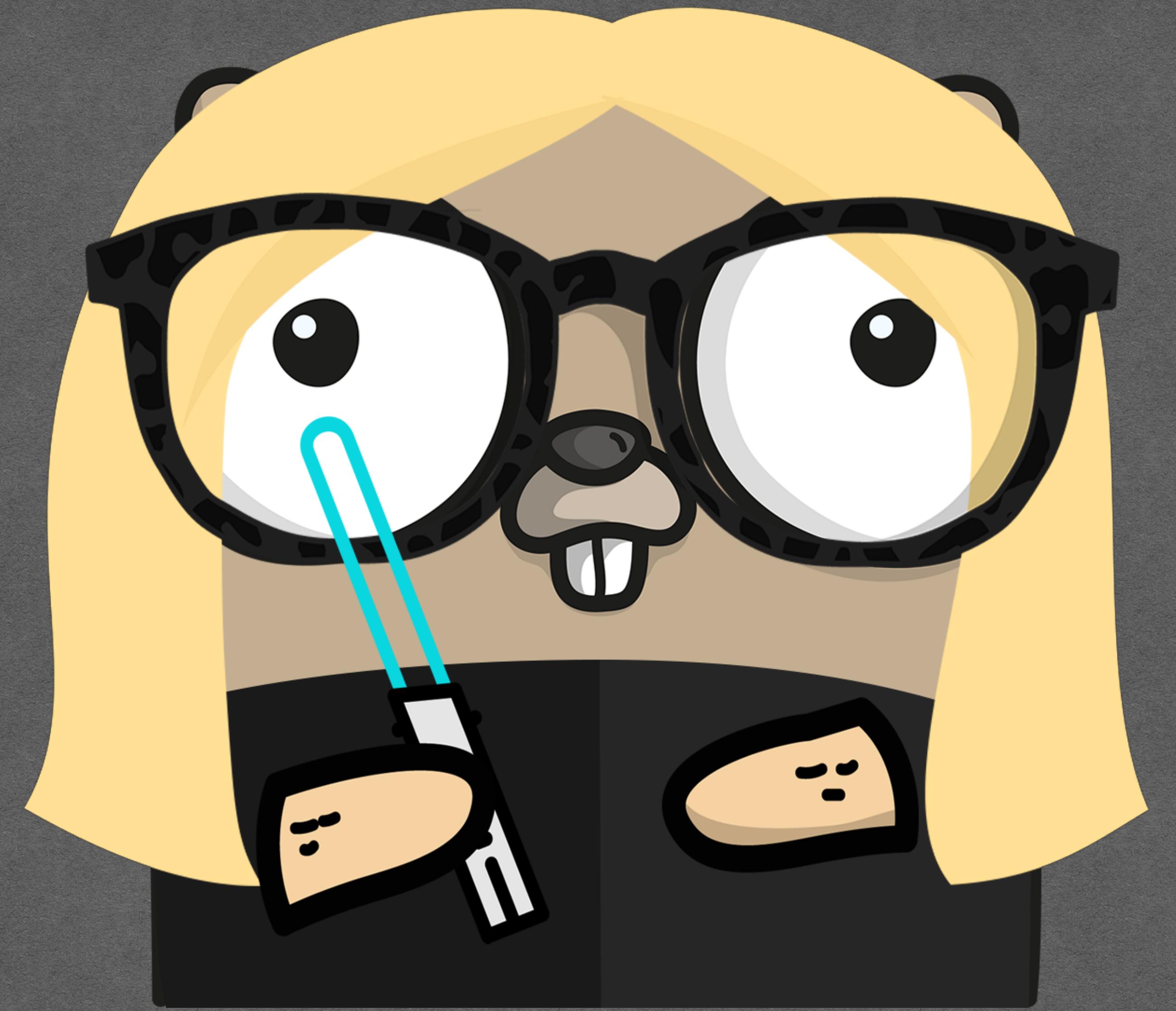


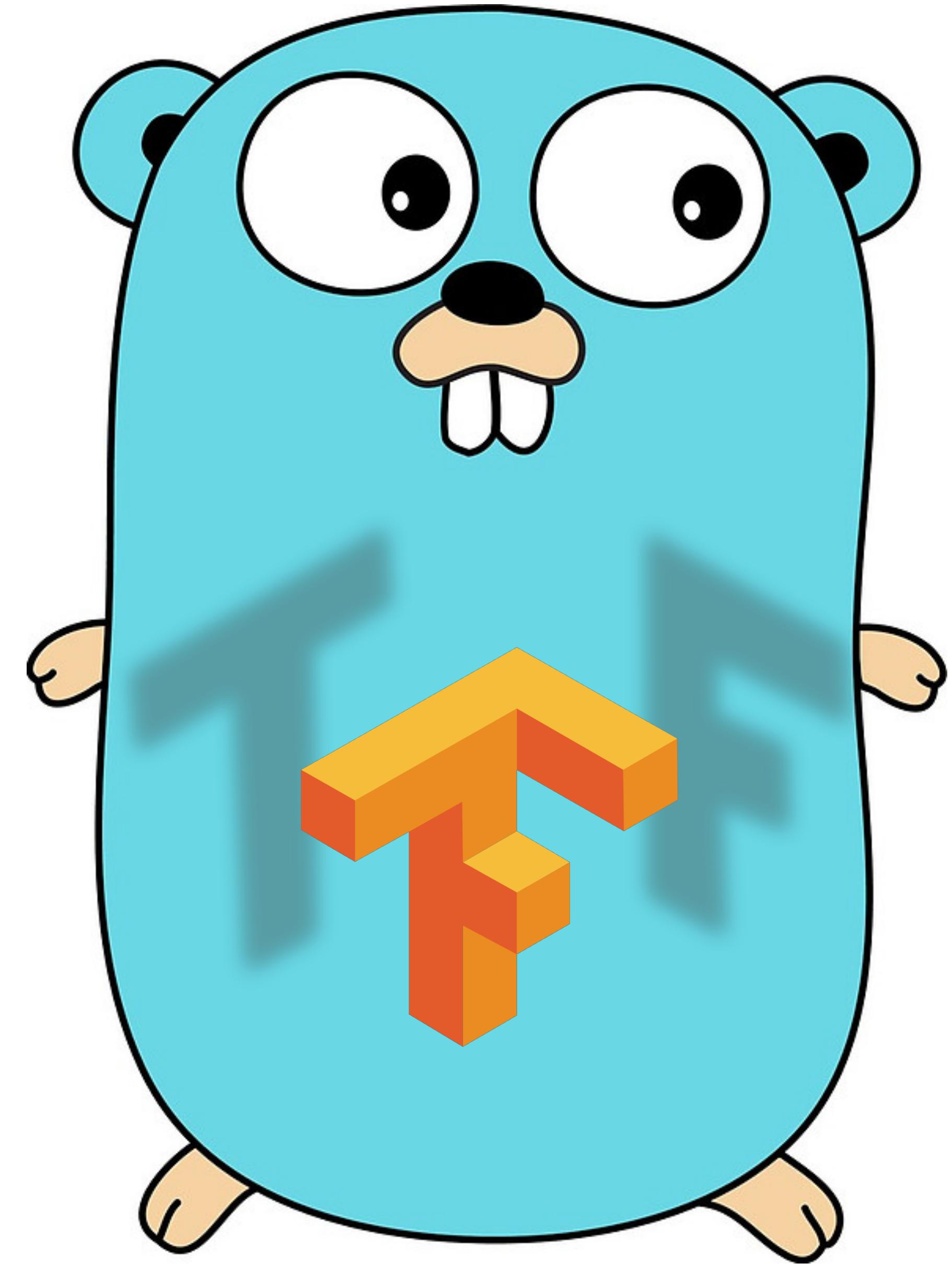
Captcha Challenge

Read all about it at the December 28 2017
Gophers Academy Advents Blog post

<https://github.com/Pisush/break-captcha-tensorflow>

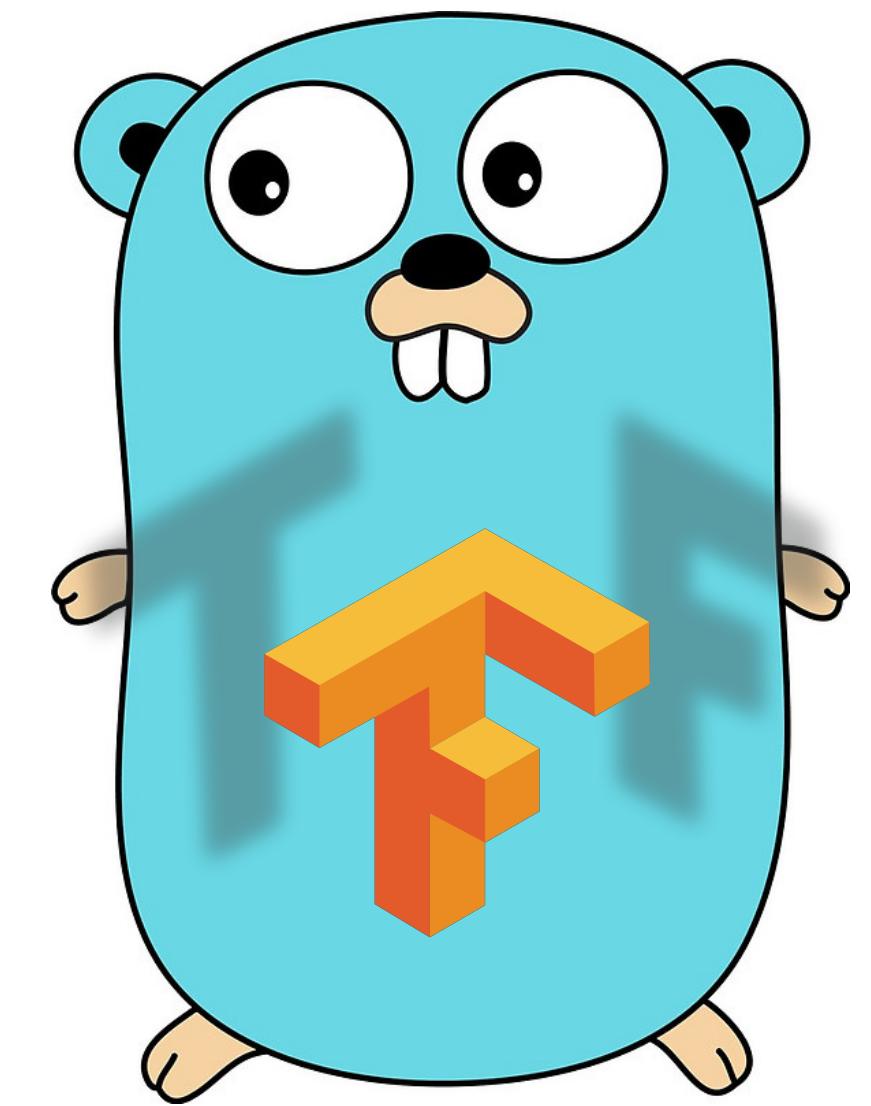
Using Machine Learning: Go + TensorFlow





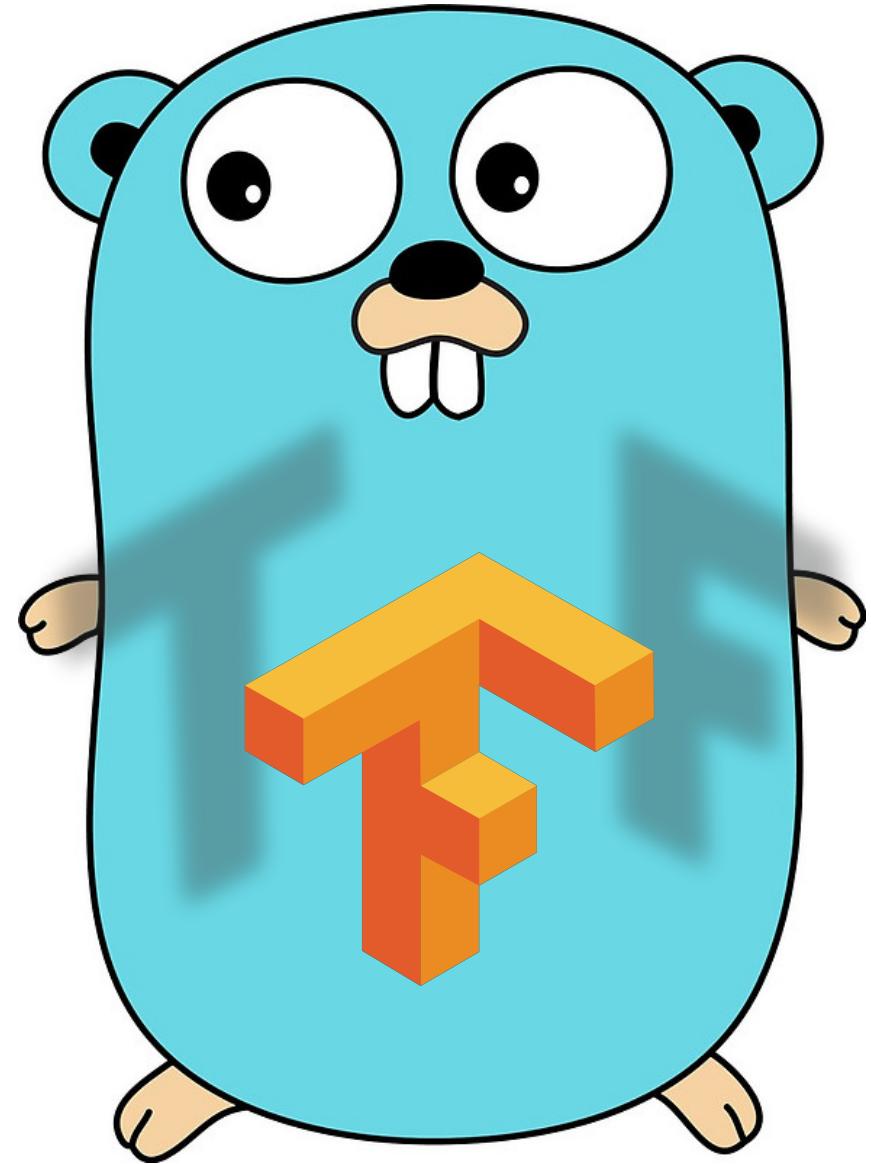
How to ML

1. Define the problem
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
7. Tune the hyperparameters
8. Predict



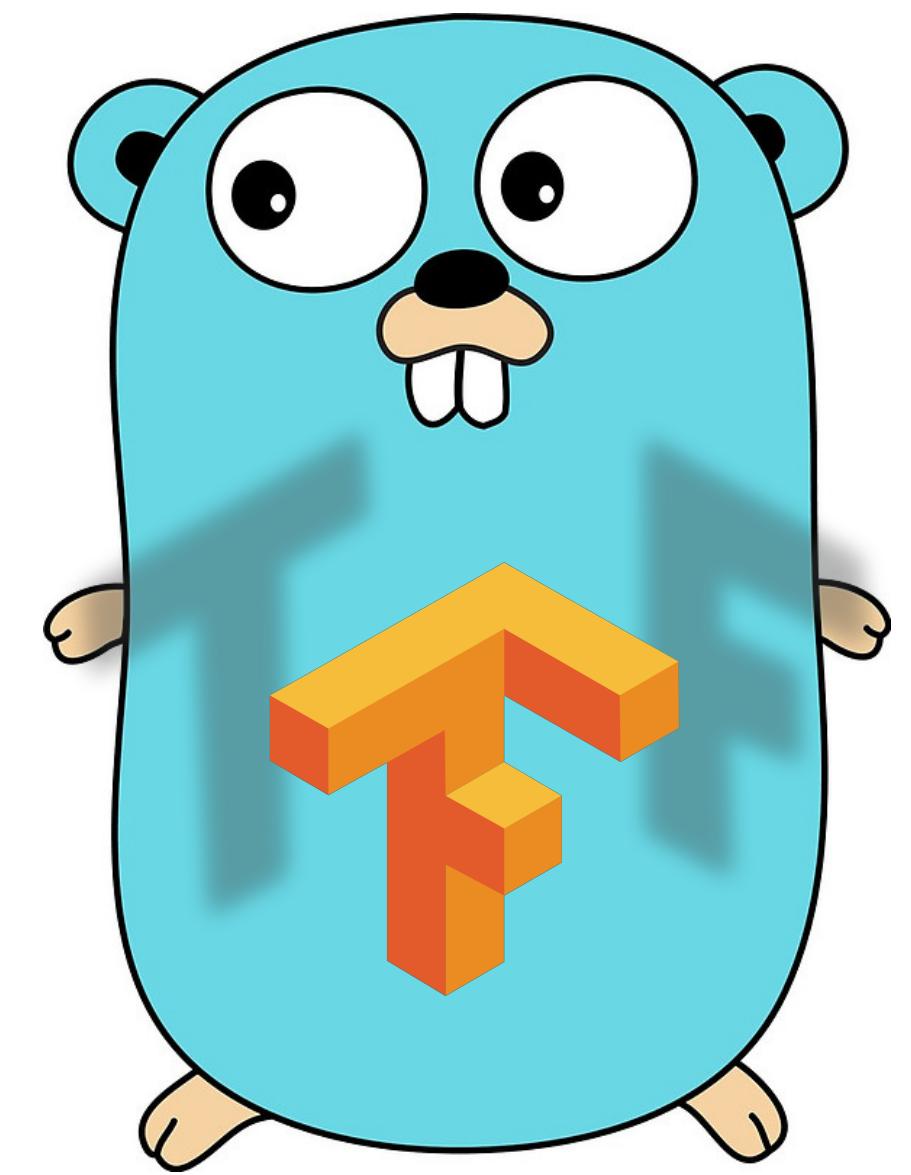
How to ML

- 1. Define the problem**
