

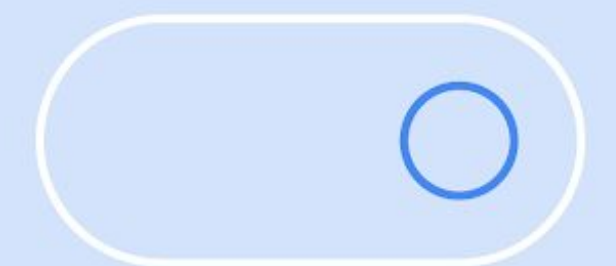
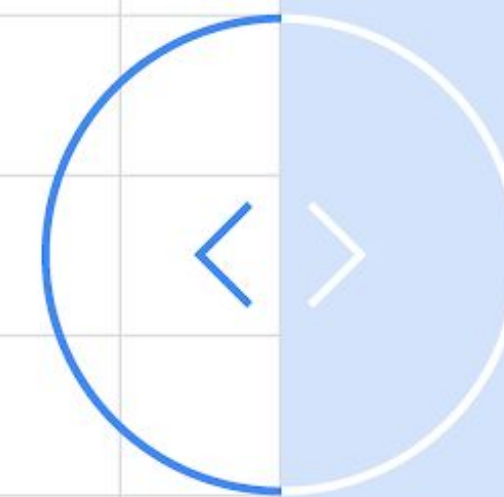


TensorFlow Hub: Models, models, and models



Sayak Paul
PyImageSearch
[@RisingSayak](#)

Google Developers



Ideal audience

- ML Developers that have worked with TensorFlow and Keras

Agenda

- What is TensorFlow Hub?
- Why it might be useful?
- A closer look at tfhub.dev
- Ease of using TensorFlow Hub
- QA

What is TensorFlow Hub?



A collection of SoTA* pre-trained models published by different teams as well community contributors.

tfhub.dev

*State of The Art

Why it might be useful?

- Making SoTA machine learning models more and more accessible.

Why it might be useful?

