Women Techmakers

MLAct

TOASTMASTERS INTERNATIONAL

Google Developer Groups

Google Developer Student Clubs

Keras-CV Object Detection Live

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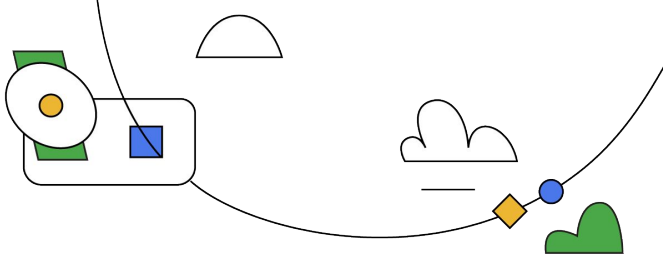
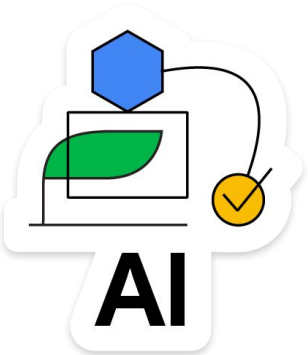
@WTM Ambassador

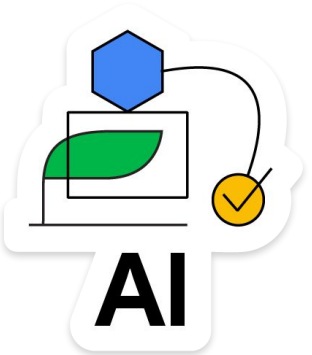


Agenda

1. Applied ML with Keras-CV & Keras-NLP
2. Keras-CV for Object Detection
3. From Matplotlib to Open-CV
4. Live Demo

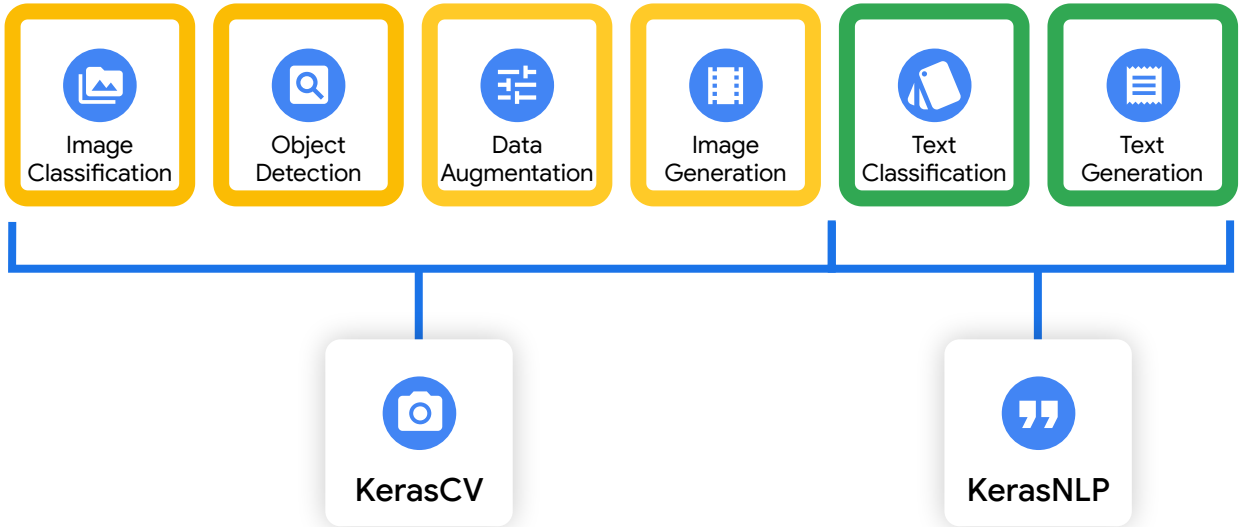


Applied ML with Keras-CV & Keras-NLP



Keras-CV

What can you do with KerasCV and KerasNLP?



Libraries for state of the art **computer vision** and **natural language processing**.
From idea to implementation in just a few lines of code!

Keras-CV

Why KerasCV and KerasNLP?

SOTA models, written in minutes

BERT, GPT-2, Stable Diffusion, ResNet, RetinaNet, etc.

Integrated with the TF Ecosystem

TFLite, DTensor, XLA, TPUs, and beyond

Easy to get started

Readable and modular design with great documentation

Section 01

What can you do with KerasCV?

