

Detectron object detection

By Facebook



DETECTRON

- Detectron is Facebook AI Research's (FAIR) software system
- Implements state-of-the-art object detection algorithms, including Mask R-CNN.
- It is written in Python and powered by the Caffe2 deep learning framework.



GOAL OF DETECTRON

The goal of Detectron is to provide a

- high-quality,
- high-performance
- codebase for object detection research.

It is designed to be flexible in order to support rapid implementation & evaluation of novel research.

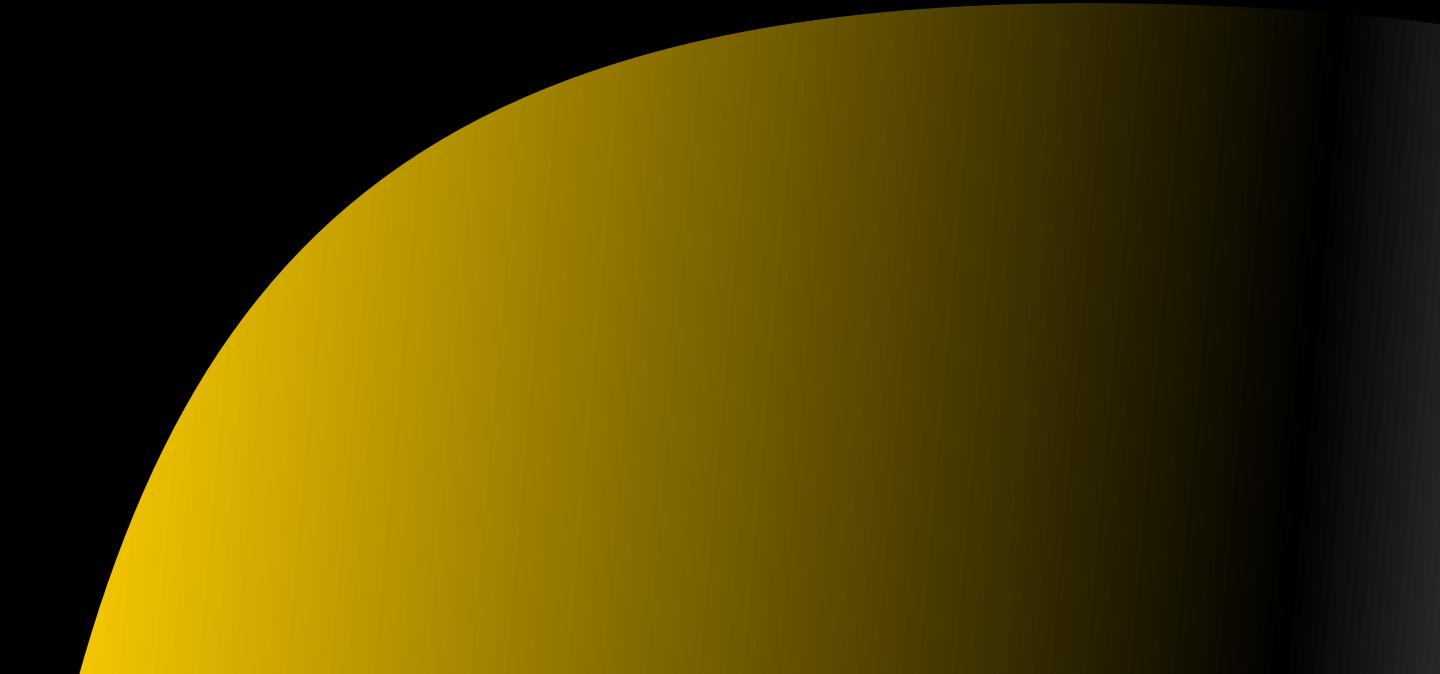


WHY DETECTRON

- High quality
- Industry standard codebase for object detection research
 - Incredibly accurate
 - Object related algorithms are embedded in Detectron
 - Leverages the Caffe2 deep learning framework underneath.
 - In a popular language, Python

"Detectron model is meant to advance object detection by offering speedy training and addressing the issues companies face when making the step from research to production "

– Mark Roosevelt 



DETECTRON includes
implementations of the
following object detection
ALGORITHMS:

- Mask R-CNN
- RetinaNet
- Faster R-CNN
- RPN
- Fast R-CNN
- R-FCN



R-FCN

- A type of region-based object detector
-
- **Efficiently detects objects in an image while simultaneously generating a high-quality segmentation mask for each instance.**
- The method, called Mask R-CNN, extends Faster R-CNN by adding a branch for predicting an object mask in parallel with the existing branch for bounding box recognition.
- **Mask R-CNN is simple to train and adds only a small overhead to Faster R-CNN, running at 5 fps.**
- **Mask R-CNN outperforms all existing, single-model entries on every task.**
- **Mask R-CNN is easy to generalize to other tasks.**



