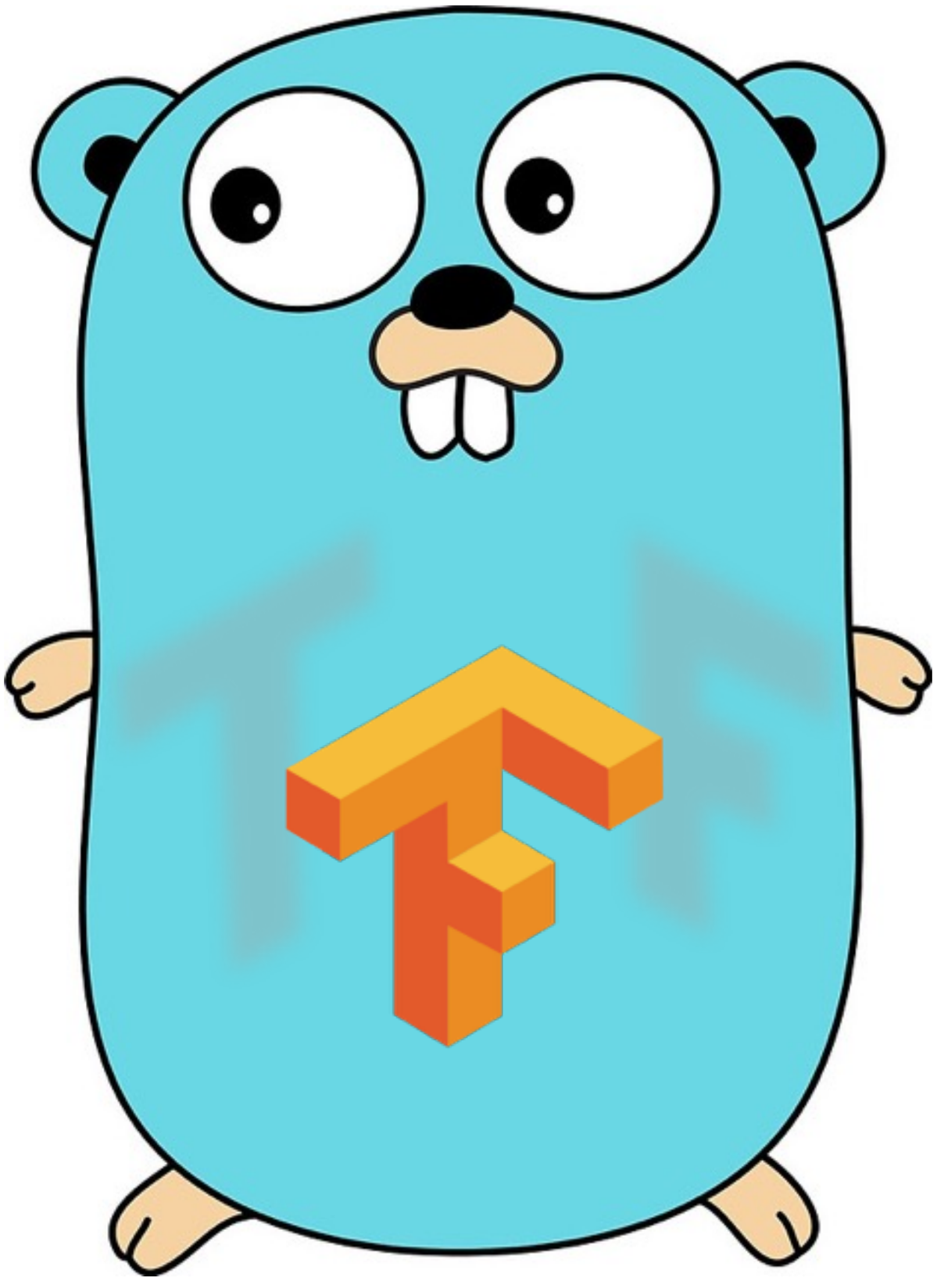
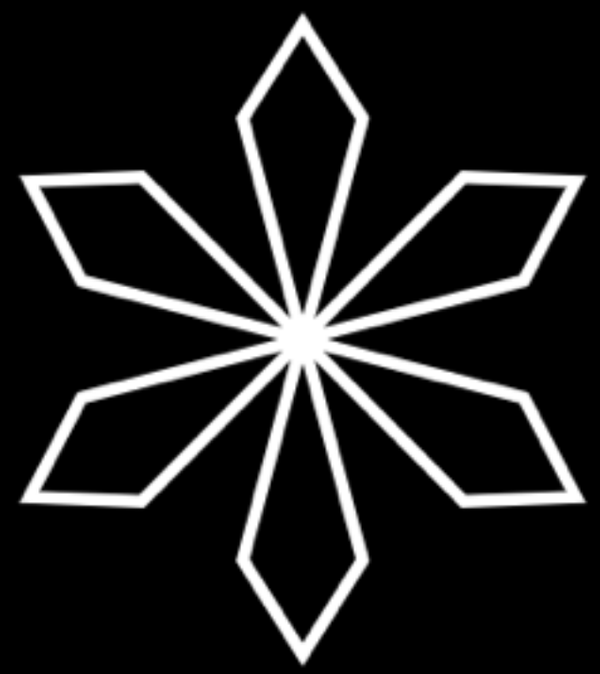