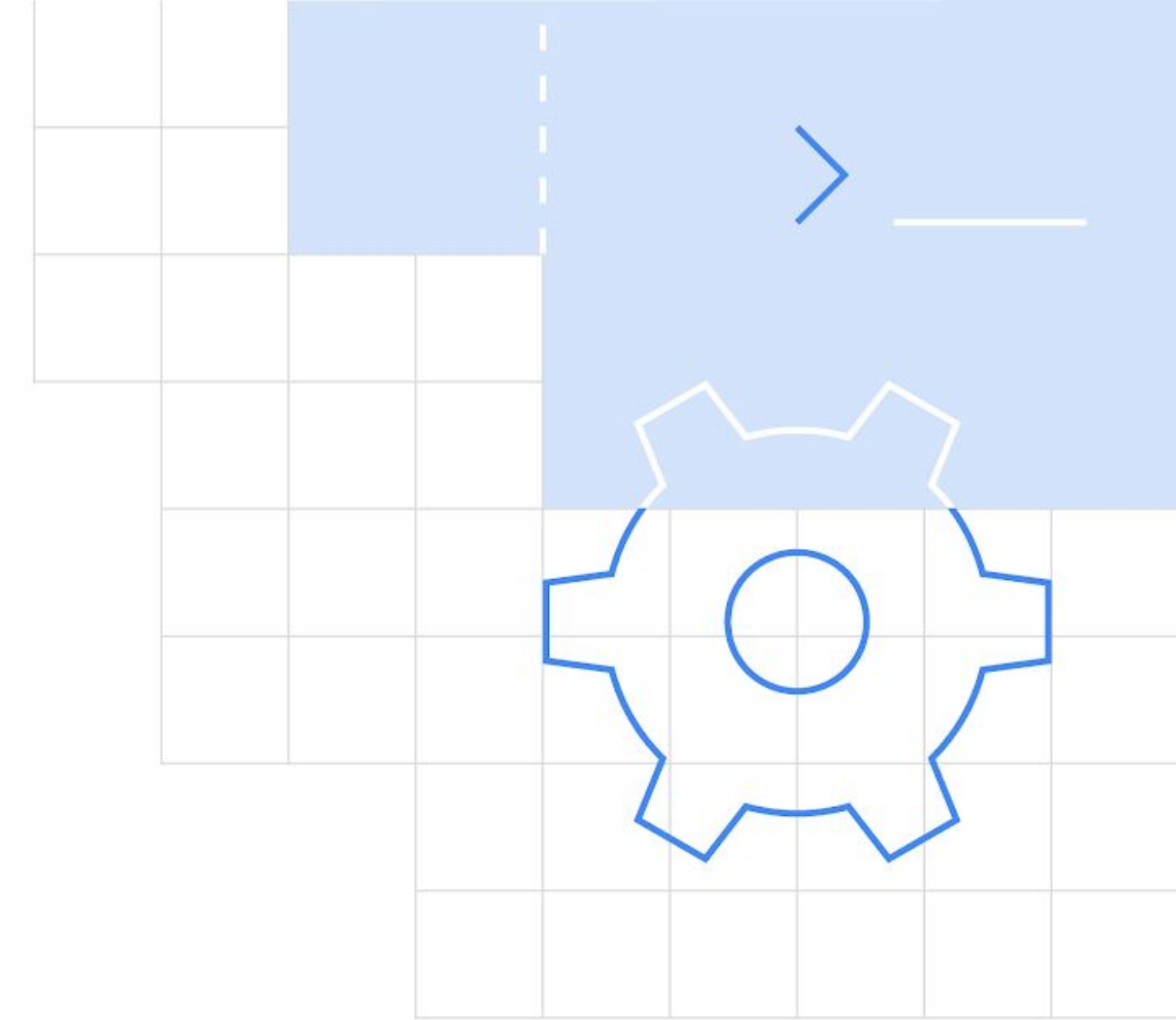
- Making SoTA machine learning models more and more accessible.
- Making it easier for people to take advantage of SoTA models without expertise.

Why it might be useful?

- Making SoTA machine learning models more and more accessible.
- Making it easier for people to take advantage of SoTA models without expertise.
- Transfer learning for different domains including image, text.

Why it might be useful?

- Making SoTA machine learning models more and more accessible.
- Making it easier for people to take advantage of SoTA models without expertise.
- Transfer learning for different domains including image, text.
- Providing a platform for the developers to give back :)