Section 01

Image Classification

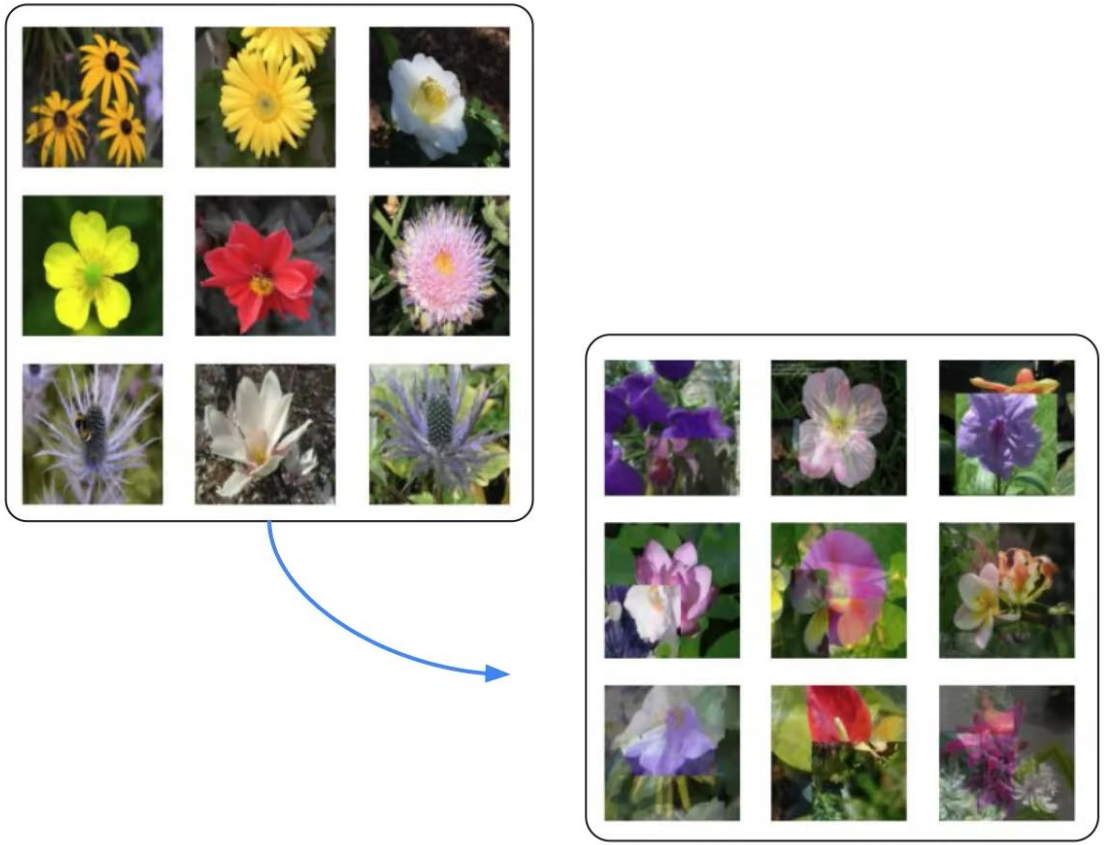
```python
from keras_cv.models import (
    ResNetBackbone, ImageClassifier,
)

backbone = ResNetBackbone.from_preset(
    "resnet50_imagenet",
)
```

```python
from keras_cv.models import (
    ResNetBackbone, ImageClassifier,
)

backbone = ResNetBackbone.from_preset(
    "resnet50_imagenet",
)
model = ImageClassifier(
    backbone=backbone,
    num_classes=2,
)
```

```
from keras_cv.models import (
    ResNetBackbone, ImageClassifier,
)

backbone = ResNetBackbone.from_preset(
    "resnet50_imagenet",
)
model = ImageClassifier(
    backbone=backbone,
    num_classes=2,
)
model.compile(...)
model.fit(cat_vs_dog_dataset)
```

Section 01

Data Augmentation



```python
from keras_cv.layers import (
    CutMix, MixUp, RandAugment, RandomFlip,
)

augmenter = keras.Sequential(
    [
        RandomFlip(),
        RandAugment(value_range=(0, 255)),
        CutMix(),
        MixUp(),
    ],
)
train_dataset = flowers_dataset.map(augmenter)
```