@NataliePis

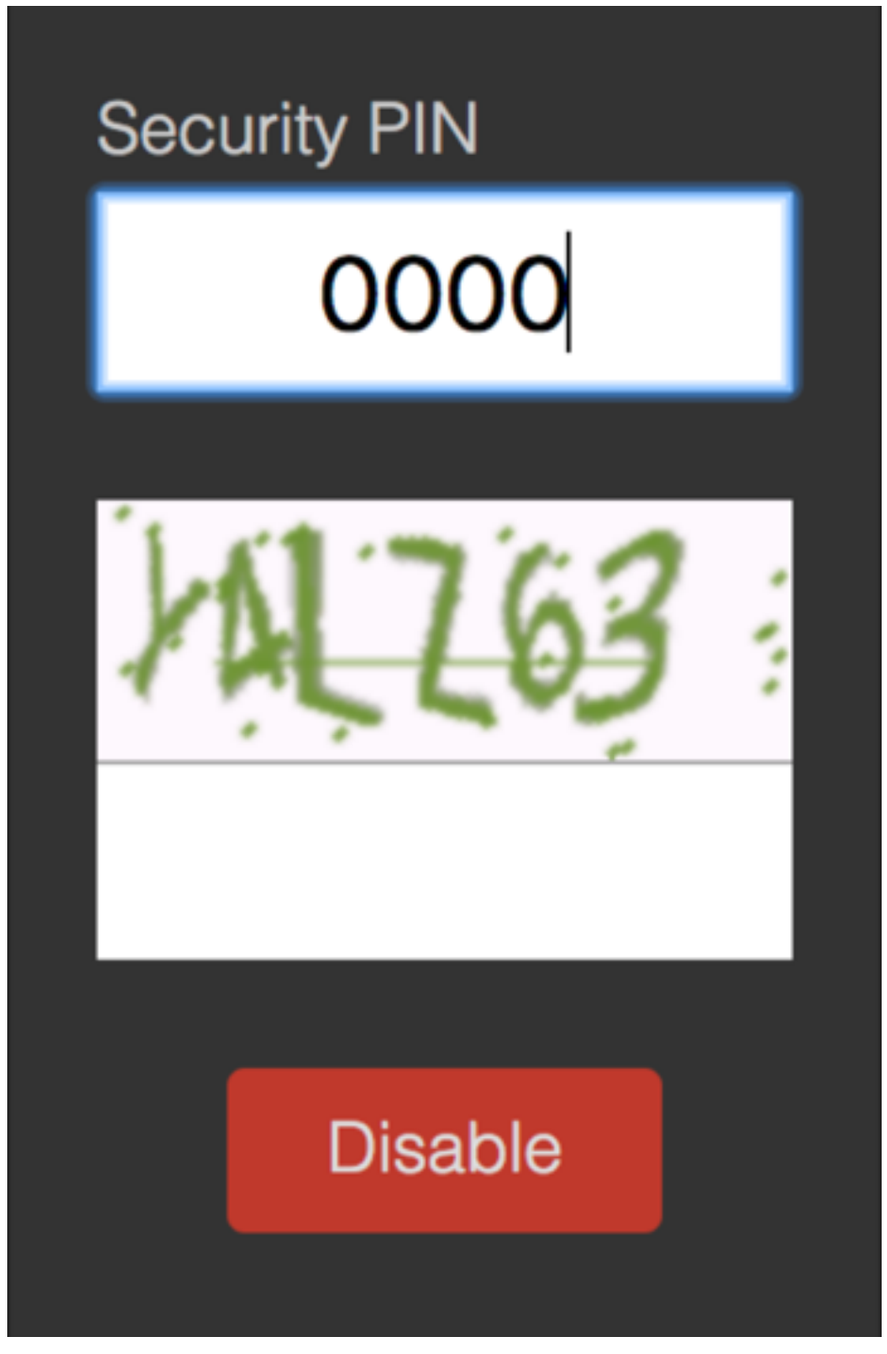


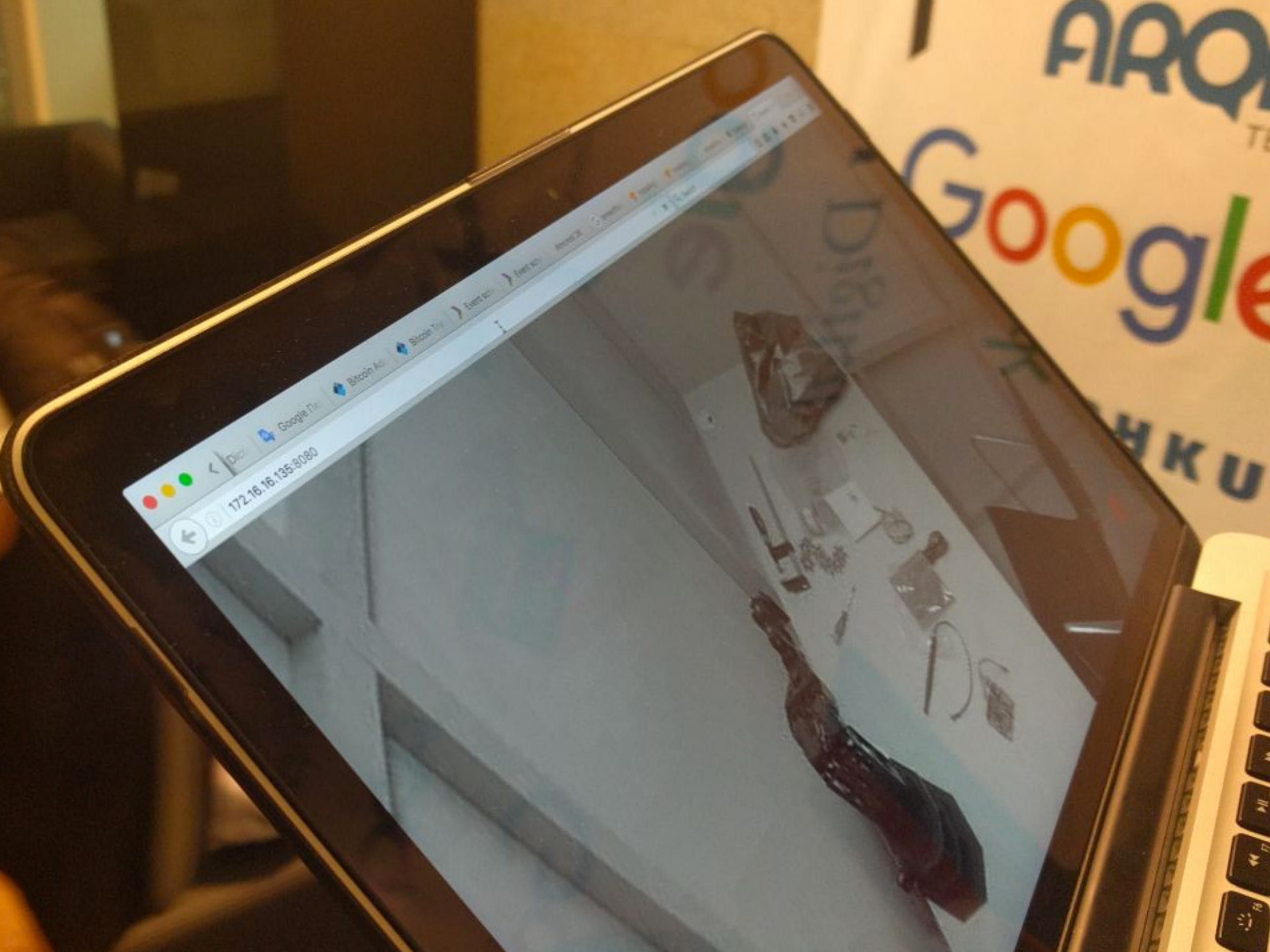
BLACKLIGHT

Captcha Challenge

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)