tfhub.dev 🙌



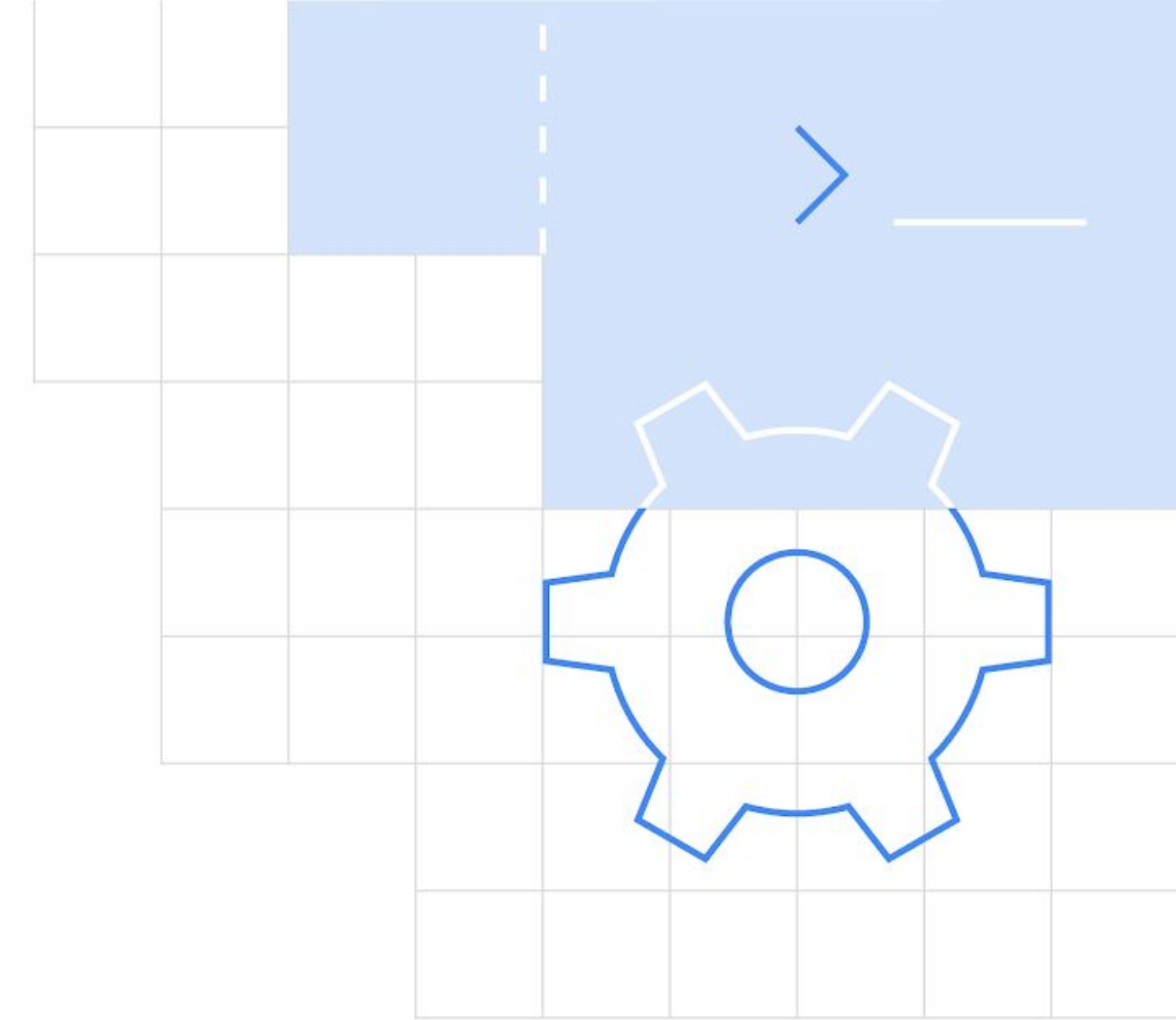


Image classification demo

(Off-the-shelf inference)

```
# Specify the URL and prepare HUB module
```

```
classifier_url = \
```

```
    "https://tfhub.dev/google/tf2-preview/mobilenet_v2/classification/2"
```

```
classifier = tf.keras.Sequential([
```

```
    hub.KerasLayer(classifier_url, input_shape=(224, 224, 3)
```

```
])
```

```
# Specify the URL and prepare HUB module
```

```
classifier_url = \
```

```
    "https://tfhub.dev/google/tf2-preview/mobilenet_v2/classification/2"
```

```
classifier = tf.keras.Sequential([
```

```
    hub.KerasLayer(classifier_url, input_shape=(224, 224, 3)
```

```
])
```

```
# Run preprocessed image for inference
```

```
result = classifier.predict(preprocessed_image)
```