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
7. Tune the hyperparameters
8. Predict



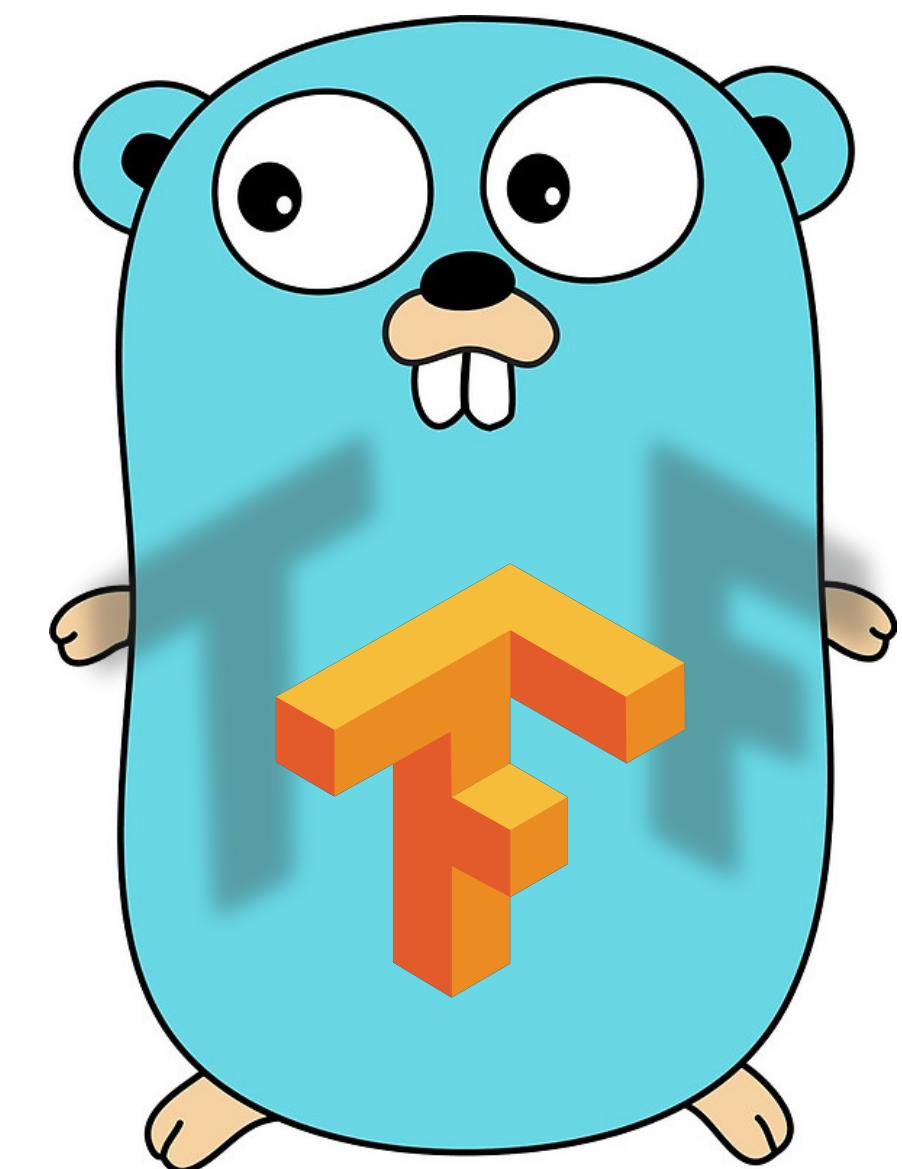
How to ML

1. Define the problem
- 2. Gather data**
 - relevant to the task
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
7. Tune the hyperparameters
8. Predict



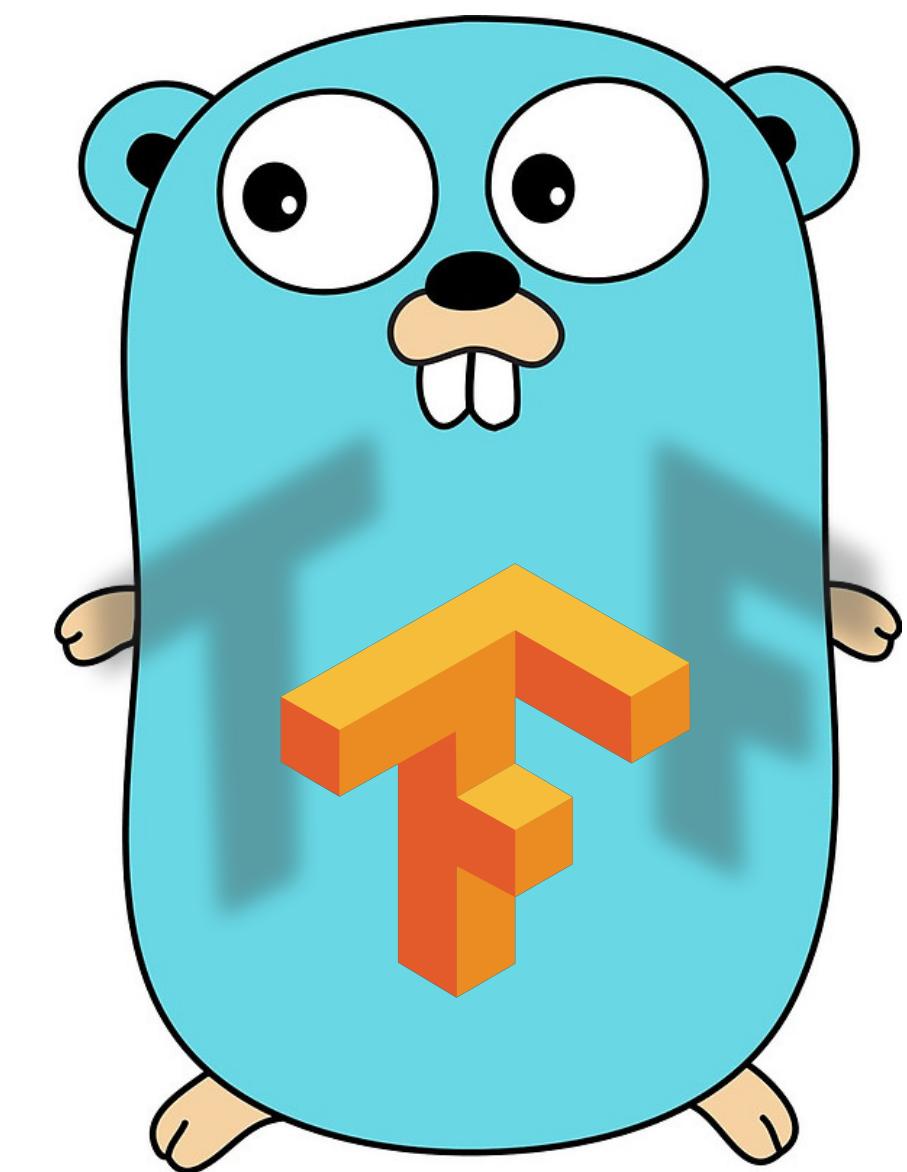
How to ML

1. Define the problem
 2. Gather data
 3. **Prepare data**
 4. Choose a model
 5. Train the model
 6. Evaluate the model
 7. Tune the hyperparameters
 8. Predict
- [] clean and pre-process
randomize
split: train/test



