

Best algorithms for image recognition

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Image recognition is an application of computer vision that requires more than one computer task, such as object detection and image classification.

Image Detection is the task of taking an image as input and finding various objects within it. An example is face detection, where algorithms aim to find face patterns in images

- Yolo
- VGG

Yolo

[Yolo article](#)

Yolo (You only look once) is a real-time object detection algorithm, it uses a CNN.

Keras is a framework written in python that is designed to experiment with Neural network models.

- Process the image with keras

Pipelines are series of data processing steps that are chained together to streamline in the workflow. They are steps to process data and simplify the workflow

Features: - Speed - Accuracy - Open Source

Process images at 45 FPS

High detection Accuracy

Better generalization

Architecture

- Redimensiona la entrada de las imágenes a 448x448 (Input Resizing), esto se hace con el fin de estandarizar el tamaño de entrada de la red neuronal. La resolución actual de Yolo ha mejorado considerablemente, debido a que la mayoría de modelos utilizan una resolución de 224x224, lo que hace que rinda mejor el modelo.
- Convolution 1x1: Esto ayuda a reducir la dimensionalidad de los canales, con el fin de disminuir la complejidad computacional, permitiendo que sea más eficiente.
- Convolution 3x3: Después de la 1x1 se aplica esta otra para extraer características más complejas de la imagen. Con el fin de generar un volumen de salida que tenga lo más importante y detallado de la imagen.

- ReLu(Rectified Linear Unit): Esto es una función de activación utilizada en redes neuronales, esto devuelve cero para valores negativos y el mismo valor para valores positivos. Esto sirve para que las redes neuronales aprendan patrones más complejos y trae varios beneficios adicionales, como lo son los siguientes:
 - Facilita el entrenamiento
 - Eficiencia computacional
 - Mayor velocidad de convergencia:
 - * Gracias a la simplicidad y la eliminación de la saturación de entradas positivas

¿How does Yolo Work?

The algorithm use several aproaches:

1. Residual Blocks:
 1. Are a component of a deep neural network that aims to address the vanishing gradient problem, this problem is very common on high layer Architectures, that has a lot of layers on the images.
2. Bounding Box Regression:
 1. This refines the coordinates of the Bounding boxes predicted by the model.
3. Intersection Over Union (IOU): It keeps the relevant information, and obviously discard the irrelevant boxes.
4. Non-Maximun Supression (NMS): NMS to keep only the boxes with the highest probability score of detection.

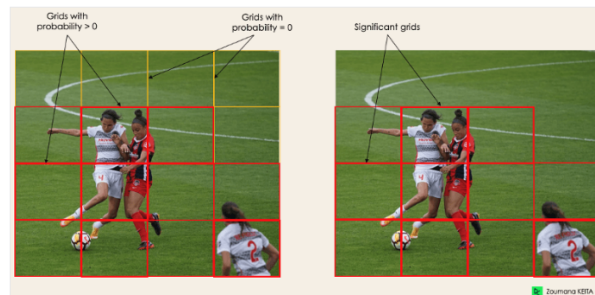


Figure 1: Player's grid

Aplications of Yolo

1. Agriculture
2. Security Surveillance
3. Self Driving Cars

VGG

VGG hace referencia a un grupo de geometria visual, Visual Geometry Group

The numbers we see in this kind of models at the end, for example the VGG-16 or the VGG-19 stands for the deep layers of the model.

Disadvantages

It is really heavy so it takes time to train its parameters It weights arround 533MB, so implementing it takes a time-consuming task

It has a 6,7% error, and wons a GoogleNet classification.

VGG Article