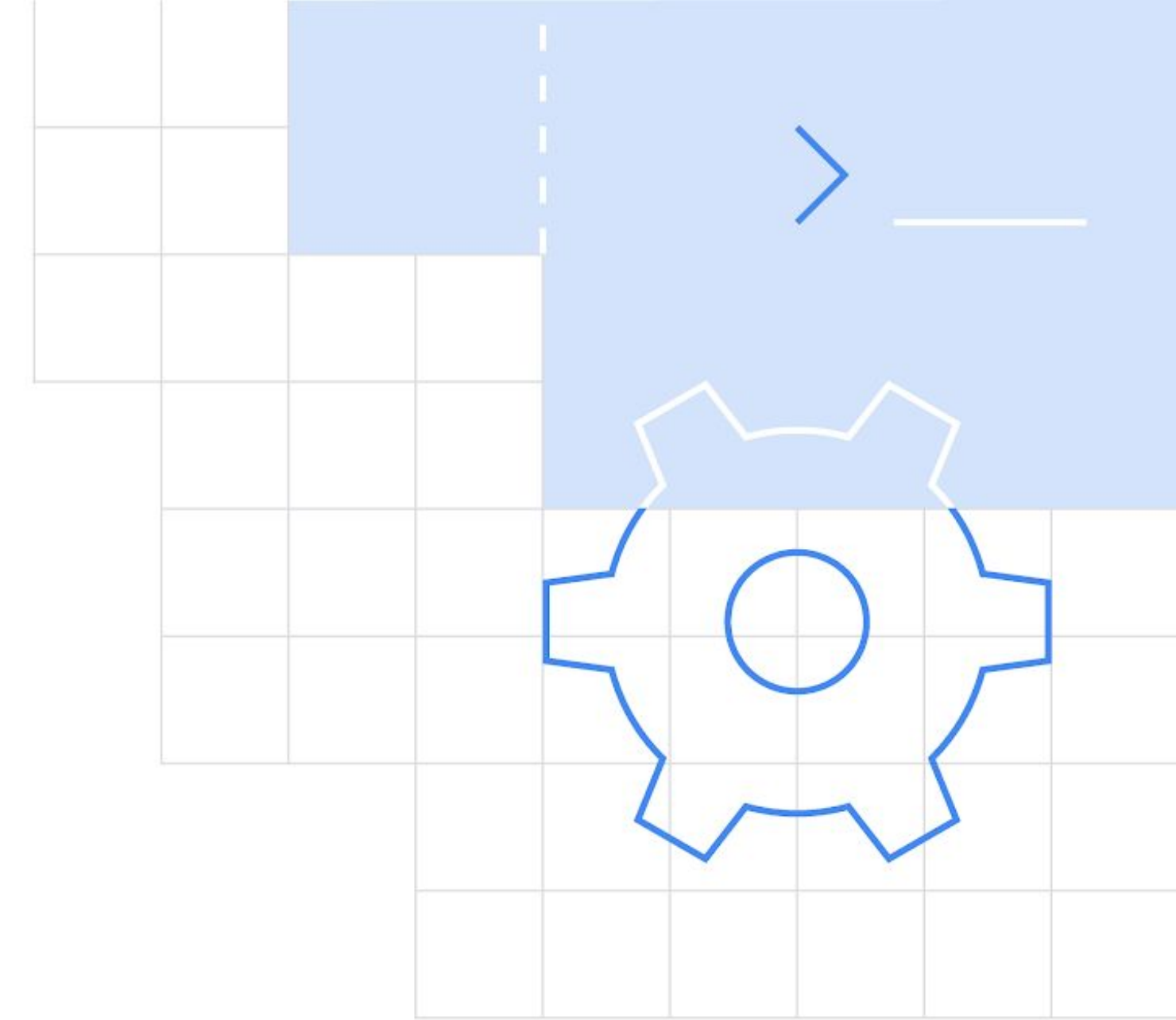


Image classification demo

(Transfer Learning)



```
# URL for the feature extractor network
```

```
feature_extractor_url = \
```

```
    "https://tfhub.dev/google/tf2-preview/mobilenet_v2/feature_vector/2"
```

```
# Convert to a layer
```

```
feature_extractor_layer = hub.KerasLayer(feature_extractor_url,  
    input_shape=(224, 224, 3))
```



```
# URL for the feature extractor network
```

```
feature_extractor_url = \n    "https://tfhub.dev/google/tf2-preview/mobilenet_v2/feature_vector/2"
```

```
# Convert to a layer
```

```
feature_extractor_layer = hub.KerasLayer(feature_extractor_url,\n    input_shape=(224,224,3))
```