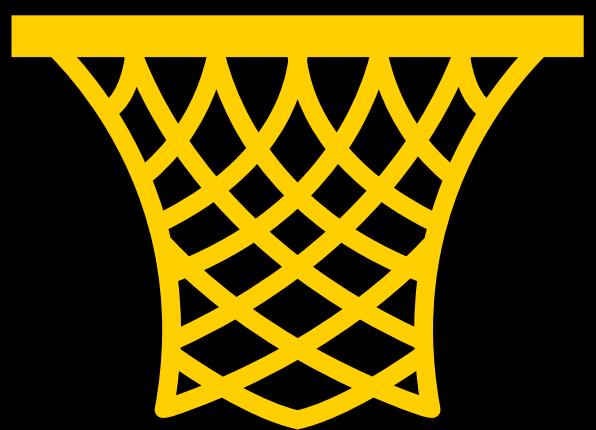
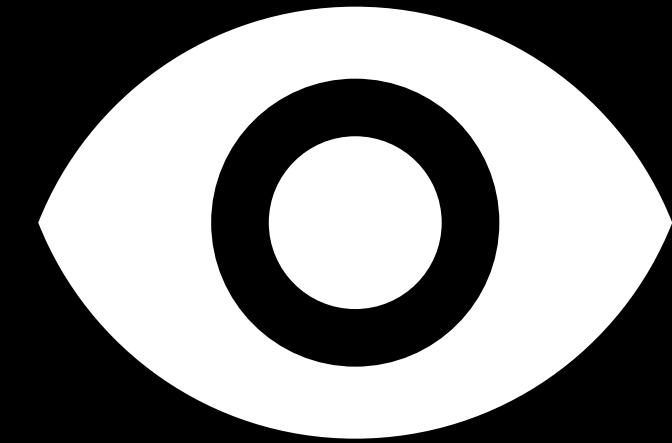
MASK R-CNN

- Conceptually simple & flexible framework for object instance segmentation.
- Efficiently detects objects in an image while simultaneously generating a high-quality segmentation mask for each instance.
- The method, called Mask R-CNN, extends Faster R-CNN by adding a branch for predicting an object mask in parallel with the existing branch for bounding box recognition.
- Mask R-CNN is simple to train and adds only a small overhead to Faster R-CNN, running at 5 fps.
- Mask R-CNN outperforms all existing, single-model entries on every task.
- Mask R-CNN is easy to generalize to other tasks.



RETINANET

- One of the best, one-stage object detection models.
- Work well with dense and small scale objects.
- Formed by making two improvements over existing single stage object detection models -
 - a. Feature Pyramid Networks (FPN) .
 - b. Focal Loss.
- Using larger scales allows RetinaNet to surpass the accuracy of all two-stage approaches, while still being faster.
- Except YOLOv2 (which targets on extremely high frame rate), RetinaNet outperforms SSD, DSSD, R-FCN and FPN.
- Built on top of ResNet and is responsible for computing convolutional feature maps of an entire.