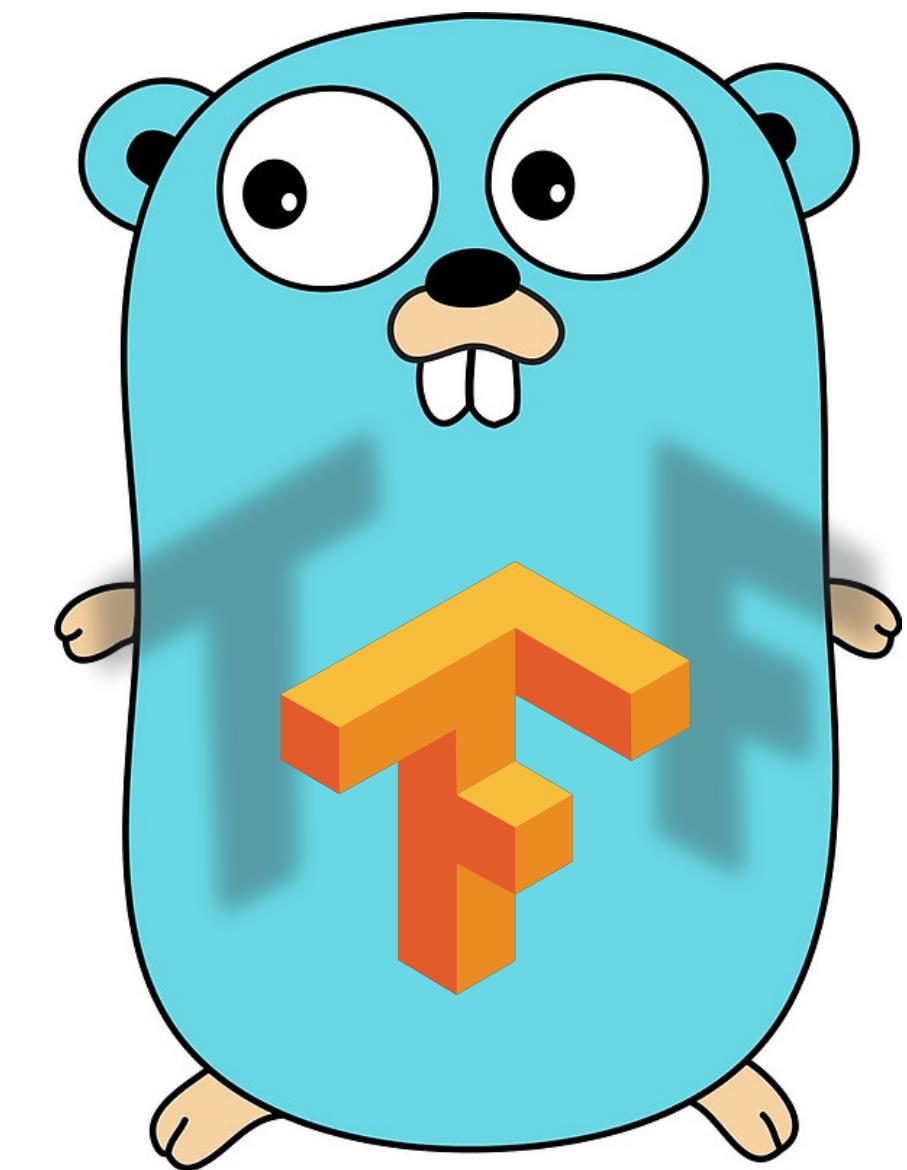
How to ML

1. Define the problem
 2. Gather data
 3. **Prepare data**
 4. Choose a model
 5. Train the model
 6. Evaluate the model
 7. Tune the hyperparameters
 8. Predict
- [] clean and pre-process
randomize
split: train/test
75/25



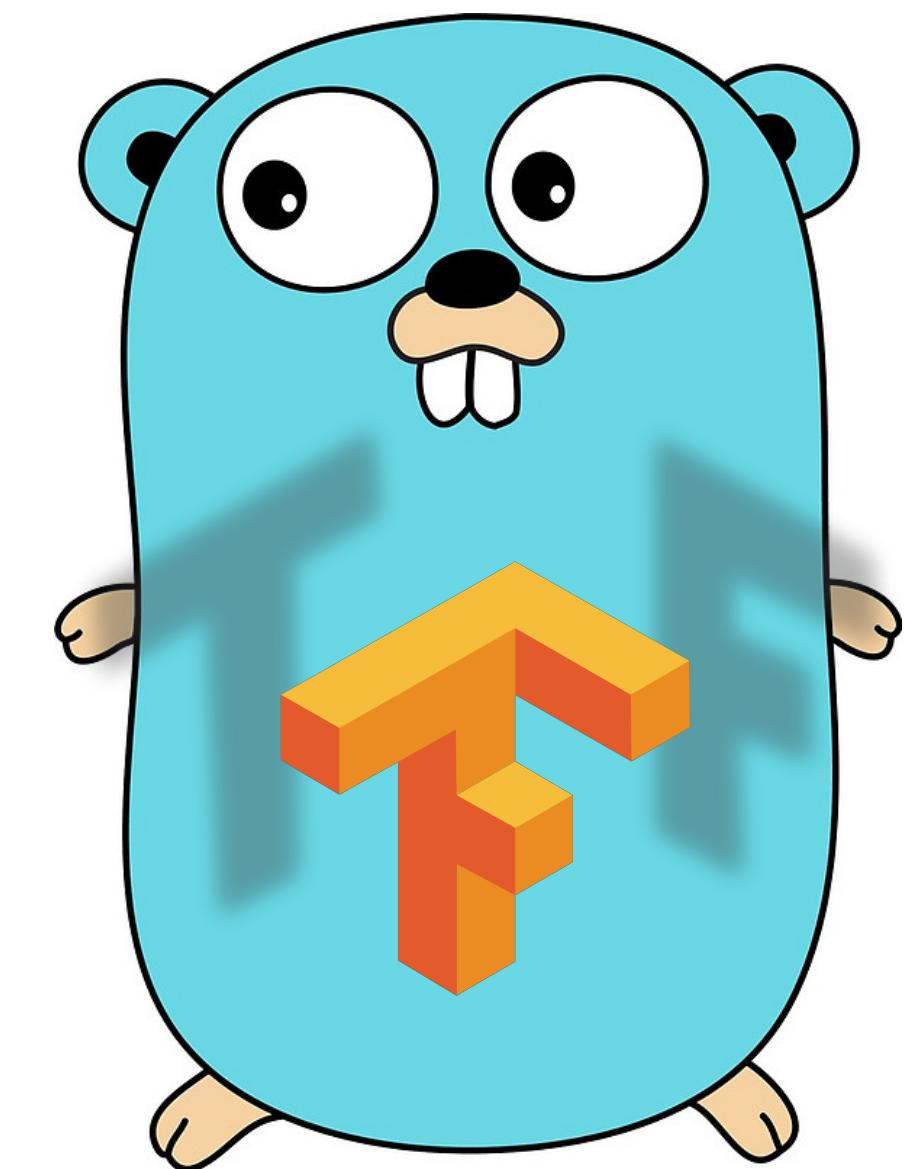
How to ML

1. Define the problem
 2. Gather data
 3. Prepare data
 - 4. Choose a model**
 5. Train the model
 6. Evaluate the model
 7. Tune the hyperparameters
 8. Predict
- learning task
input type
possible number
of categories



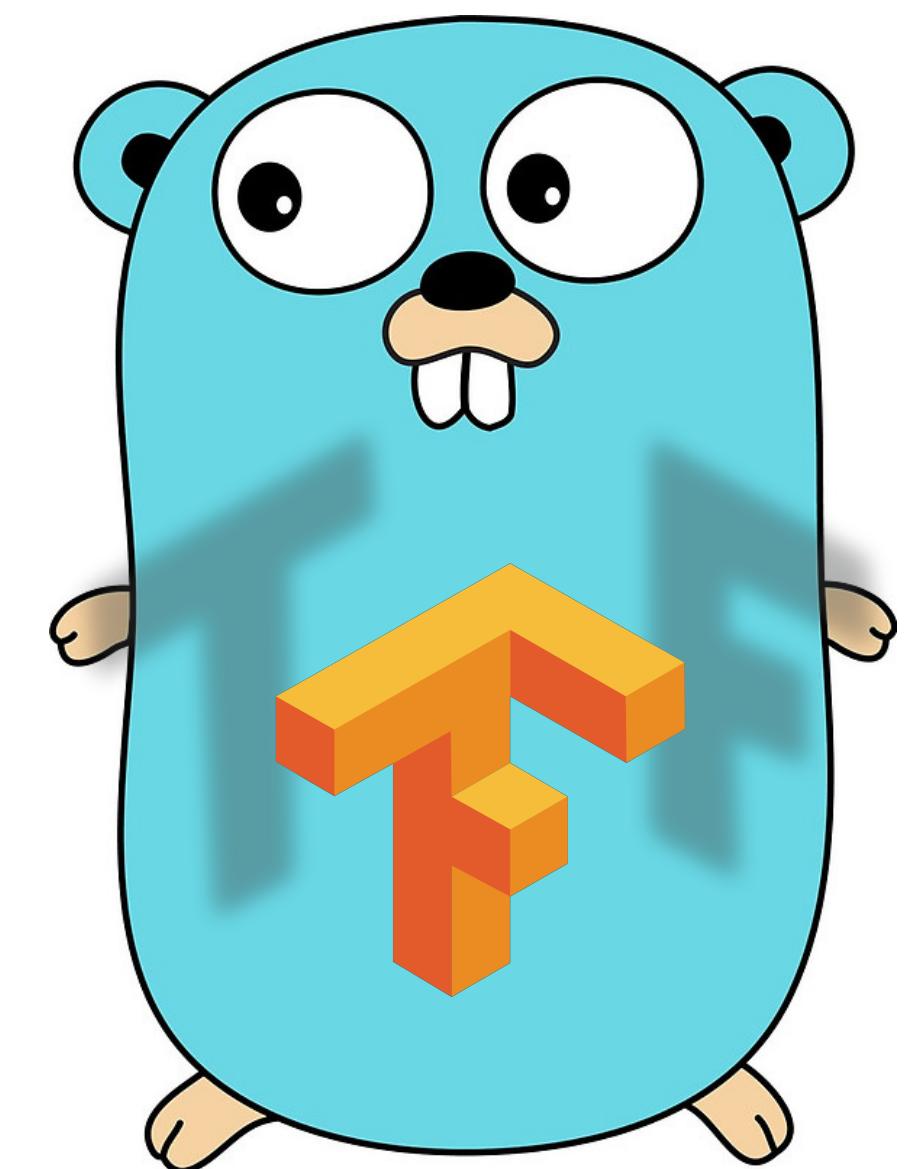
How to ML

1. Define the problem
 2. Gather data
 3. Prepare data
 4. Choose a model
 - 5. Train the model**
 6. Evaluate the model
 7. Tune the hyperparameters
 8. Predict
- assign random values
predict the train data
adjust weights