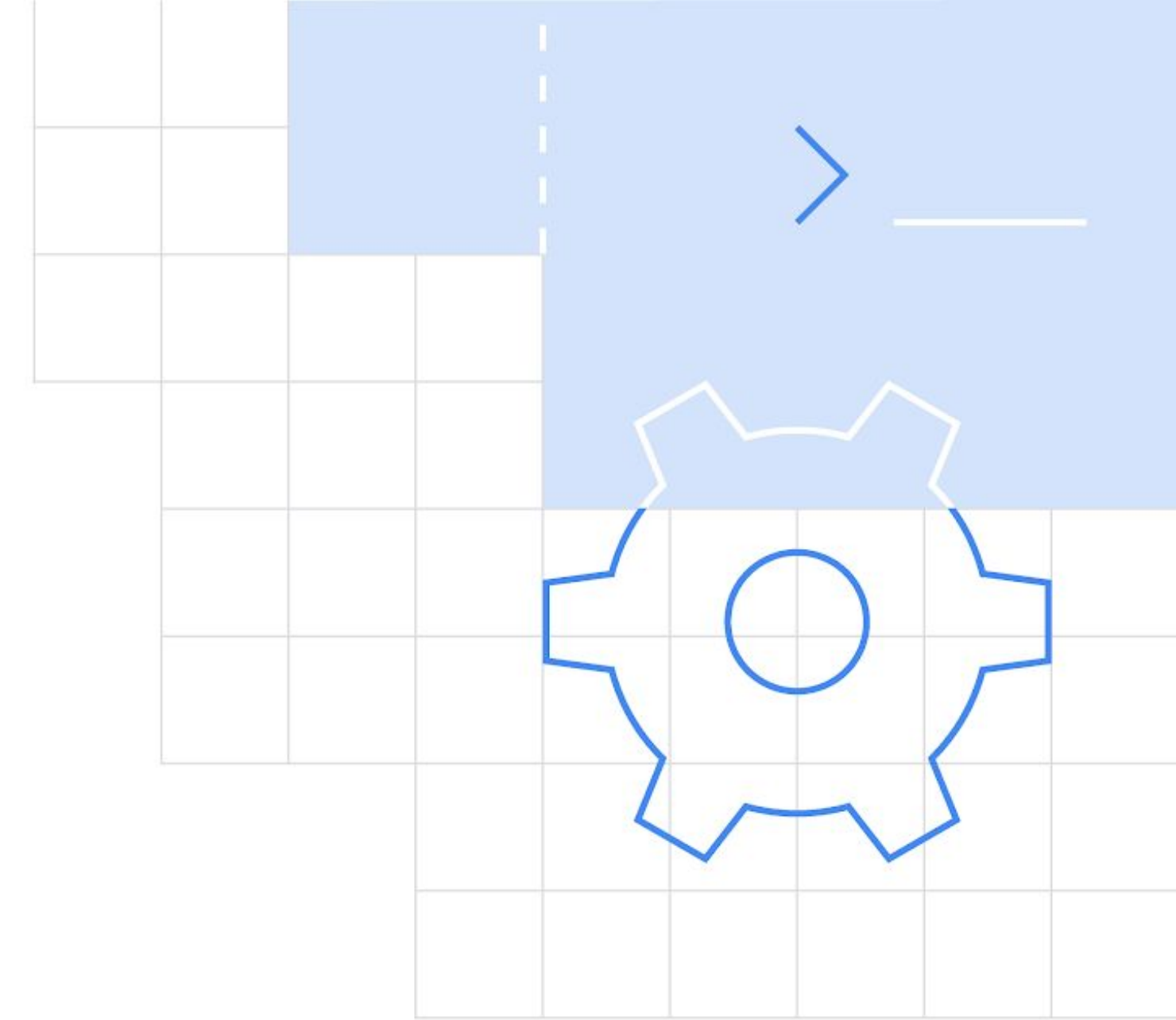
```
# Define, compile, and train a custom classification model
```

```
model = tf.keras.Sequential([\n    feature_extractor_layer,\n    layers.Dense(len(CLASSES))\n])
```

```
model.compile(...)
```