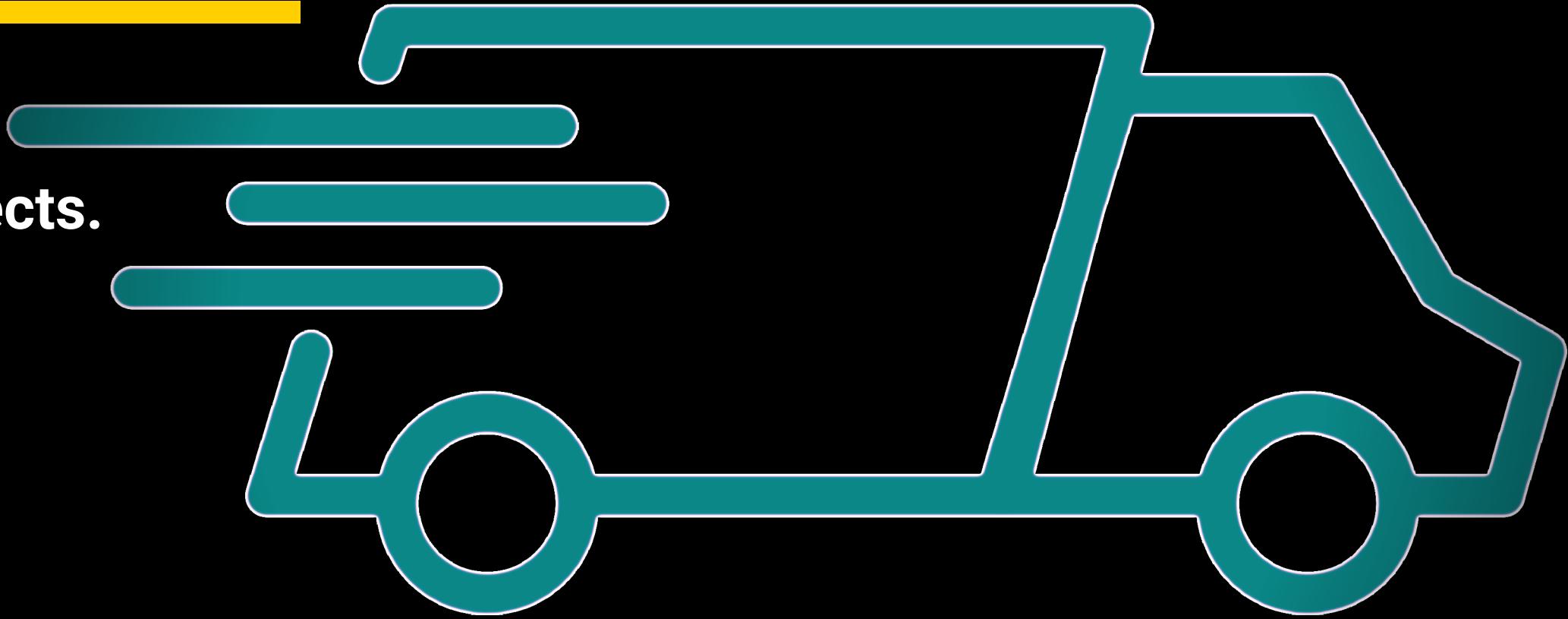
FAST R-CNN

- Instead of feeding the region proposals to the CNN, we feed the input image to the CNN to generate a convolutional feature map.
- From the convolutional feature map, we identify the region of proposals and warp them into squares .
- By using a RoI pooling layer we reshape them into a fixed size so that it can be fed into a fully connected layer.
- From the RoI feature vector, we use a softmax layer to predict the class of the proposed region and also the offset values for the bounding box.
- Uses selective search algorithm on the feature map to identify the region proposals is used to predict the region proposals.



FASTER R-CNN

- Work well with dense & small scale objects.
- Uses convolution neural networks like
 - a. YOLO (You Look Only Once)
 - b. SSD (Single Shot Detector)
- You don't have to feed 2000 region proposals to the convolutional neural network every time.
- The predicted region proposals are then reshaped using a RoI pooling layer which is then used to classify the image within the proposed region and predict the offset values for the bounding boxes.

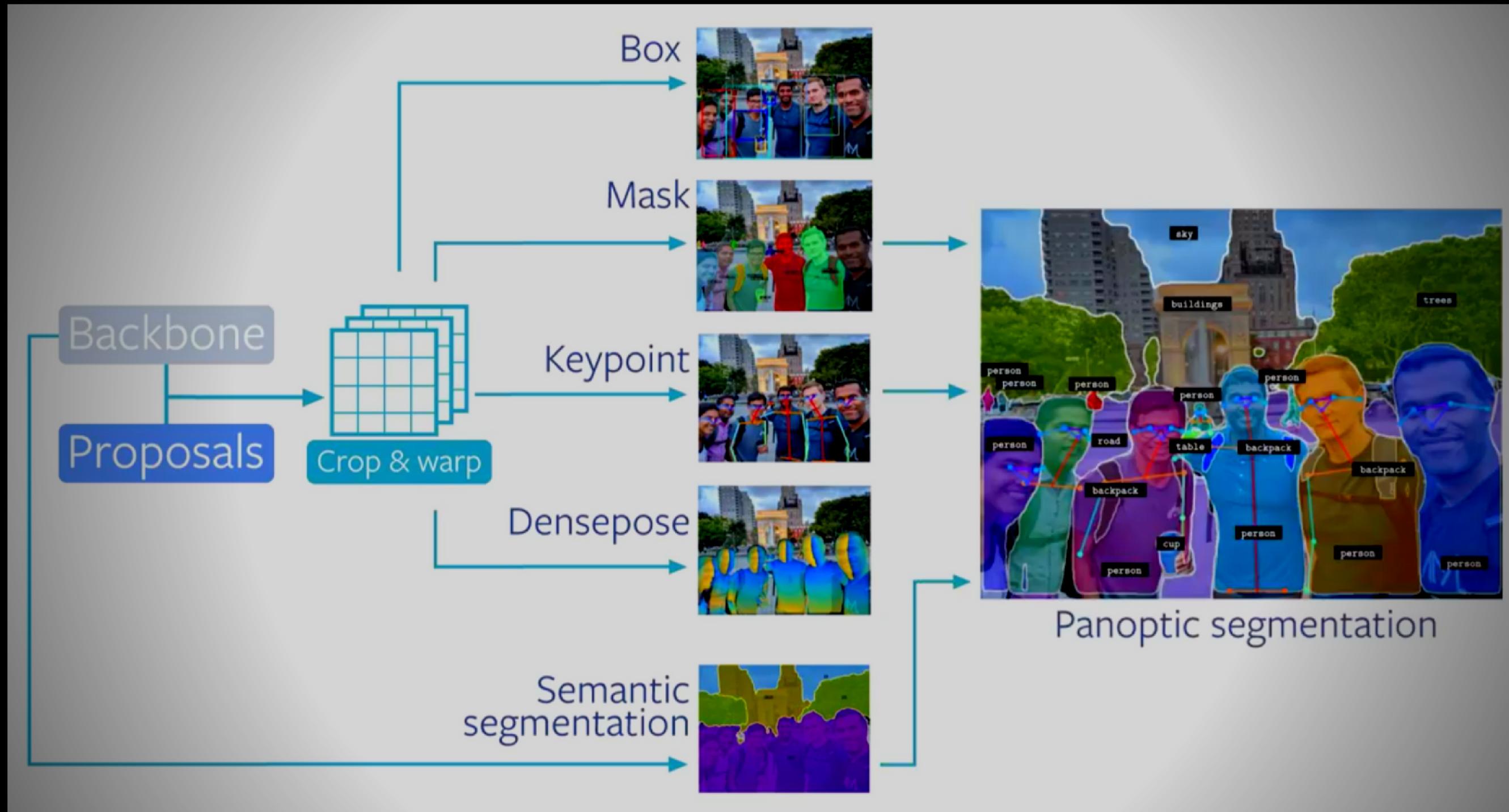


USING THE FOLLOWING BACKBONE NETWORK ARCHITECTURES:

- ResNeXt{50,101,152}
- **ResNet{50,101,152}**
- Feature Pyramid Networks
(with ResNet / ResNeXt)
- **VGG16**



FRAMEWORK OF DETECTRON



**WANT TO USE
DETECTRON?**

Lets make your dream come true !!!