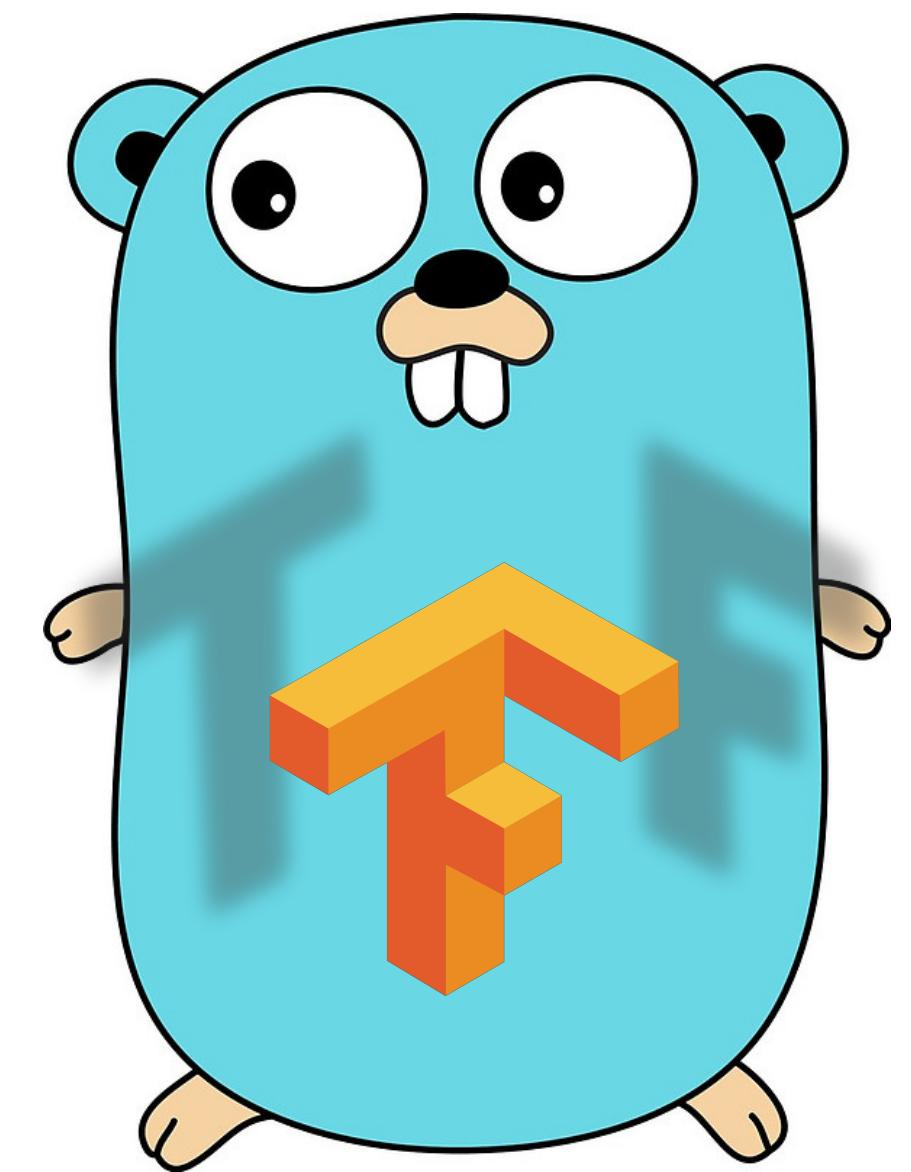
How to ML

1. Define the problem
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
- 6. Evaluate the model**
 - check test data metrics
7. Tune the hyperparameters
8. Predict



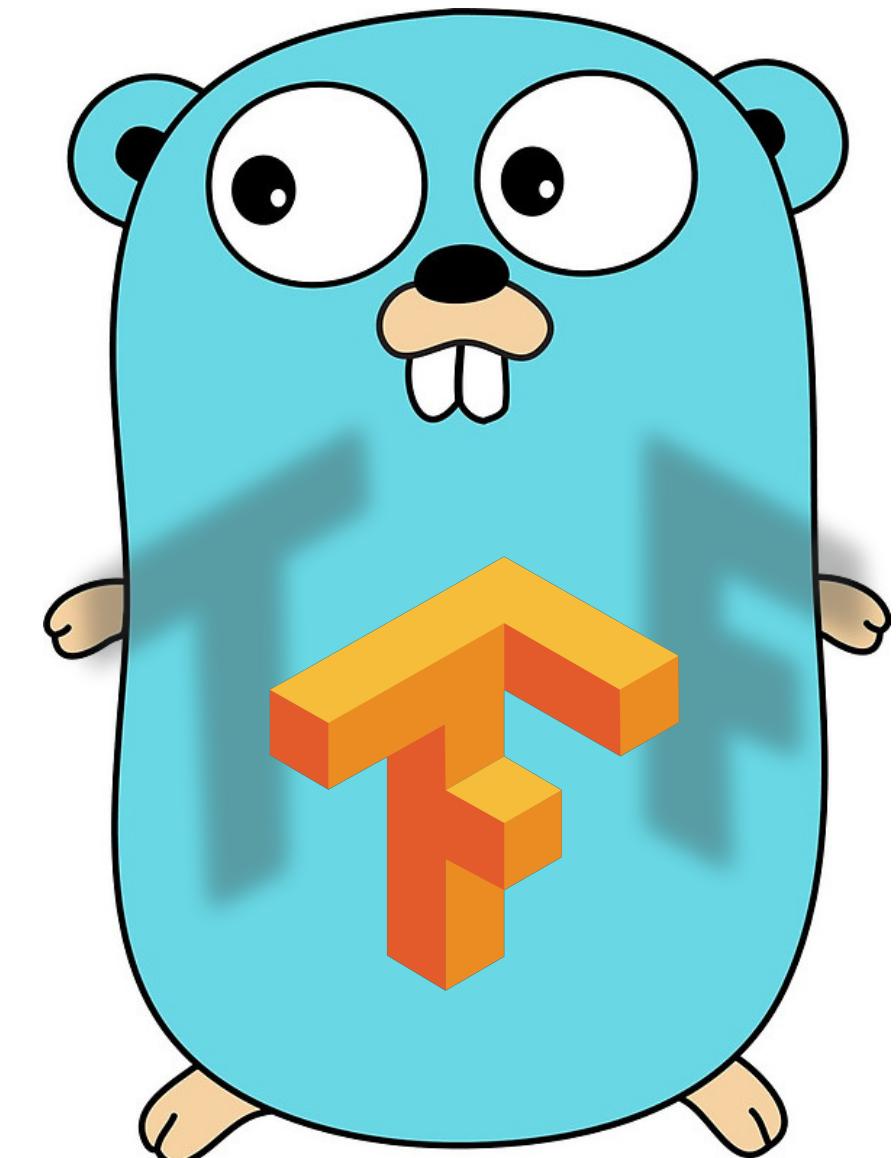
How to ML

1. Define the problem
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
- 7. Tune the hyperparameters**
 - or, fine tune
8. Predict



How to ML

1. Define the problem
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
7. Tune the hyperparameters
- 8. Predict**



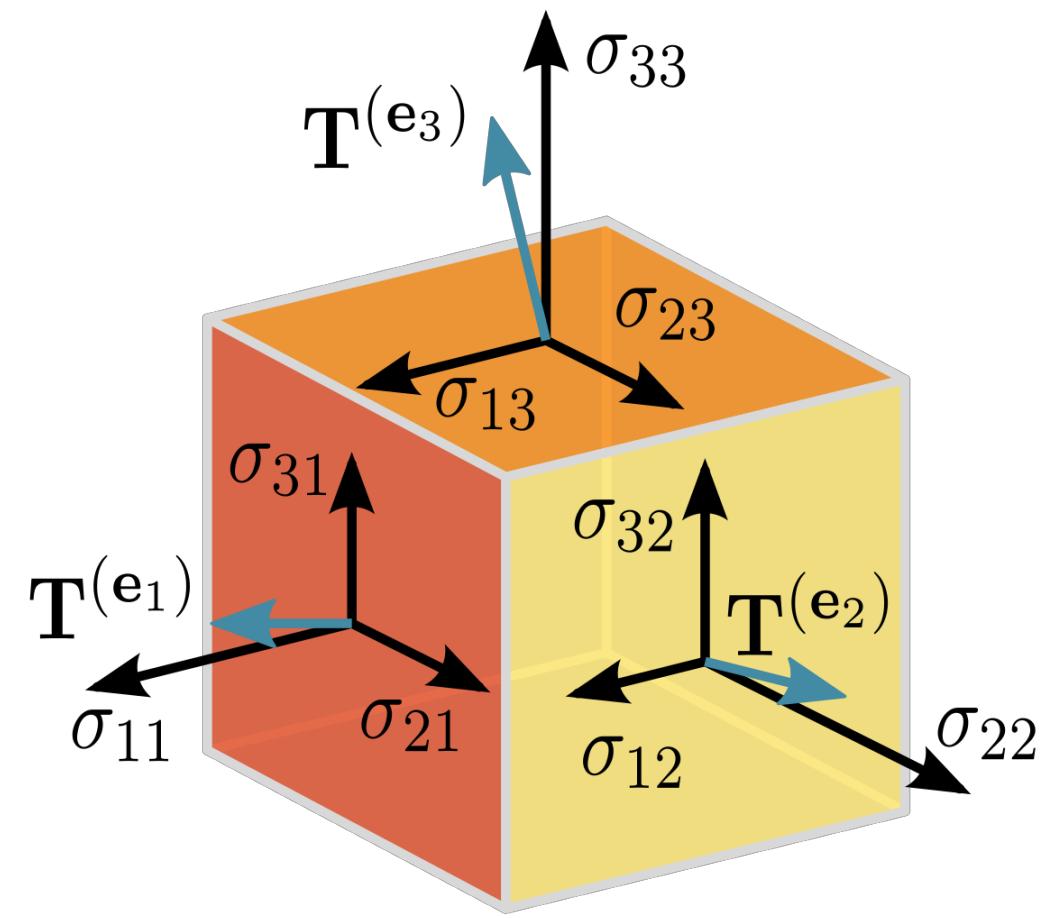


TensorFlow

TensorFlow is an open-source software
for Machine Intelligence,
used mainly for
Machine Learning applications
such as neural networks.



