

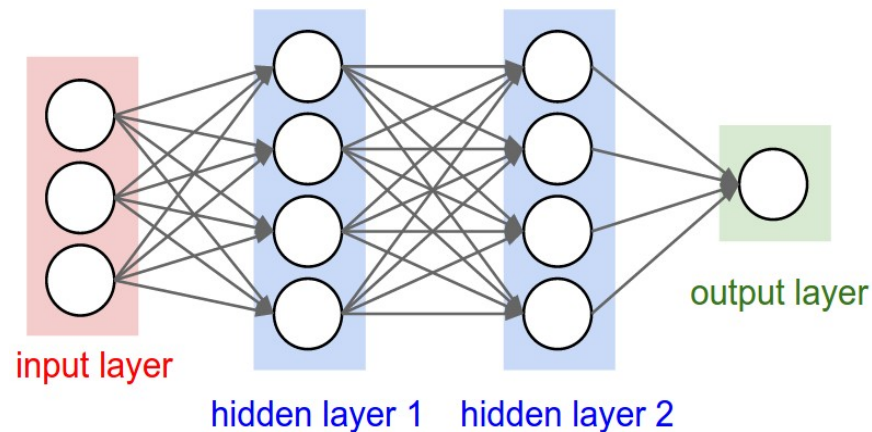
Deep Features for Image Retrieval and Classification

José M. Saavedra (PhD.)
Orand S.A.

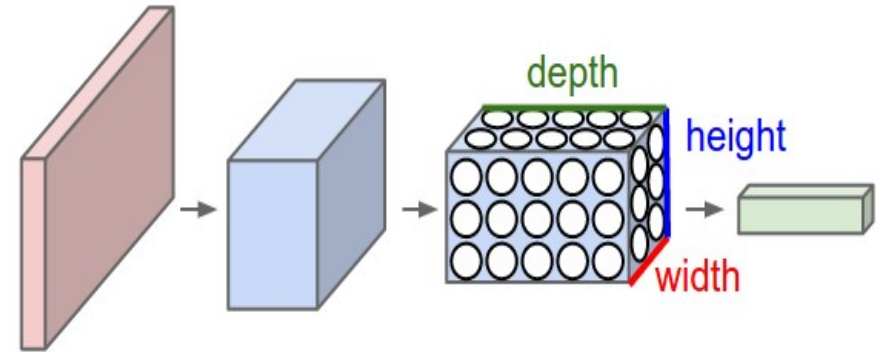
Convolutional Neural Net

A deep layer arranges neurons in a 3D space.