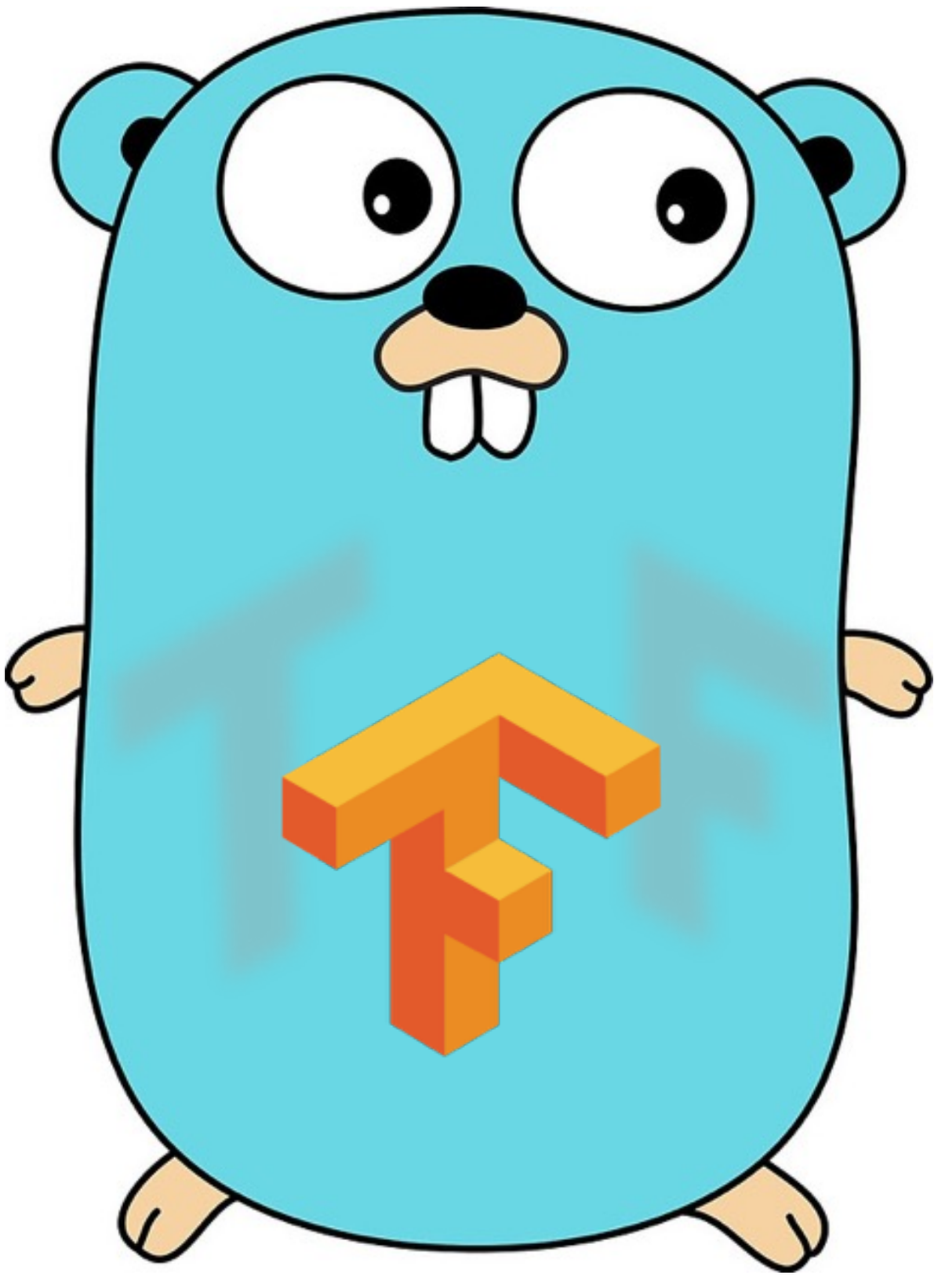

Google
172.16.16.135:8080

Challenge Cracked!

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**
   - clean and pre-process
   - randomise
   - split: train/test
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**
   - clean and pre-process
   - randomise
   - split: train/test 75/25
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**
   - learning task
   - input type
   - possible number of categories
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**
    - assign random values
    - predict the train data
    - adjust weights
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**
    - check test data metrics