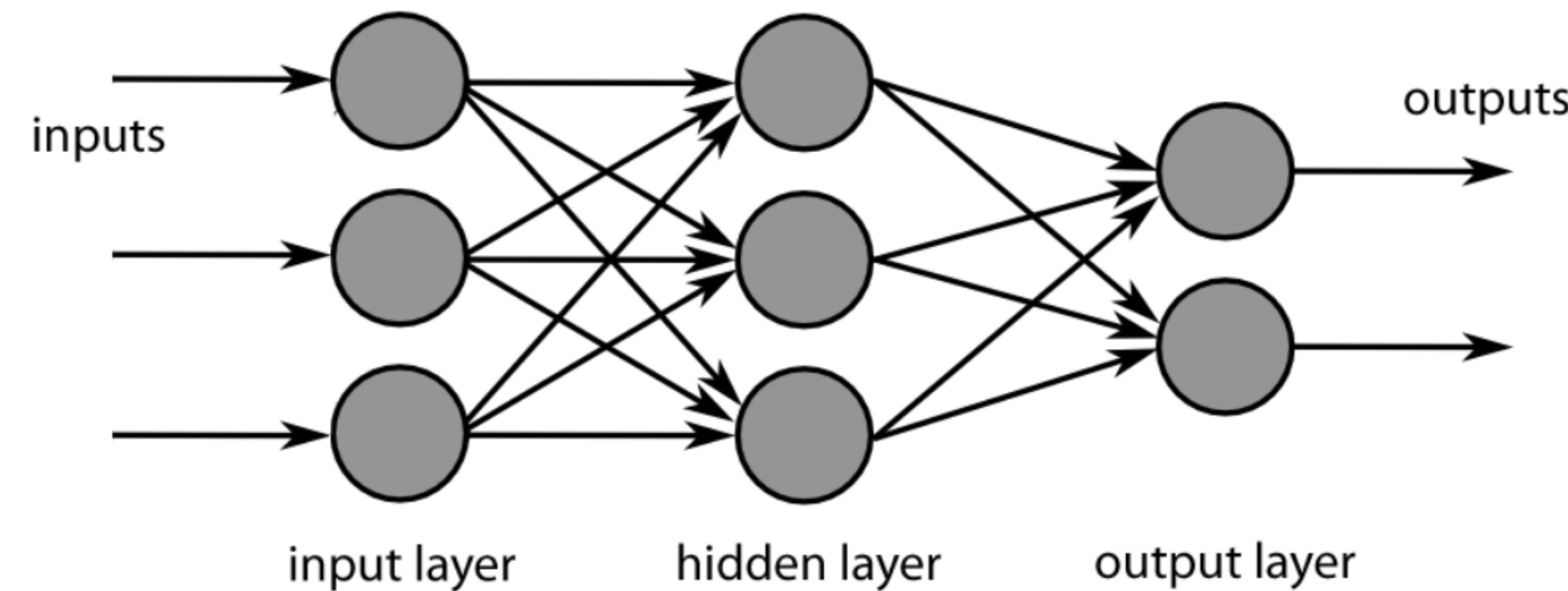
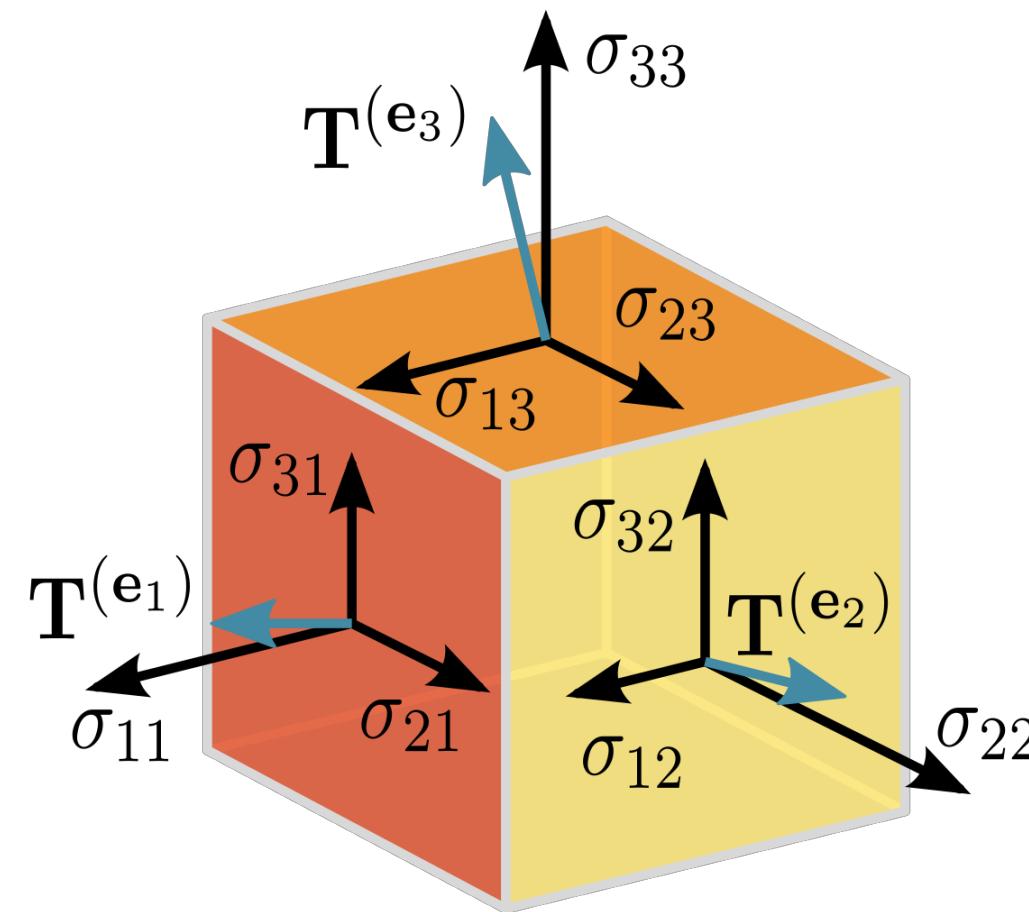
TensorFlow is an open-source software for Machine Intelligence, used mainly for machine learning applications such as neural networks.



A tensor is a generalization of vectors and matrices to potentially higher dimensions

1. data type
2. shape
 - number of dimensions
 - number of values / dimension

TensorFlow is an open-source software for Machine Intelligence, used mainly for machine learning applications such as neural networks.



A tensor is a generalization of vectors and matrices to potentially higher dimensions

1. data type
2. shape
 - number of dimensions
 - number of values / dimension

The flow part comes to describe:
- the graph (model) is a set of nodes (operations)
- the data (tensors) "flows" through those nodes, undergoing mathematical manipulation

You can look at, and evaluate, any node of the graph

TensorFlow

- Community driven
- Becoming friendly for developers
 - AutoML: automates ML models design
 - TF Hub: repo for modules
 - Black-box tools built on top of TF

TensorFlow

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 - **AutoML: automates ML models design**
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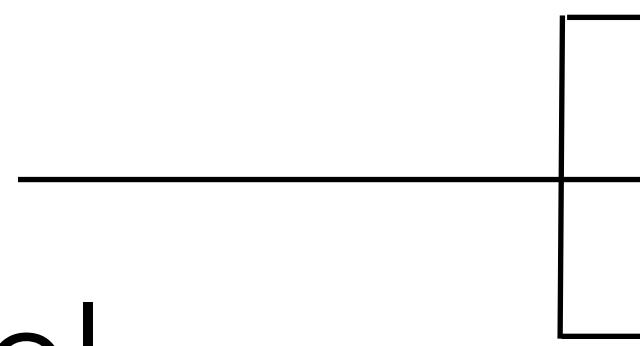
How to ML

1. Define the problem
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How to ML

1. Define the problem
 2. Gather data
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- 
- assign random values
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TensorFlow

- Community driven
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Supported Languages

TF APIs

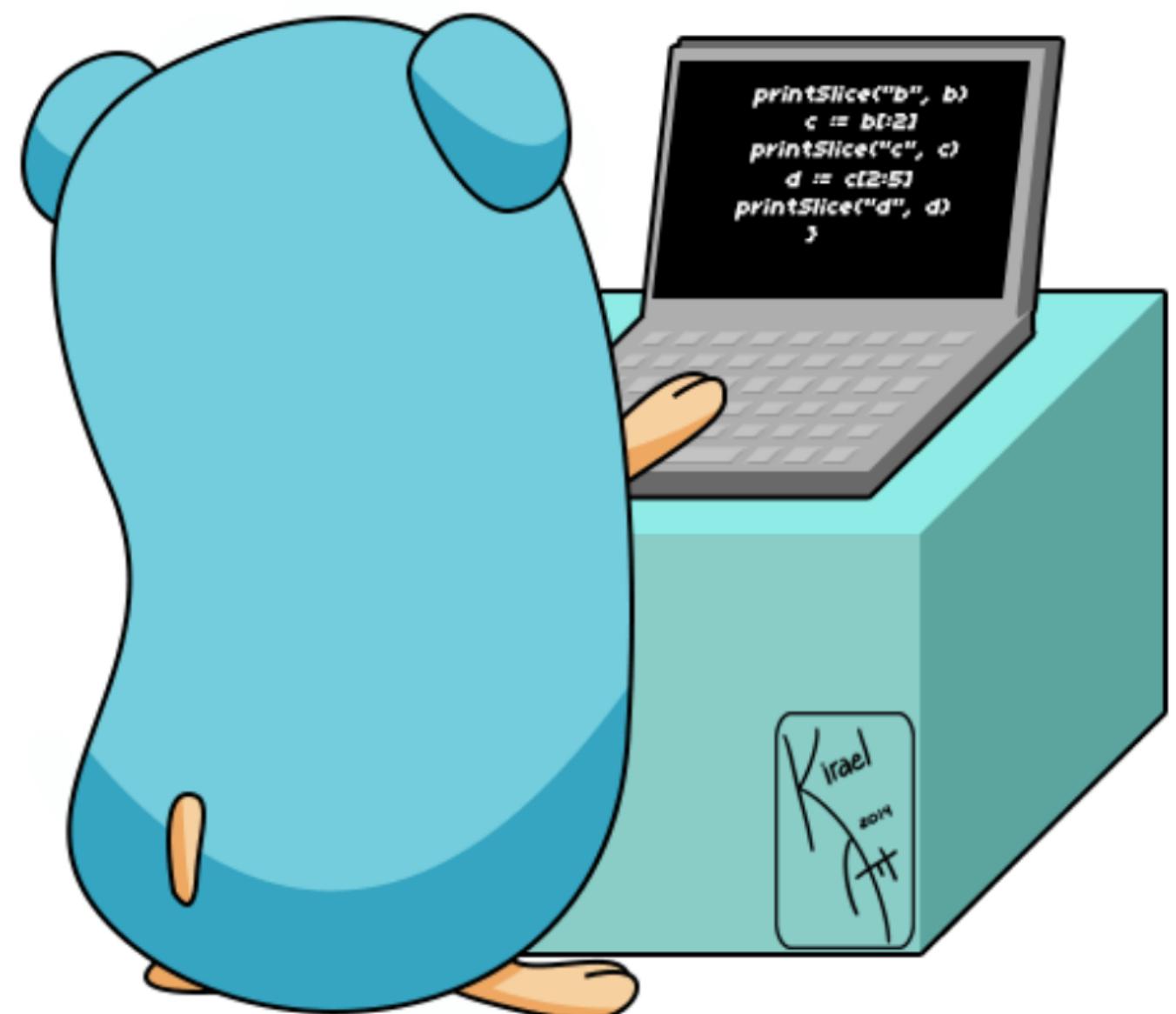
- Python
- C++
- Java
- Go
- JavaScript
- Swift