- **STEP -1 -OPEN your python IDE & use the below command -**

```
!pip install 'git+https://github.com/facebookresearch/detectron2.git'
```



```
!pip install 'git+https://github.com/facebookresearch/detectron2.git'  
# (add --user if you don't have permission)
```

```
Collecting git+https://github.com/facebookresearch/detectron2.git  
  Cloning https://github.com/facebookresearch/detectron2.git to /tmp/pip-req-build-brrbyhcg  
    Running command git clone -q https://github.com/facebookresearch/detectron2.git /tmp/pip-req-build-brrbyhcg  
Requirement already satisfied: Pillow>7.1 in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (7.1.2)  
Requirement already satisfied: matplotlib in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (3.2.2)  
Requirement already satisfied: pycocotools>2.0.2 in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (2.0.2)  
Requirement already satisfied: termcolor>1.1 in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (1.1.0)  
Collecting yacs>0.1.6  
  Downloading https://files.pythonhosted.org/packages/28/4f/f9e4ad472a867878ce3bb7efb16654c5d63672b80dc8e6e953a67018433/yacs-0.1.8-py3-none-any.whl  
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (0.8.9)  
Requirement already satisfied: cloudpickle in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (1.3.0)  
Requirement already satisfied: tqdm>4.29.0 in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (4.41.1)  
Requirement already satisfied: tensorflow in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (2.5.0)  
Collecting fvcore>0.1.6,>=0.1.5  
  Downloading https://files.pythonhosted.org/packages/e6/69/805702ba4c2ae87ab887665619f8478a18ad8aa92efdf7c28e8761c72a6b/fvcore-0.1.5.post20210624.tar.gz (49kB)  
    51KB 4.3MB/s  
Collecting iopath>0.1.9,>=0.1.7  
  Downloading https://files.pythonhosted.org/packages/21/d9/22104caed16fa41382792fed959f4a9b88b2f905e7a82e4483180a2ec2a/iopath-0.1.8-py3-none-any.whl  
Requirement already satisfied: future in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (0.16.0)  
Requirement already satisfied: pydot in /usr/local/lib/python3.7/dist-packages (from detectron2==0.4.1) (1.3.0)  
Collecting omegaconf>2.1.0rc1  
  Downloading https://files.pythonhosted.org/packages/f9/96/1966b49bf6ca64bfadfa7bcc9a8d73c5d83b4be769321fcc5d617abeb8c/omegaconf-2.1.0-py3-none-any.whl (74kB)  
    81KB 6.9MB/s  
    ✓ 2m 16s completed at 12:35 AM
```

WARNING: The following packages were previously imported in this runtime:
[pydevd_plugins]
You must restart the runtime in order to use newly installed versions.

RESTART RUNTIME

YOU WILL SEE YOUR IDE GOING CRAZY !!!
BUT DON'T GET SCARED !!
KEEP CALM & TRUST THE DETECTRON

PS: Just installing detectron2

Restart your runtime, and run it, you will get the below message

Successfully built detectron2



Write your topic or idea

Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

Briefly elaborate on what you want to discuss.