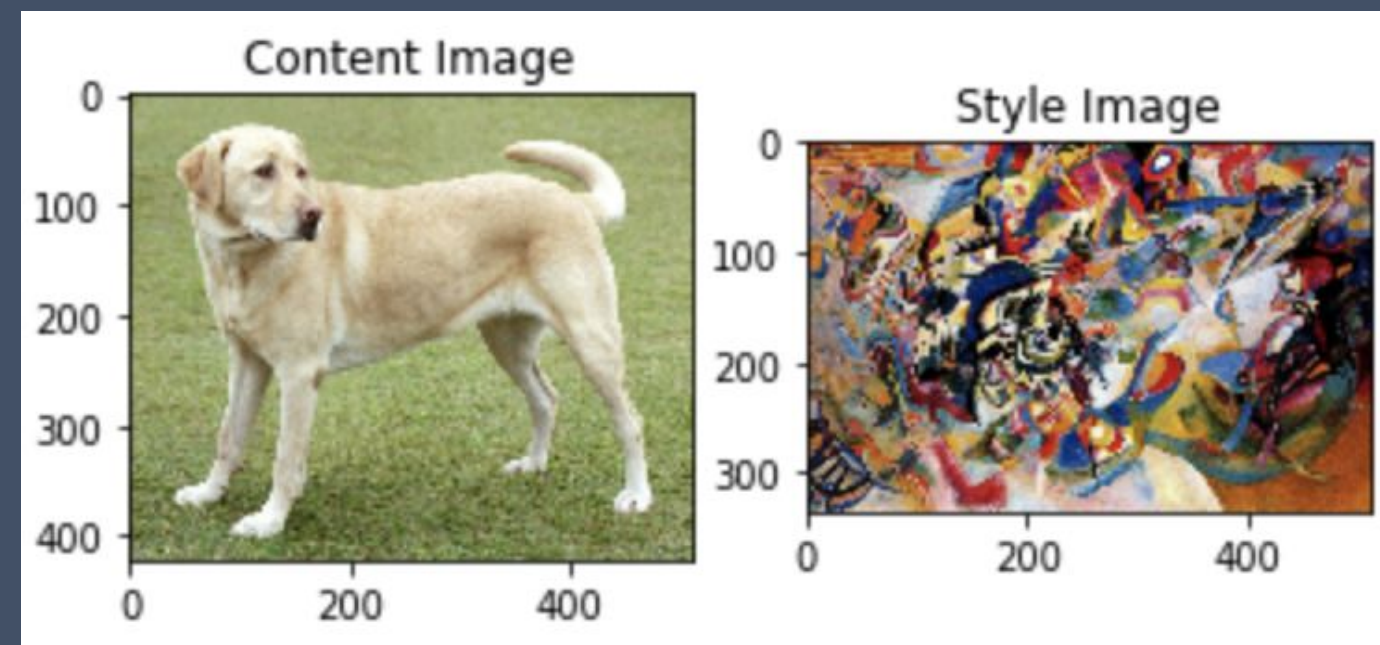
```
model.fit(...)
```

← trainable = True/False



Style transfer





```
import tensorflow_hub as hub
```

```
hub_handle = 'https://tfhub.dev/google/magenta/arbitrary-image-stylization-v1-256/1'
```

```
hub_module = hub.load(hub_handle)
```

```
stylized_image = hub_module(tf.constant(content_image), tf.constant(style_image))[0]
```

```
tensor_to_image(stylized_image)
```