TF Bindings

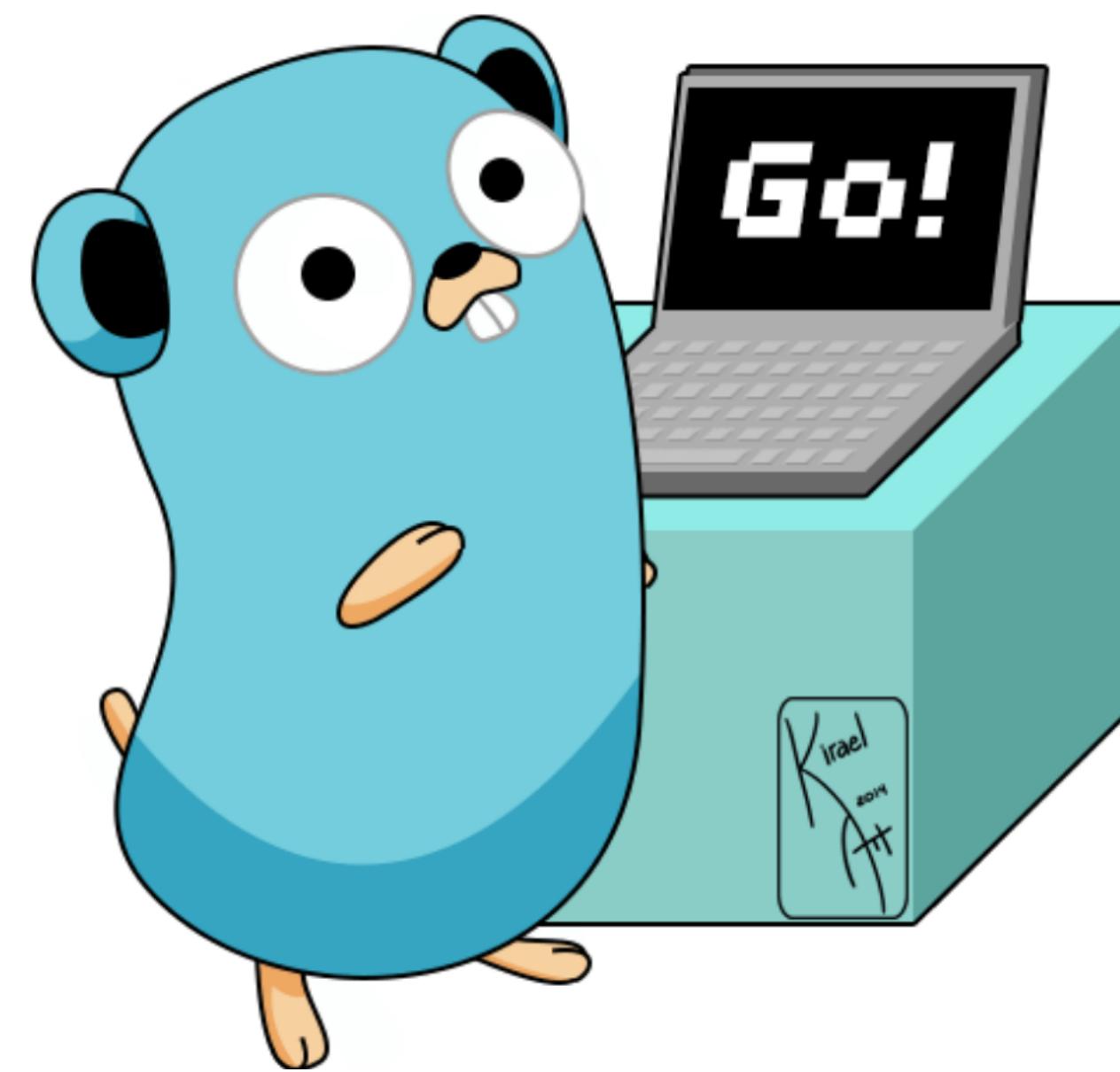
- C#
- Haskell
- Julia
- Ruby
- Rust
- Scala
-

Go APIs for TF

Train models

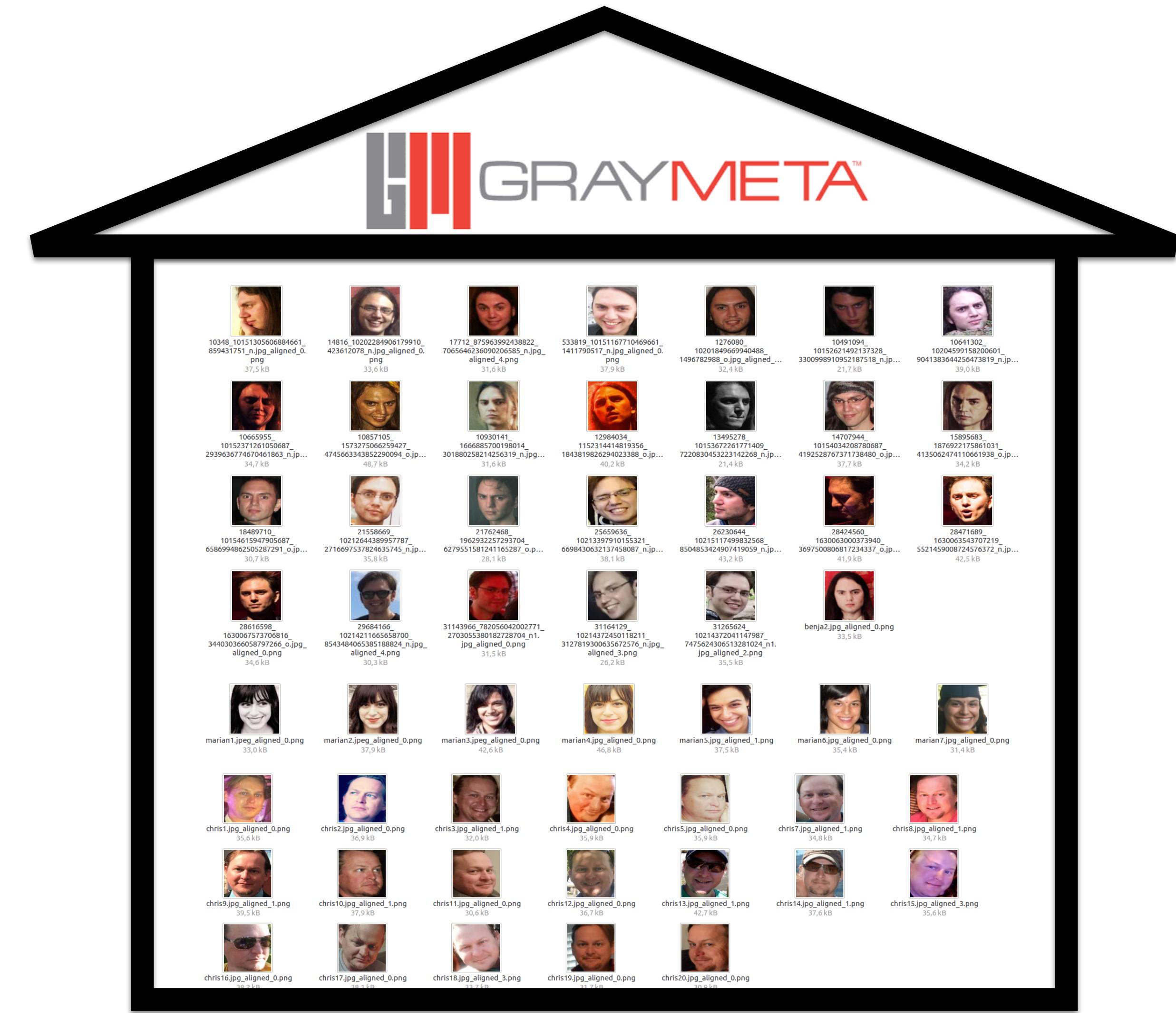


Serve models



#2

In-house ML



In-house ML

Let's recognise faces!

Requirements:

- Thousands of categories
- Increasing number of categories
- Many categories can be added any time
- Learn a new category from 2-3 example
- Real-time classifier retraining
- Fast predictions

In-house ML

The steps we took:

In-house ML

The steps we took:

1. Gather data

In-house ML

The steps we took:

1. Gather data
 - Mix of open and private data sets
2. Prepare data

In-house ML

The steps we took:

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 - FaceNet / OpenFace / custom and dlib-based

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The steps we took:

1. Gather data
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In-house ML

The steps we took:

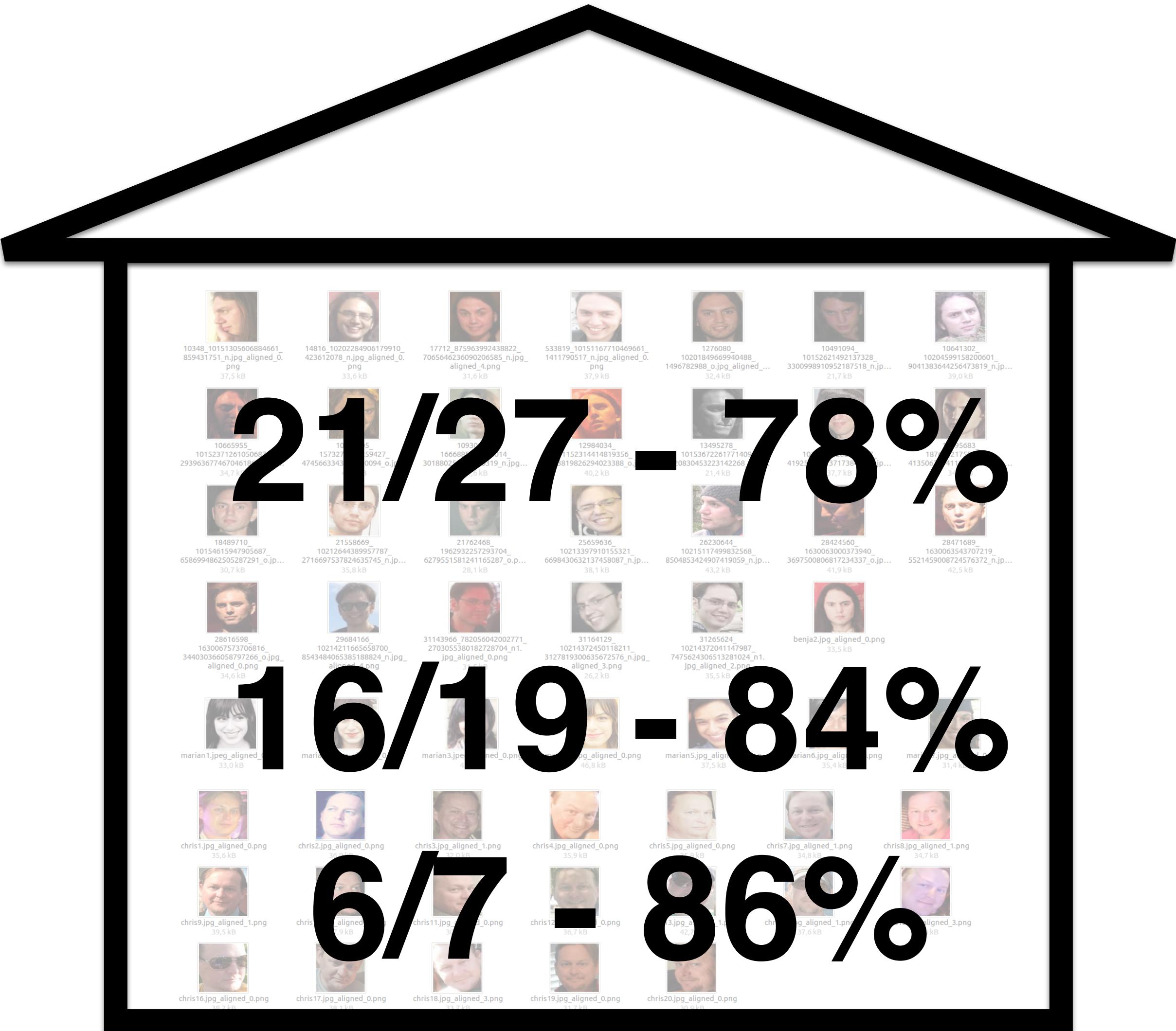
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 - Unique per client
 - Write Go code to run the model, integrate it to the engine