Write your topic or idea



Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

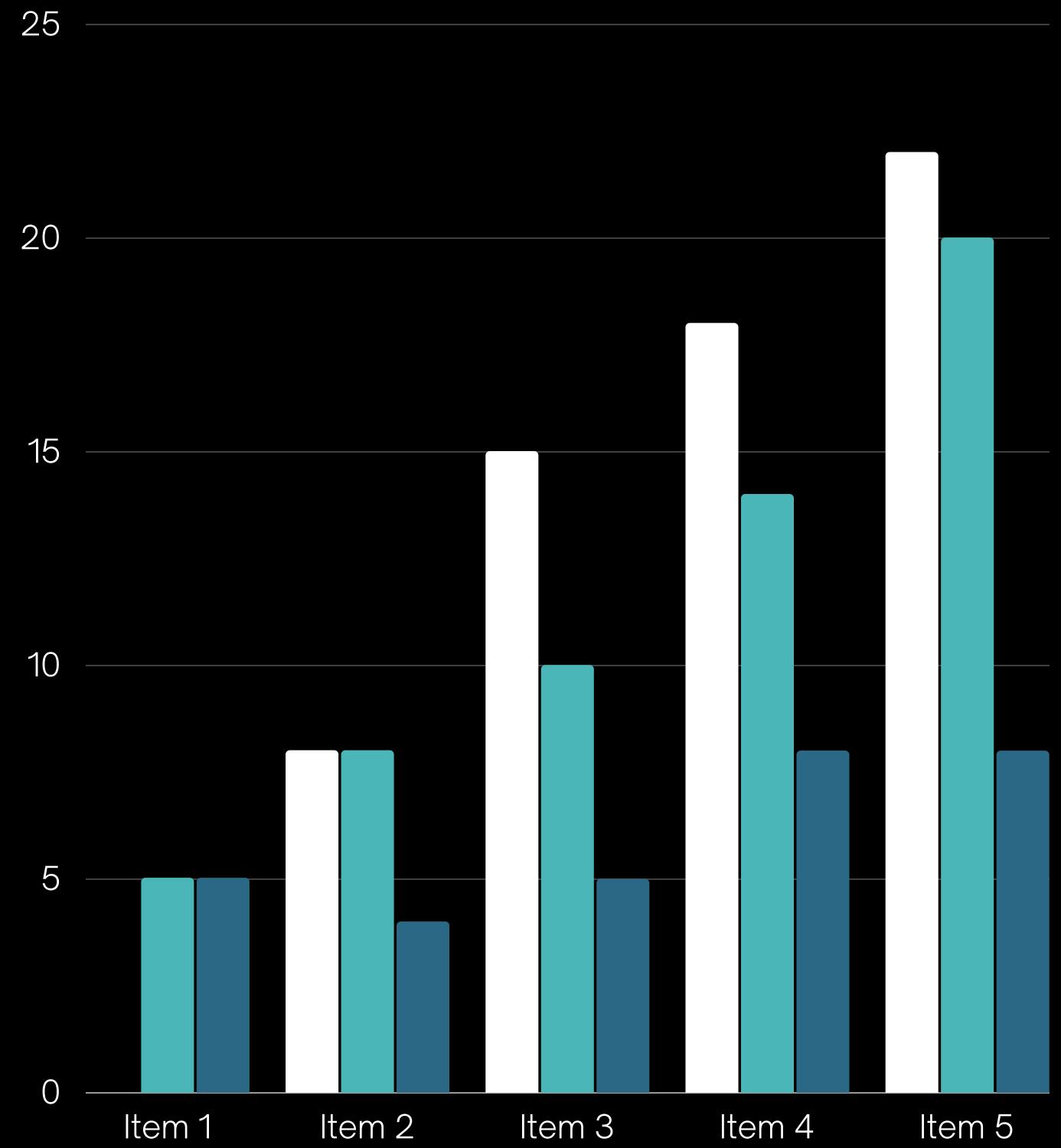
Briefly elaborate on what you want to discuss.

Add a main point

Briefly elaborate on what you want to discuss.



Add a section header



Write your
topic or idea

Briefly elaborate on what you want
to discuss.

Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

Briefly elaborate on what you want to discuss.

Add a main point

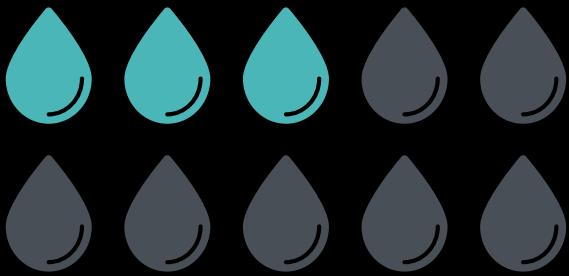
Briefly elaborate on what you want to discuss.

**Write your
topic or idea**

A wide-angle photograph of a night sky filled with stars. In the foreground, a range of mountains with rocky peaks and sparse vegetation is visible. A single, bright red streak, likely a meteor or a satellite, crosses the upper left portion of the frame against the dark blue gradient of the night sky.

Use this for a
photo caption.

Write your topic or idea



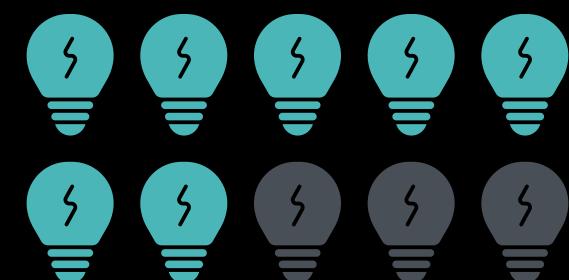
3 out of 10

Briefly elaborate on what you want to discuss.



5 out of 10

Briefly elaborate on what you want to discuss.



7 out of 10

Briefly elaborate on what you want to discuss.