7. Tune the hyperparameters
8. Predict

How to ML

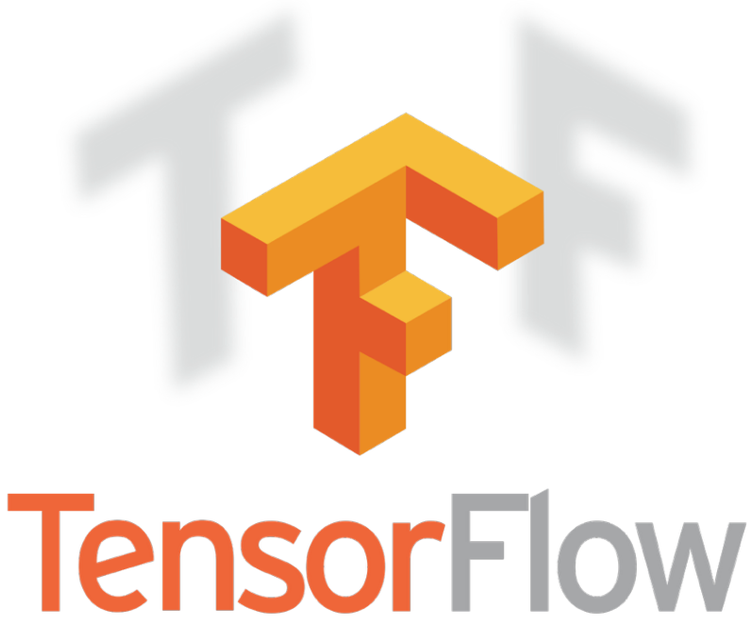
1. Define the problem
2. Gather data
3. Prepare data
4. Choose a model
5. Train the model
6. Evaluate the model
7. **Tune the hyperparameters**
    - or, fine tune
8. Predict

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.



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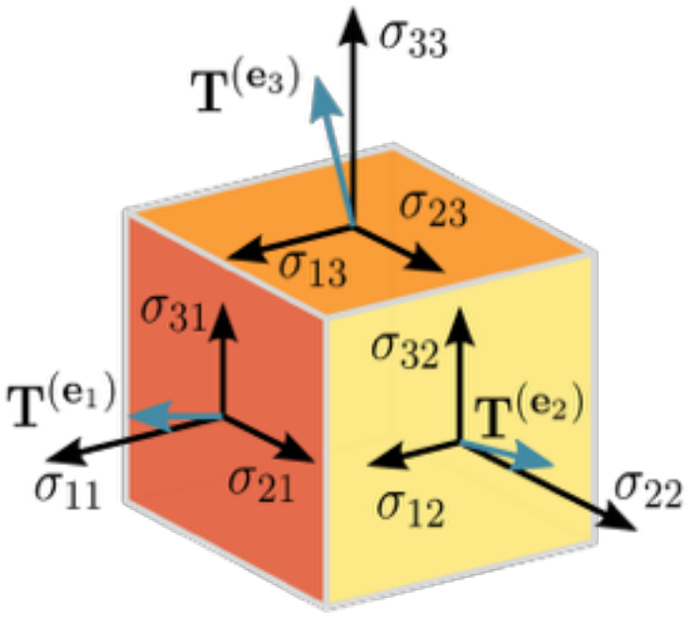

A tensor is a generalization
of vectors and matrices to
potentially higher dimensions

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

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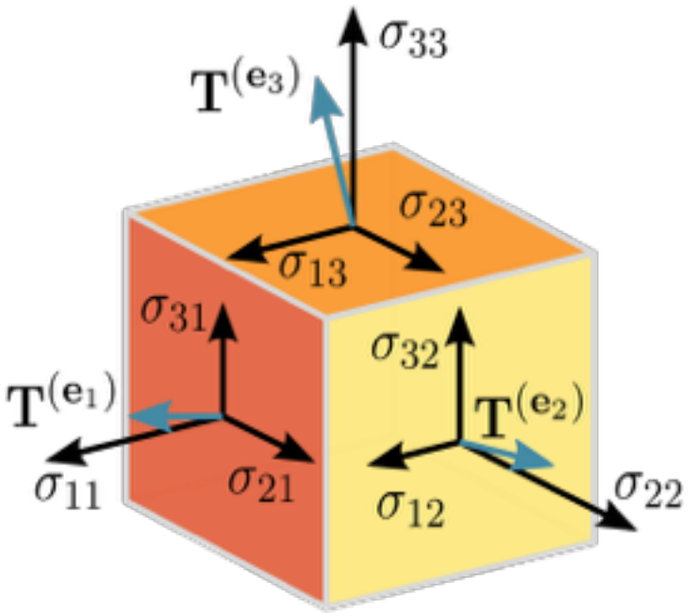