In-house ML

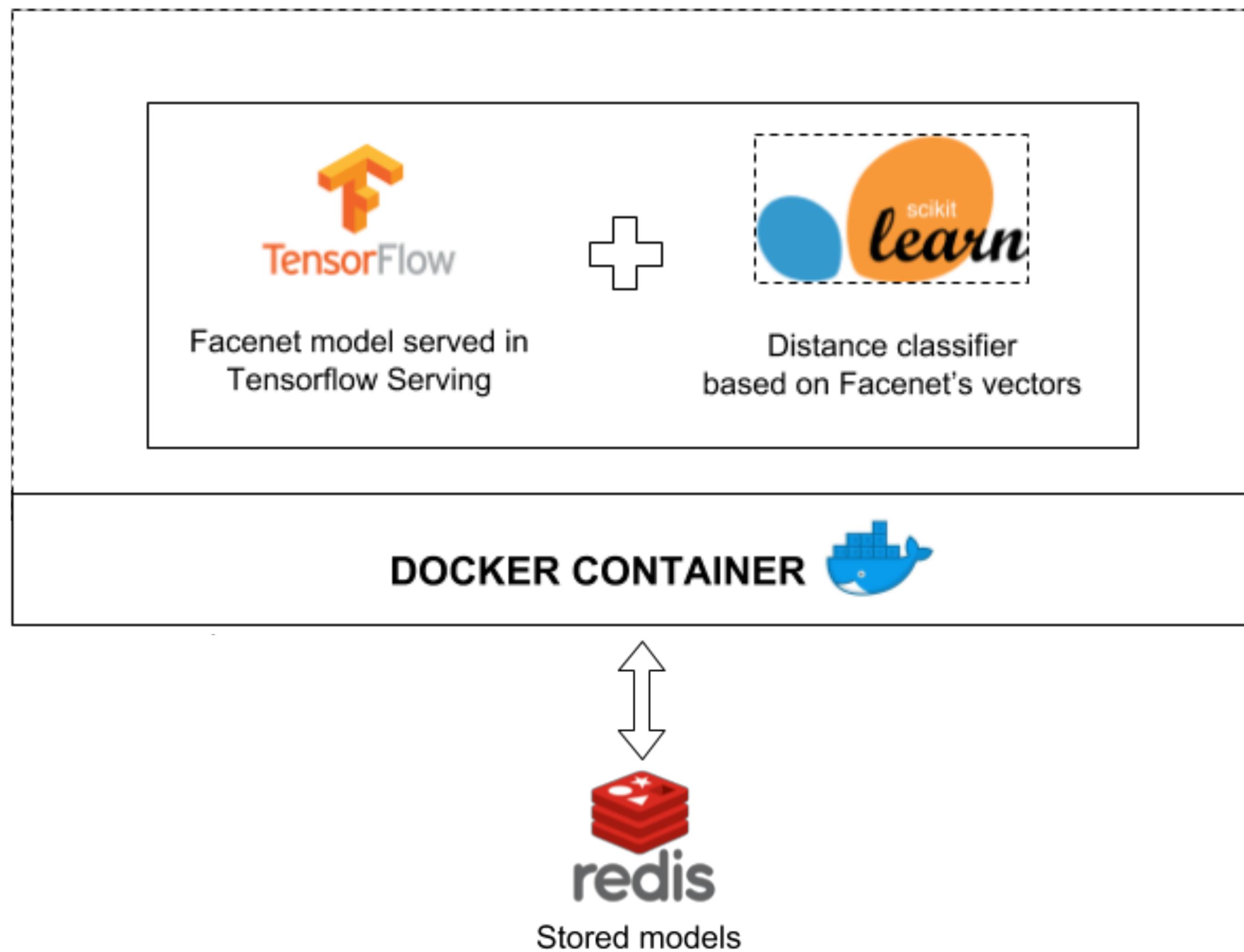
The steps we took:

1. Gather data
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4. Train the model
 - Unique per client
 - Write Go code to run the model, integrate it to the engine
5. Evaluate the model
6. Tune the parameters
7. Predict