Write your topic or idea

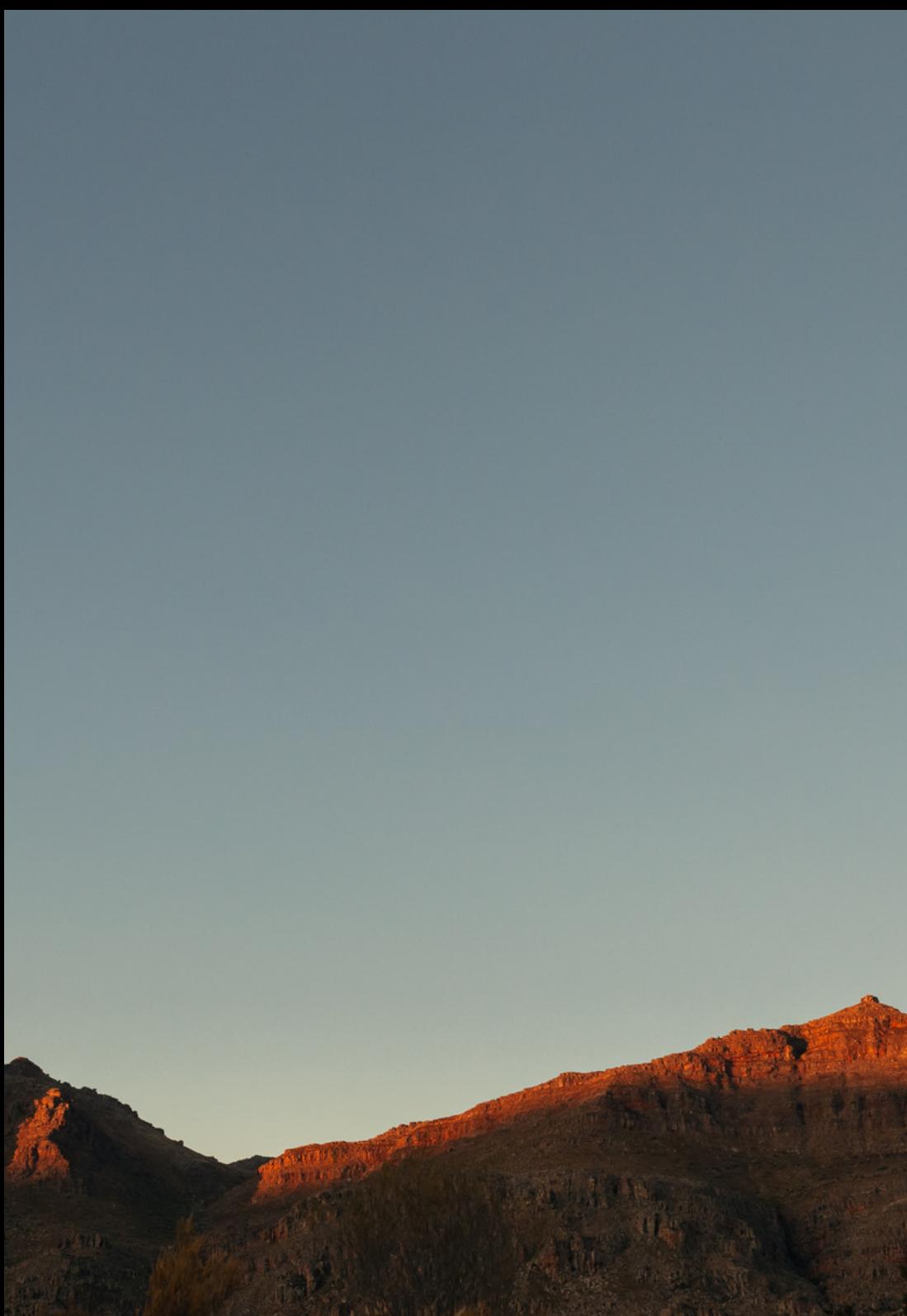
Use this for a photo caption.