Section 01

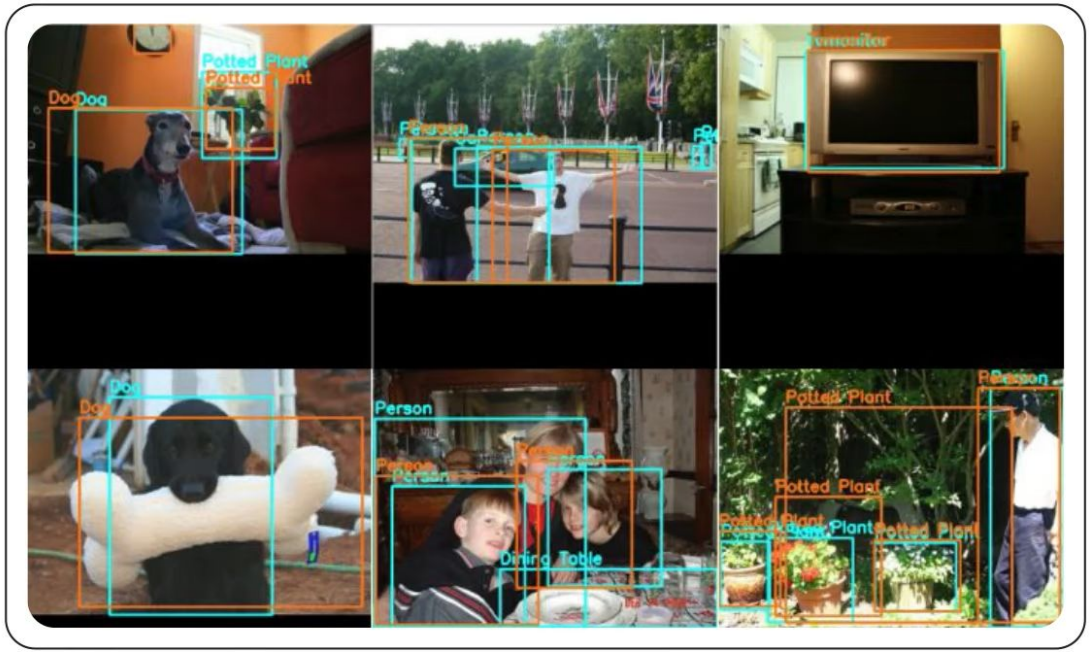
Image Generation

Text to image

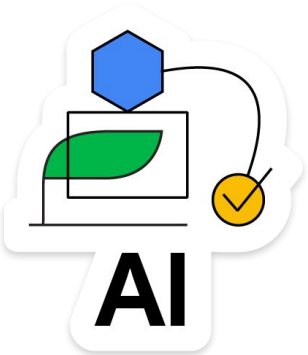
```
from keras_cv.models import (
    StableDiffusion,
)

model = StableDiffusion(
    img_width=512,
    img_height=512,
)

images = model.text_to_image(
    "photograph of an astronaut "
    "riding a horse",
    batch_size=3,
)
```

Section 01

Object Detection



Keras-CV for Object Detection



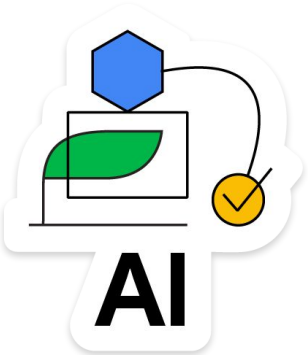
Keras-CV OD

Here’s a quick look!

Want to learn more? Take a deep dive in our full talk on KerasCV/NLP!

Object Detection

From Matplotlib to Open-CV



Keras-CV OD

Let’s Explore!

The prediction:

```
[ ]  1 type(y_pred)
```

```
dict
```

```
[ ]  1 len(y_pred)
```

```
4
```

```
[ ]  1 y_pred.keys()
```

```
dict_keys(['boxes', 'confidence', 'classes', 'num_detections'])
```

Keras-CV OD

Let’s Explore!

The prediction:

```
[ ]  1 type(y_pred['boxes'])
```

```
numpy.ndarray
```

```
[ ]  1 y_pred['boxes'].shape
```

```
(1, 100, 4)
```

Keras-CV OD

Let's Explore!

The prediction:

```
[ ]  1 type(y_pred['confidence'])
```

```
numpy.ndarray
```

```
[ ]  1 y_pred['confidence'].shape
```

```
(1, 100)
```

Keras-CV OD

Let's Explore!

The prediction:

```
[ ]  1 type(y_pred['classes'])
```

```
numpy.ndarray
```

```
[ ]  1 y_pred['classes'].shape
```

```
(1, 100)
```

Keras-CV OD

Let's Explore!

The prediction:

```
[ ]  1 type(y_pred['num_detections'])
```

```
numpy.ndarray
```

```
[ ]  1 y_pred['num_detections'].shape
```

```
(1,)
```

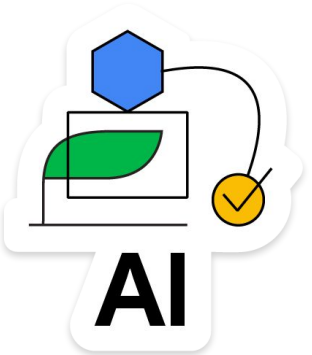
Keras-CV OD

Now into action!

Open CV

```
y_pred = pretrained_model.predict(image_batch)
        for i in np.arange(0, y_pred['num_detections'][0]):
            confidence = y_pred['confidence'].numpy()[0, i]
            if confidence > 0.5:
                idx = int(y_pred['classes'].numpy()[0, i])
                if class_ids[idx] == class_ids[14]:
                    cow_box = y_pred['boxes'].numpy()[0, i, :]
                    (startX, startY, w, h) = cow_box.astype("int")
                    (startX, startY, endX, endY) = (startX, startY, startX + w, startY + h)
                    cv2.rectangle(image, (startX, startY), (endX, endY), (0, 255, 0), 5)
```

Live Demo

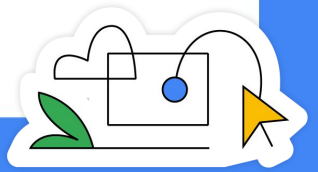


Code

https://bit.ly/KerasCVODLive

You can find the demo code and videos here!

Thank you
for tuning in!



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