In-house ML



In-house ML

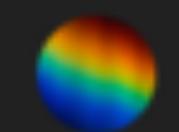


PhotoPrism

#1



Golang Berlin



PhotoPrism



Chicago



Photos



Places



Calendar



Tags



Favorites



Bookmarks



Filters



Albums



Import



Export



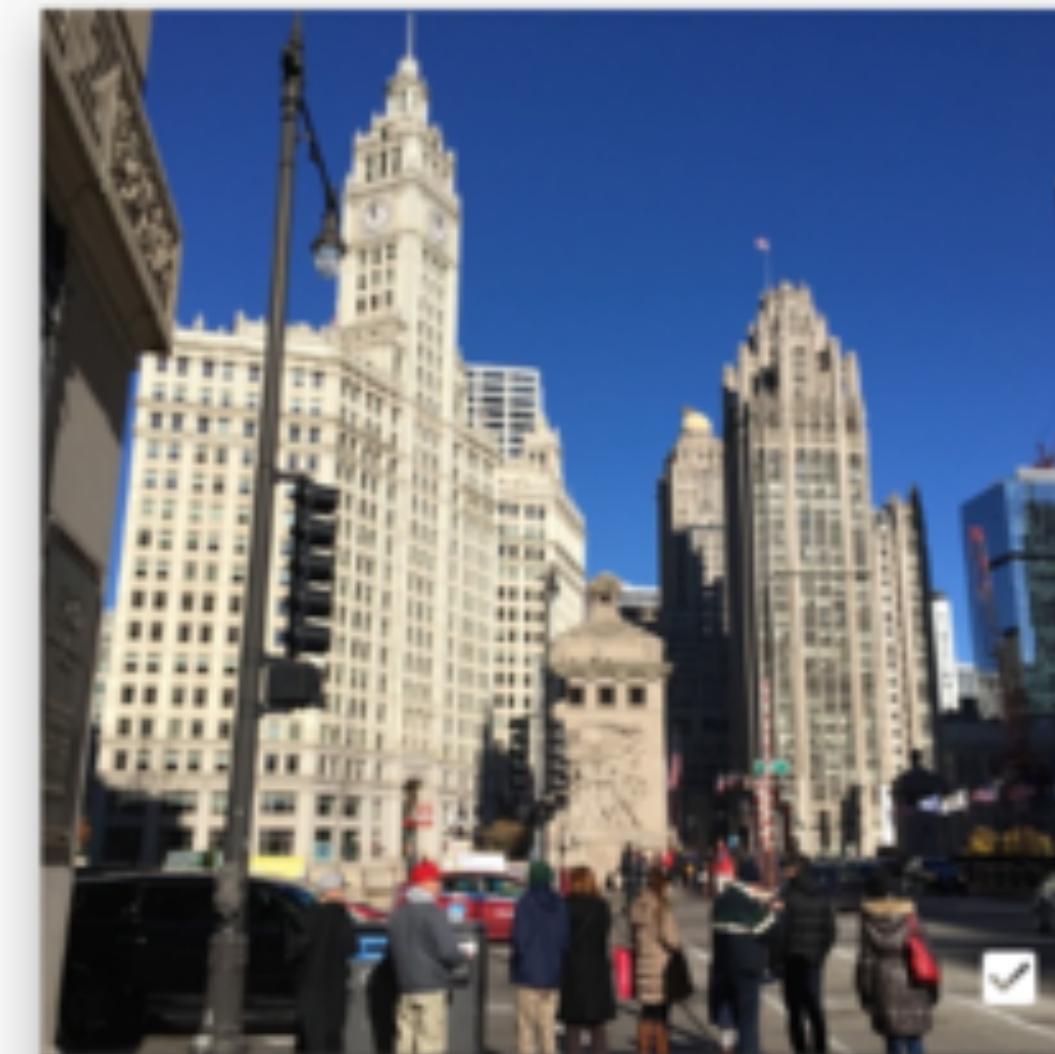
Settings

USA

iPhone SE

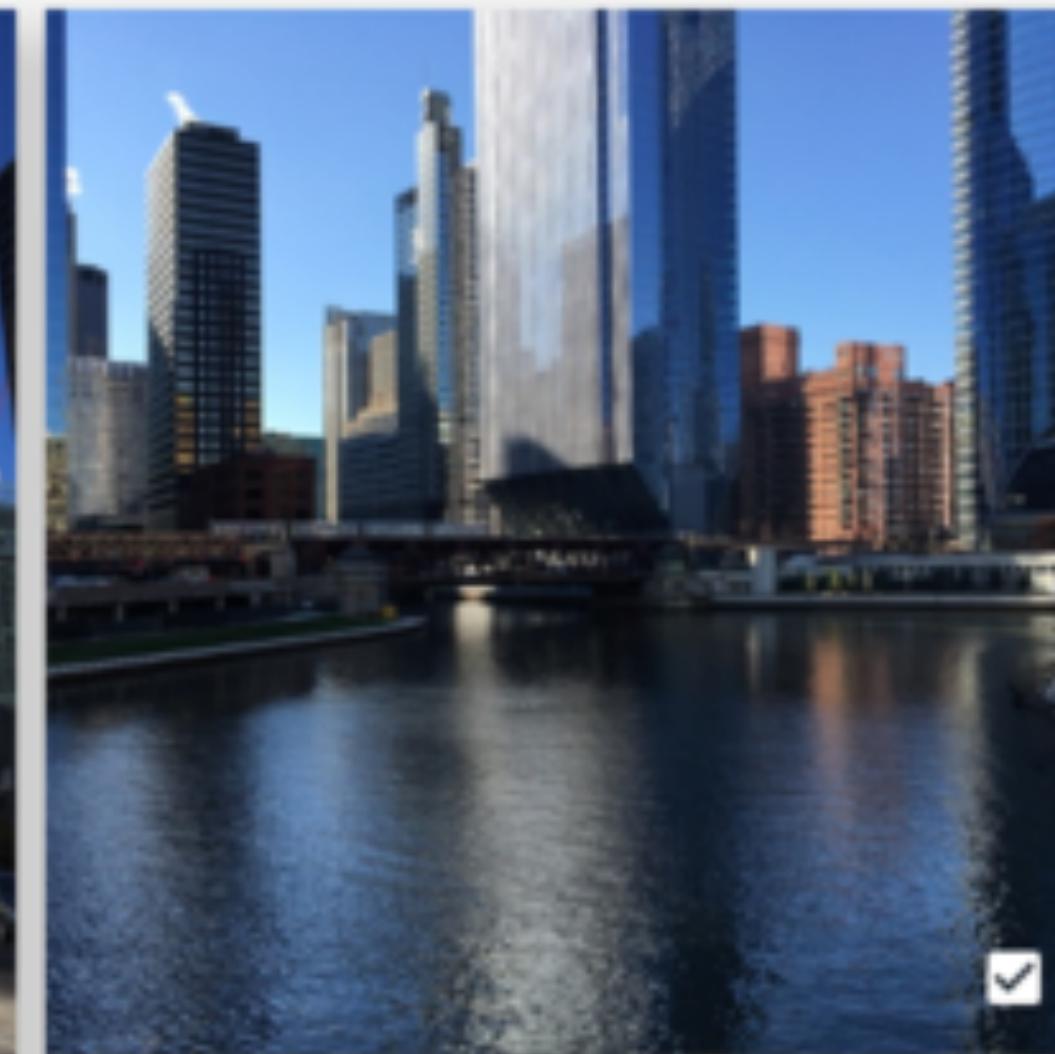
Details

Recently imported



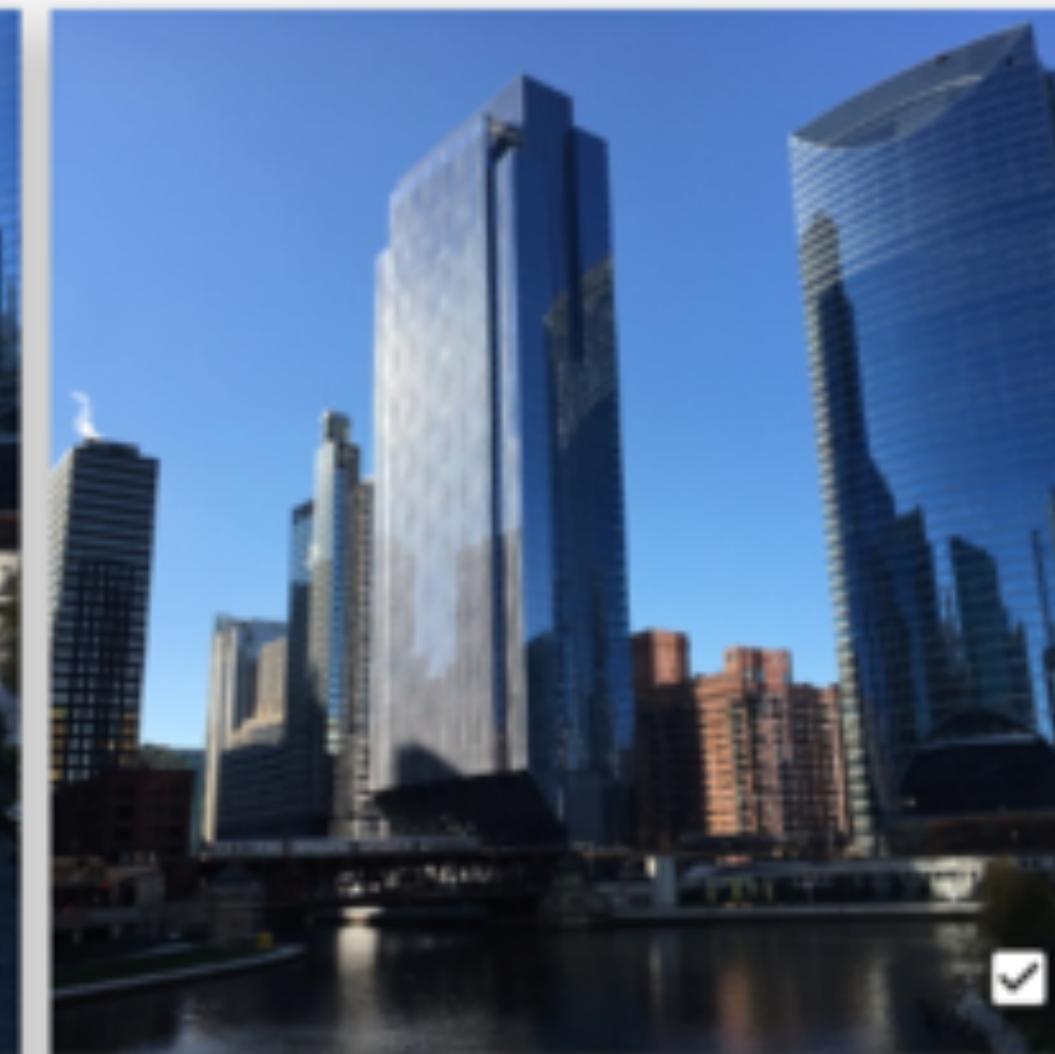
London Guarantee Building / Chicago / 2016

21/11/2016 12:01:45
iPhone SE
Chicago, Illinois, USA



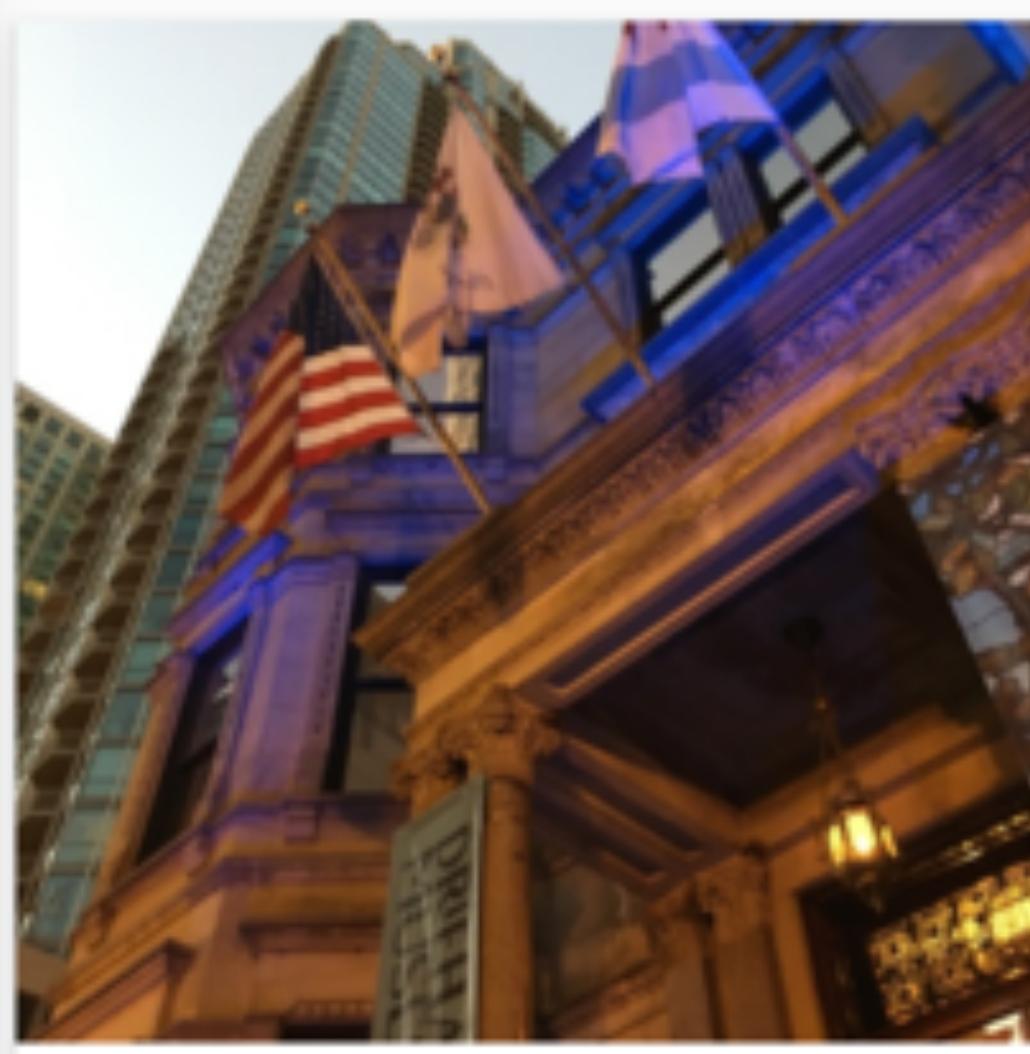
View On Chicago River / Chicago / 2016

21/11/2016 11:11:25
iPhone SE
Chicago, Illinois, USA



View On Chicago River / Chicago / 2016

21/11/2016 11:11:21
iPhone SE
Chicago, Illinois, USA



Four Points Sheraton / Chicago / 2016

20/11/2016 05:41:30
iPhone SE
Chicago, Illinois, USA



PhotoPrism.org

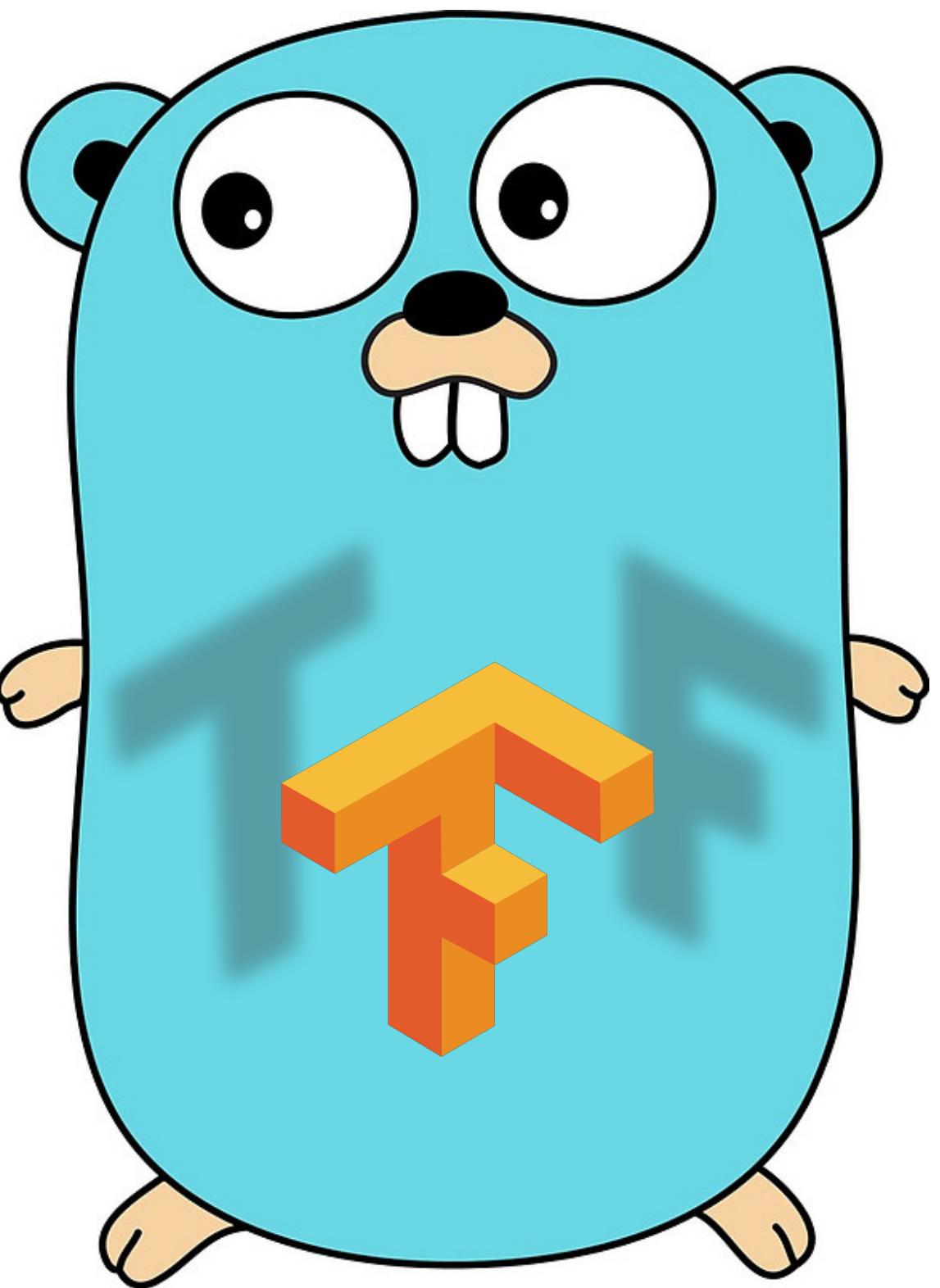
Get Engaged

Give it a try

- AutoML: automates ML models design
cloud.google.com/automl
- TF Hub: repo for modules
github.com/tensorflow/models
- A curated list of dedicated resources
github.com/jtoy/awesome-tensorflow

Be part of the community

- tensorflow.org/community



Thank
You!

@NataliePis