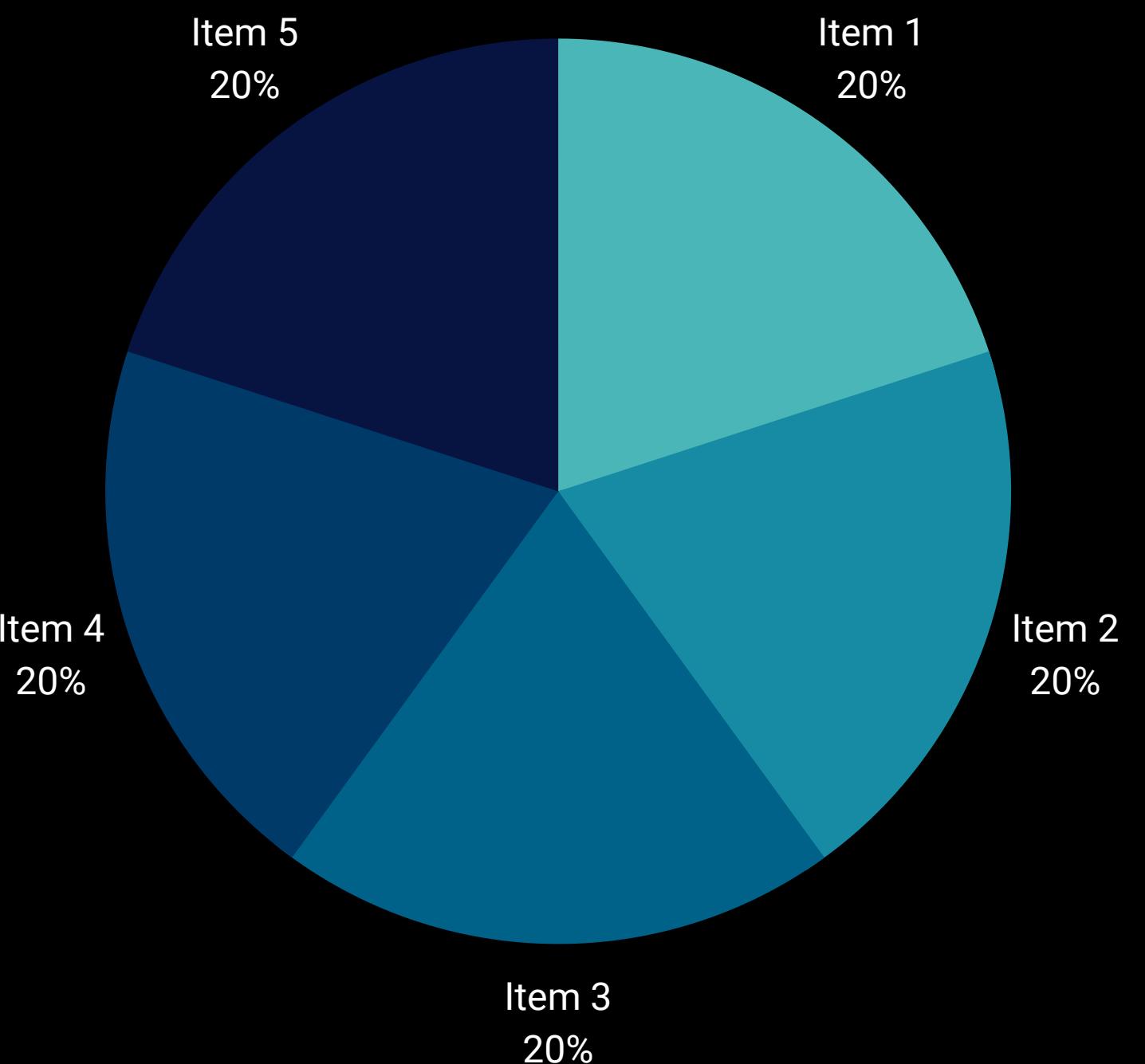


Add a section header

Write your topic or idea

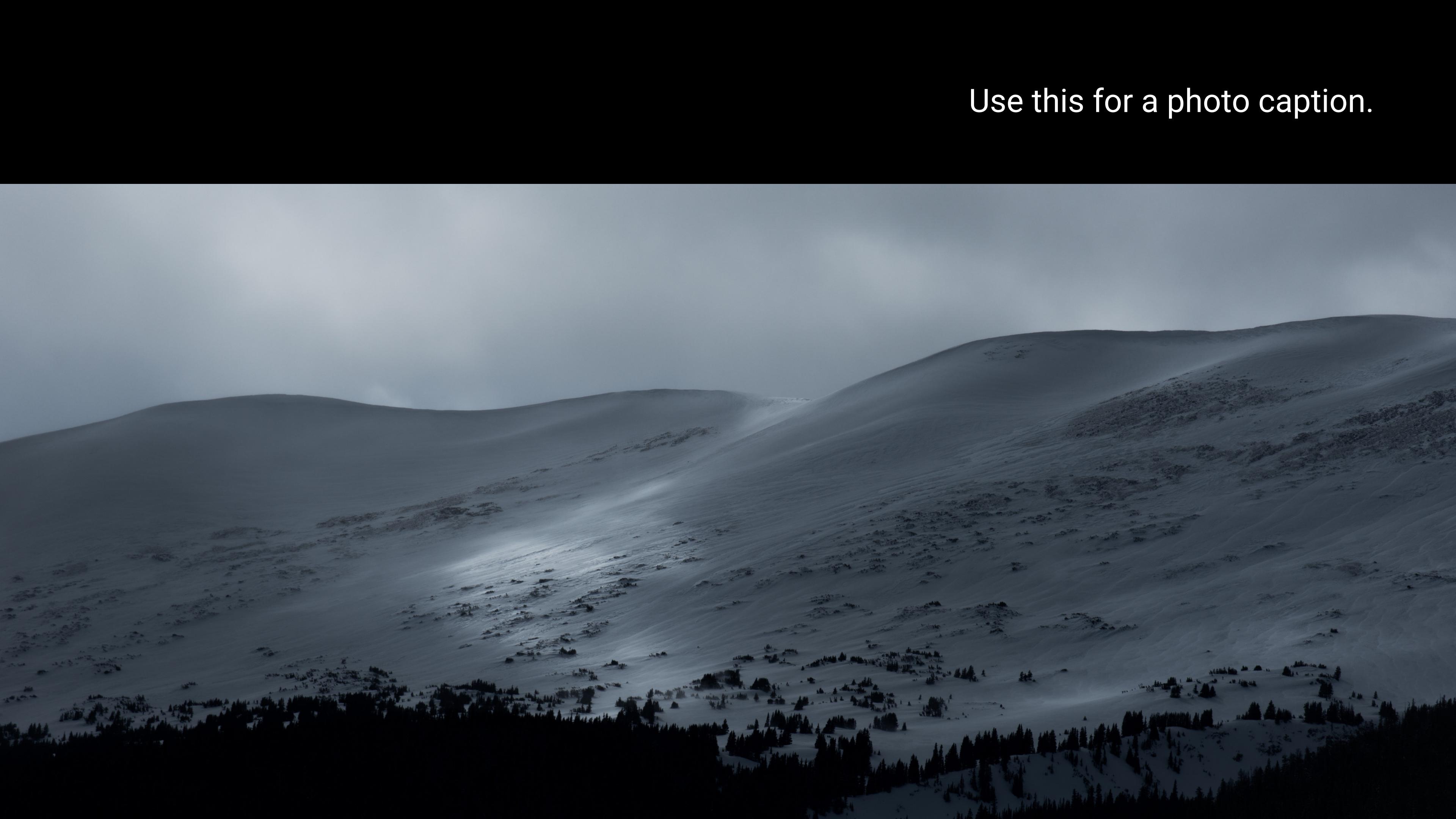
Briefly elaborate on what you
want to discuss.





Write your topic or idea

Briefly elaborate on what you
want to discuss.