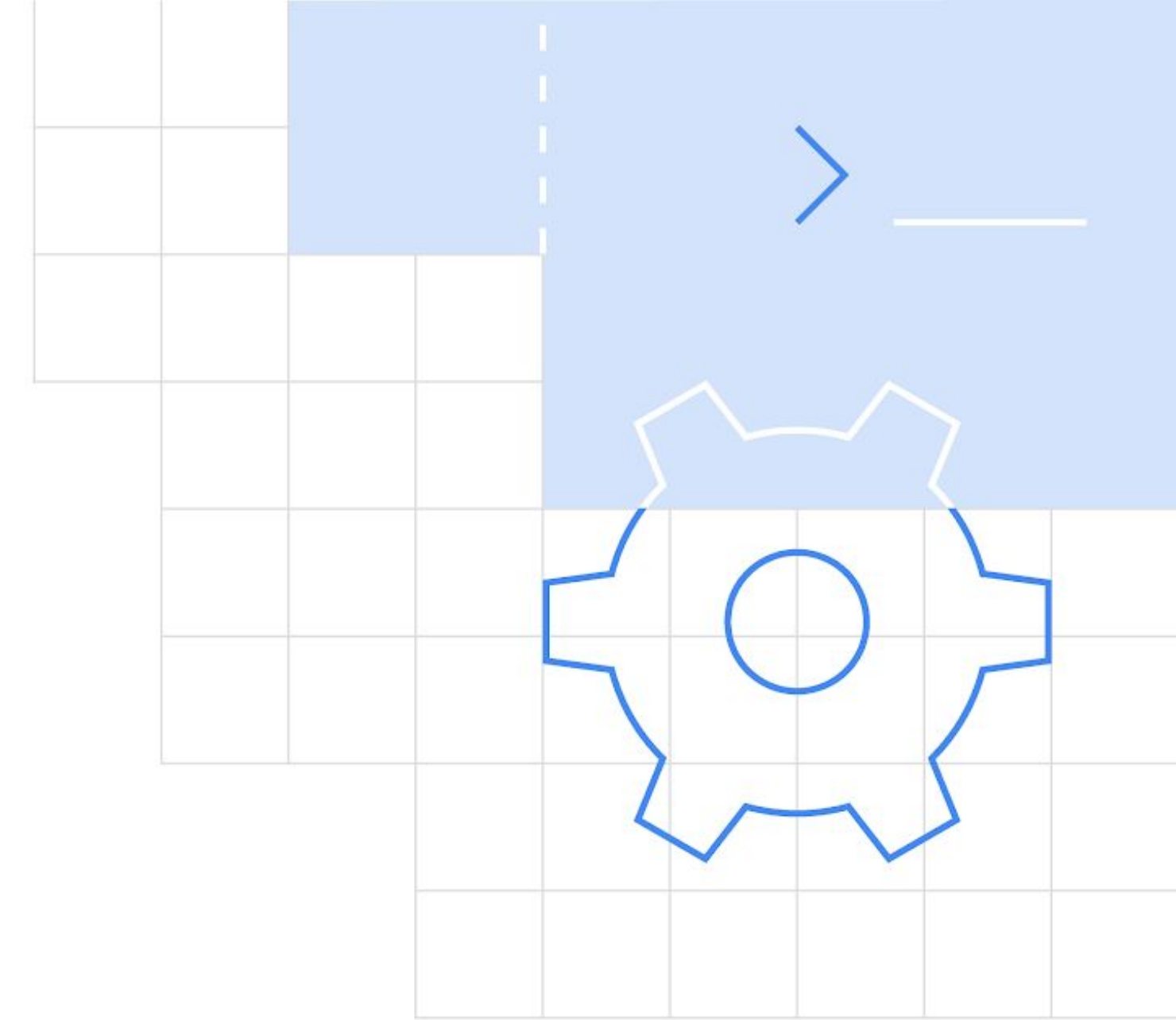
tensorflow.org/tutorials/generative/style_transfer

tfhub for other tasks

- Text classification with pre-trained embeddings.
- Object detection.
- and more (explore on tfhub.dev).