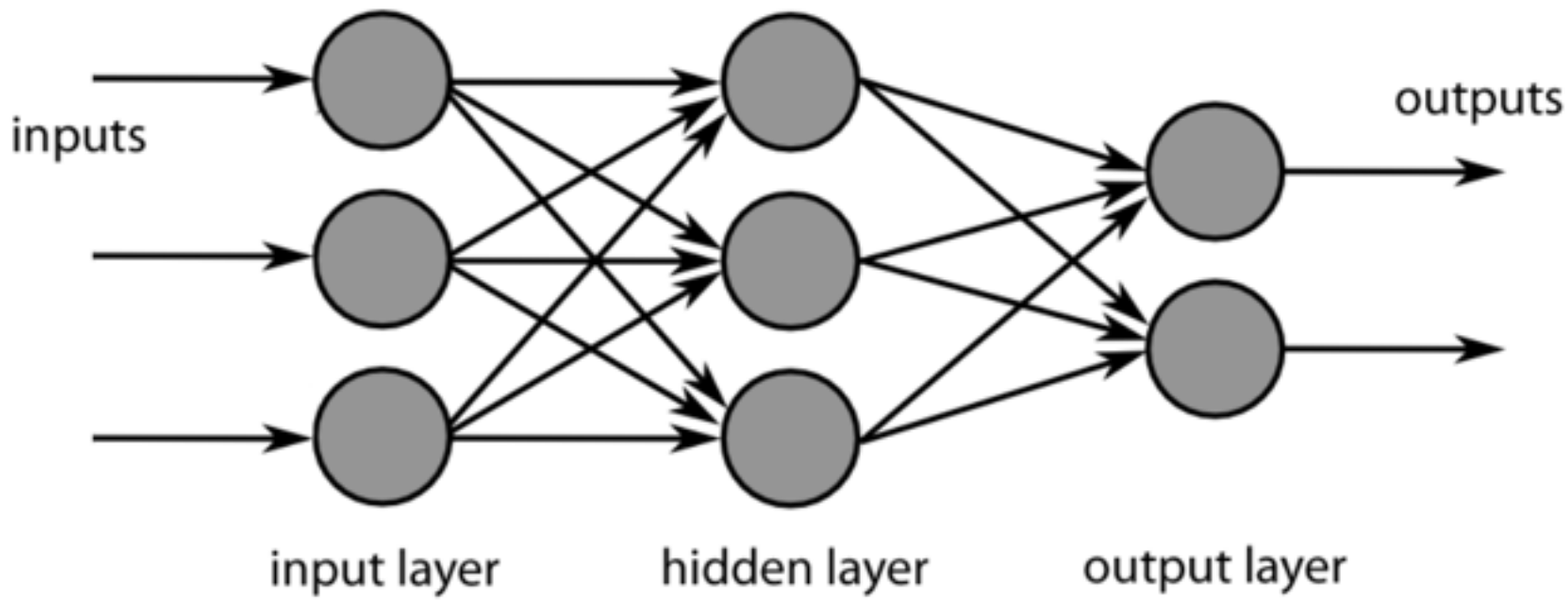

A tensor is a generalization of vectors and matrices to potentially higher dimensions

1. data type
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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

How to ML

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Supported Languages

TF APIs

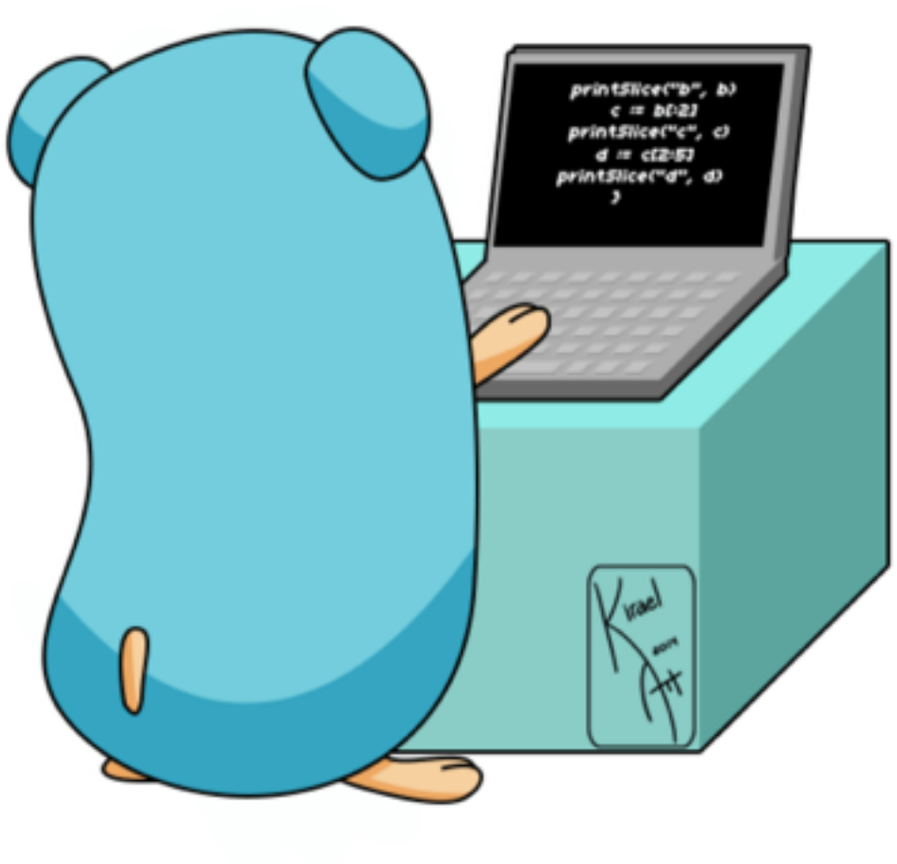
- Python
- C++
- Java
- Go
- JavaScript
- Swift