A wide-angle, dark-toned photograph of a mountainous landscape. The foreground is dominated by steep, snow-covered slopes. Sparse evergreen trees are scattered across the lower and middle slopes. In the background, more mountain ridges are visible under a heavy, overcast sky.

Use this for a photo caption.

REFERENCE LINKS FOR YOU

Facebook's AI team Releases Detectron – A Platform for Object Detection Research

www.analyticsvidhya.com/blog/2018/01/facebook-launched-detectron-platform-object-detection-research/

Add a main point

Briefly elaborate on what you want to discuss.

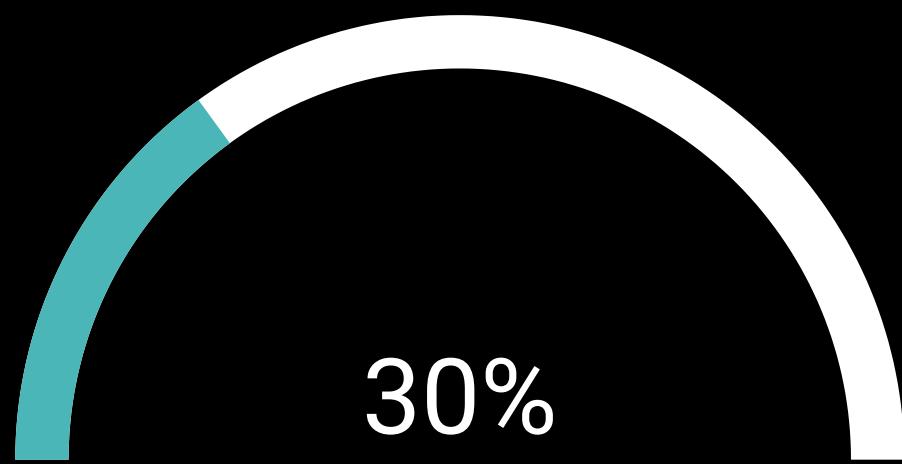
Image Labelling Using Facebook's Detectron

<https://towardsdatascience.com/image-labelling-using-facebooks-detectron-4931e30c4d0c>

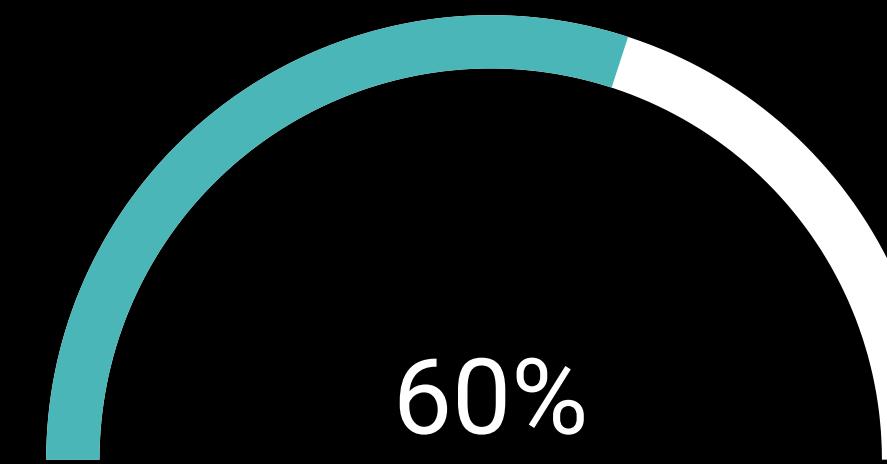
Add a main point

Briefly elaborate on what you want to discuss.

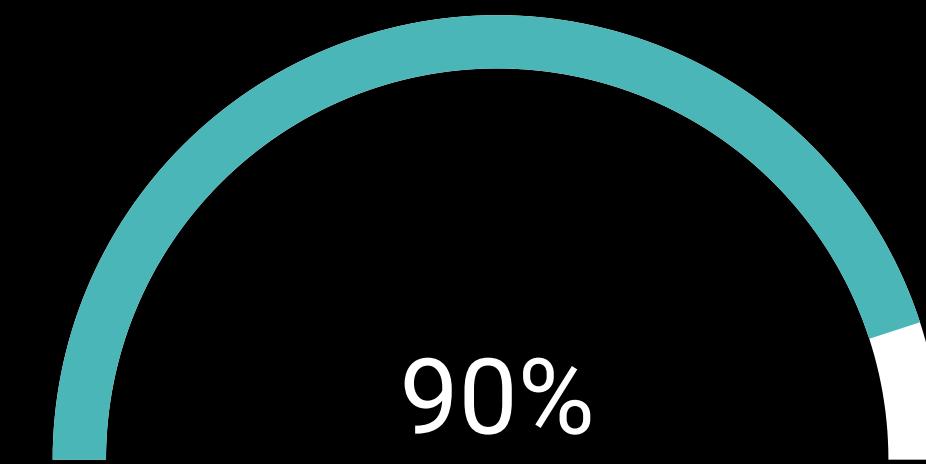
Write your topic or idea



Add a main point



Add a main point



Add a main point

Briefly elaborate on what you want to discuss.



Write your topic or idea

Briefly elaborate on what you want
to discuss.

CARTOONING AN IMAGE



OPEN CV

Free Icons

Use these elements in your
Canva presentation.