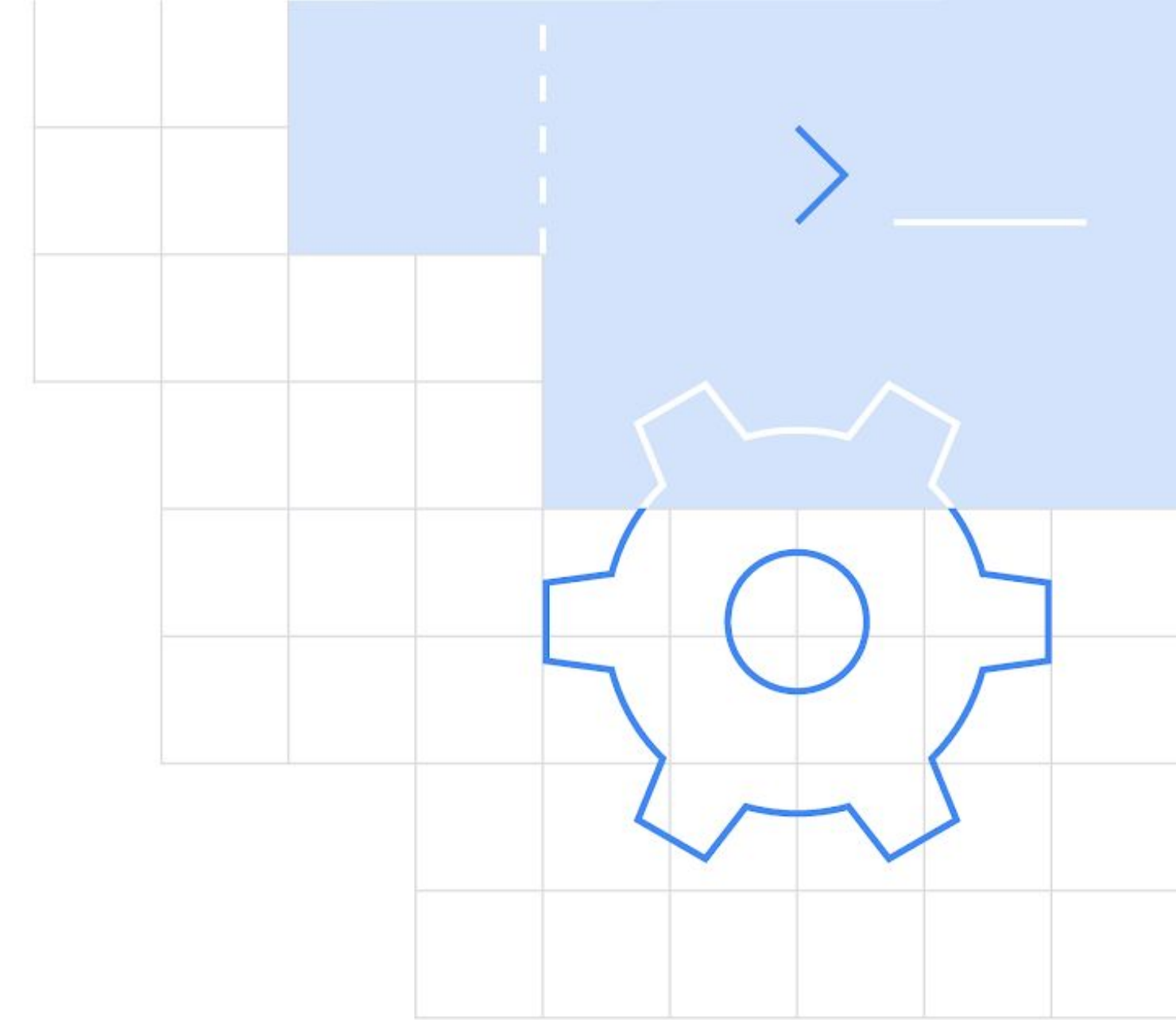
Publish your own models -

<https://bit.ly/tfhub-publish>



Slides available here -

<https://bit.ly/tf-hub>



Thank You!



Sayak Paul
PyImageSearch
[@RisingSayak](#)