TF Bindings

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

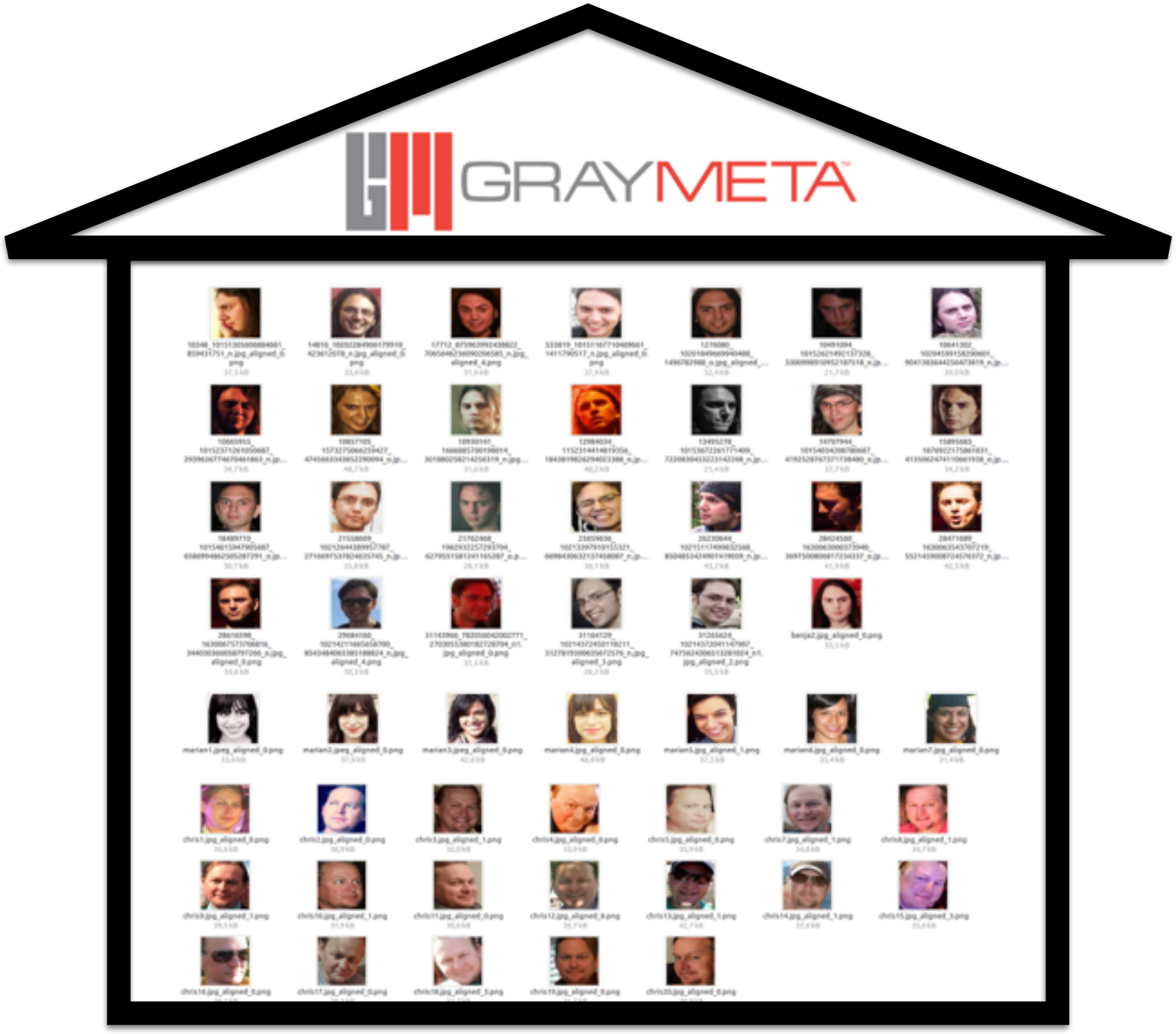
Go APIs for TF

Train models



Serve models

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
   - Mix of open and private data sets

In-house ML

The steps we took:

1. Gather data
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In-house ML

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   - FaceNet / OpenFace / custom and dlib-based

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

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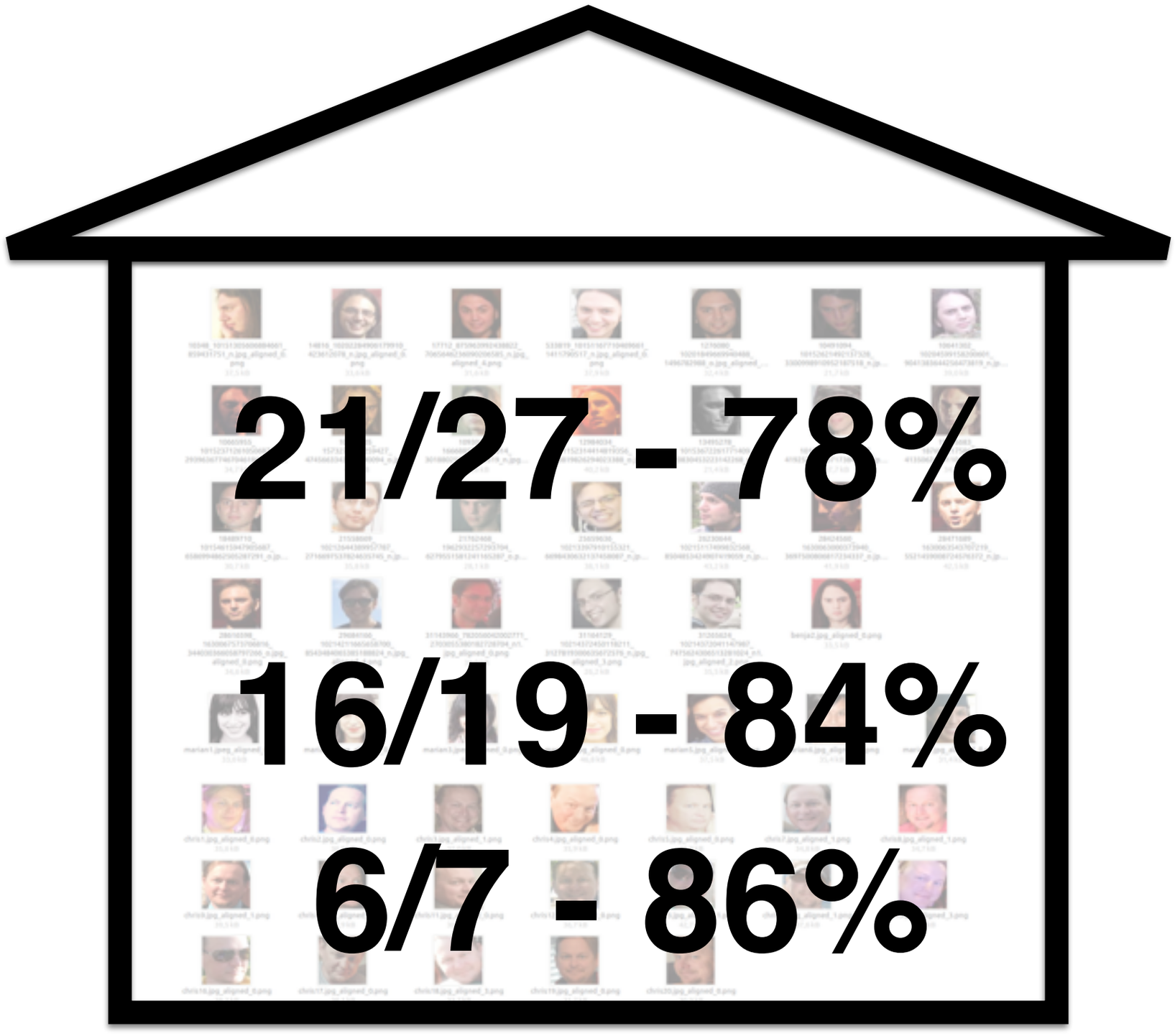
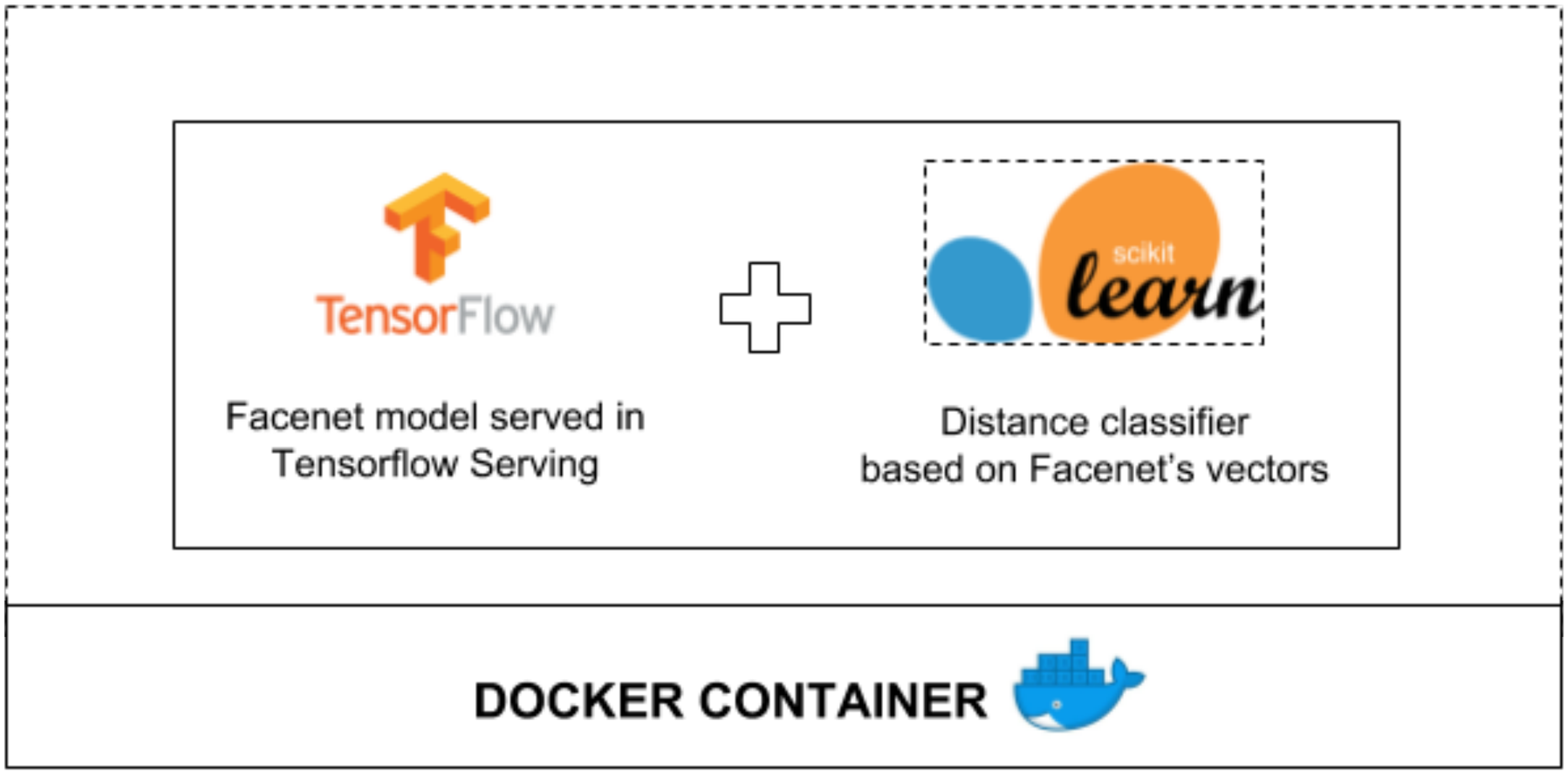
In-house ML



In-house ML


TensorFlow
scikit
learn
Facenet model served in
Tensorflow Serving
Distance classifier
based on Facenet's vectors
DOCKER CONTAINER
redis
Stored models

Get Engaged

Give it a try

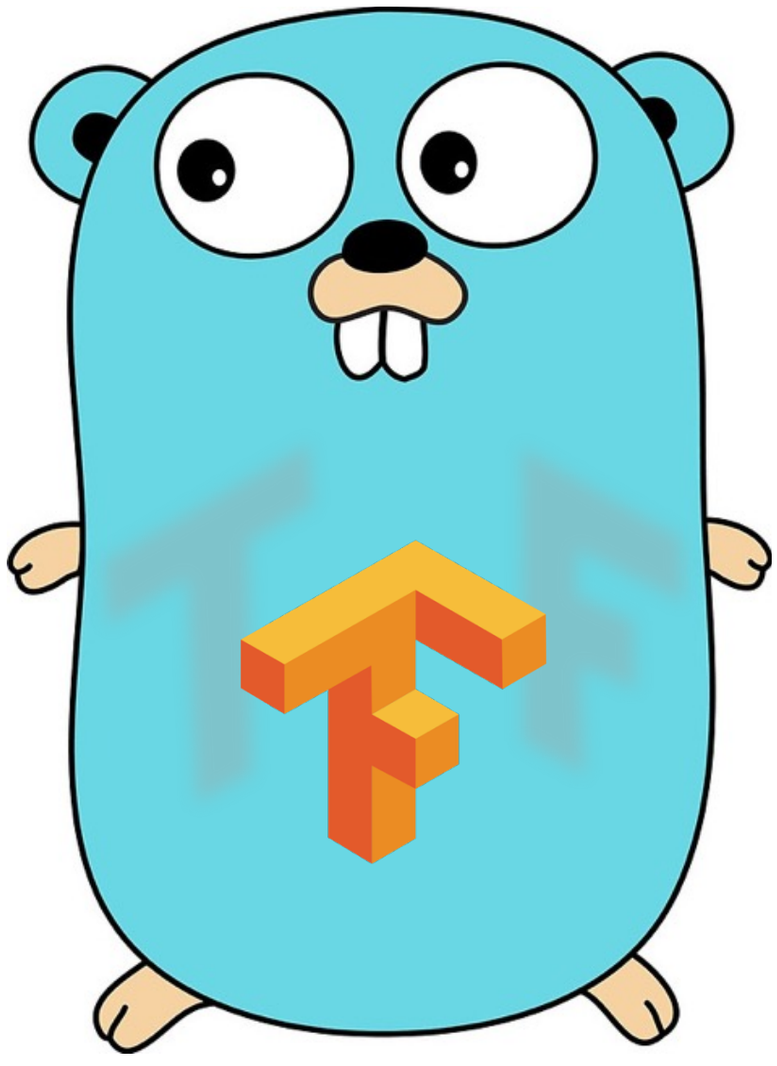
- AutoML: automates ML models design
  cloud.google.com/automl

- 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