- depth → different kinds of features



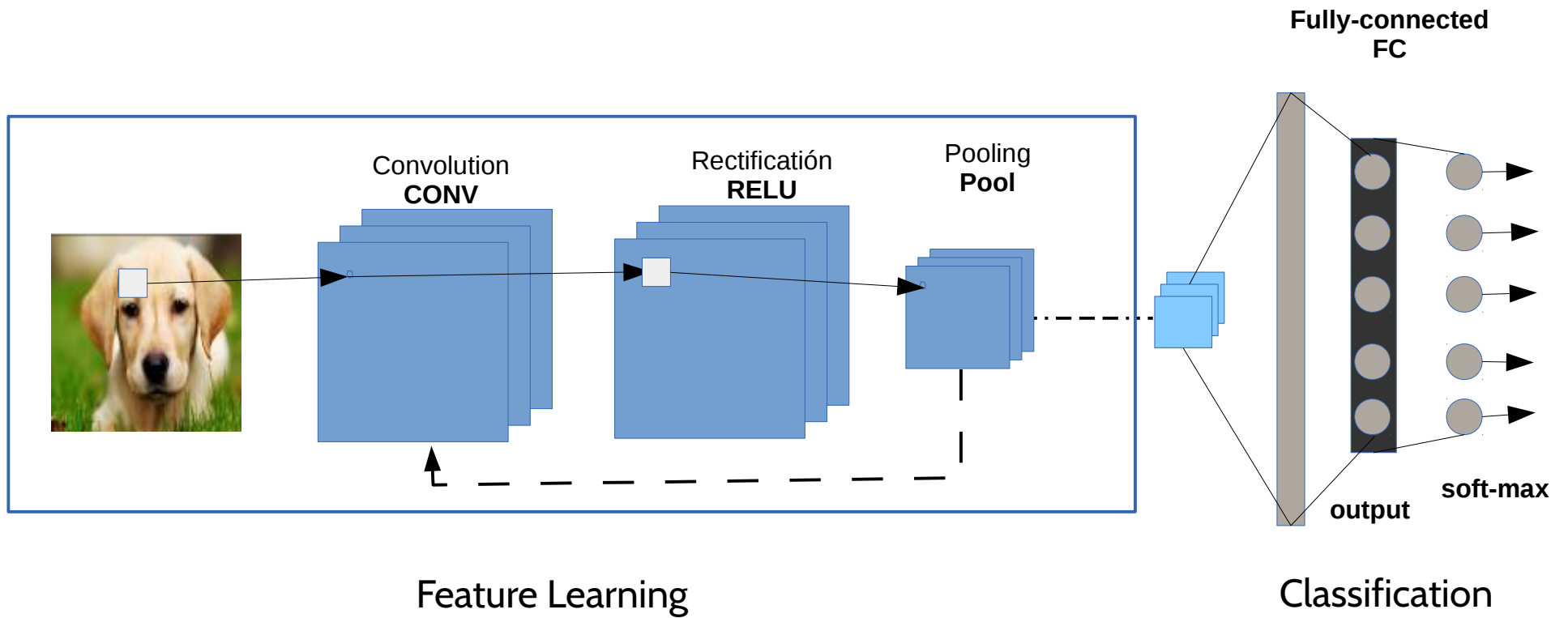
MLP



CNN

Convolutional Neural Net

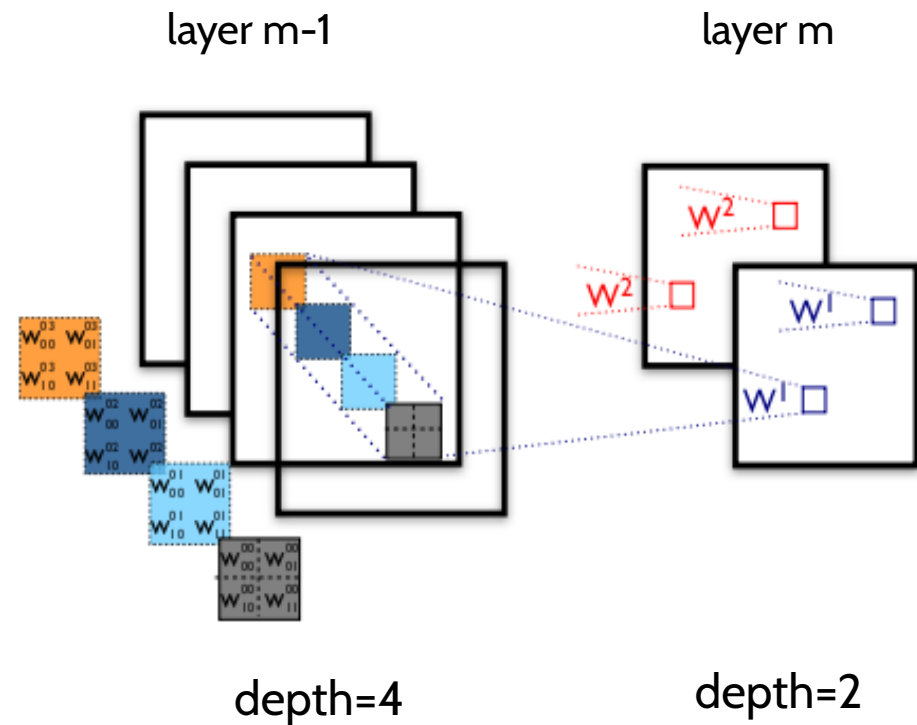
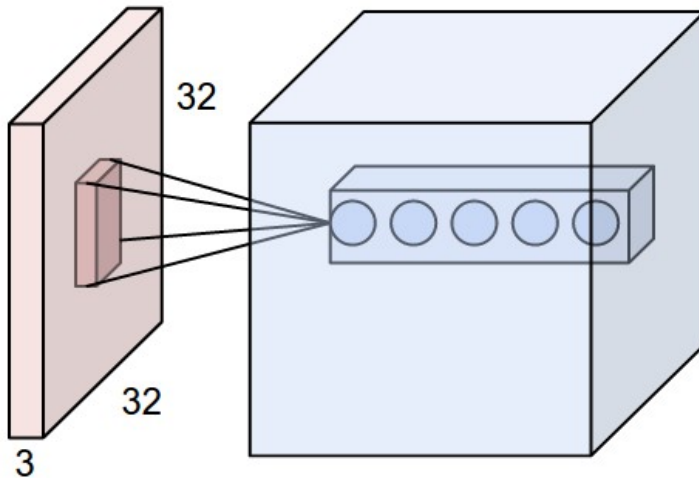
Different types of layers



Convolutional Neural Net

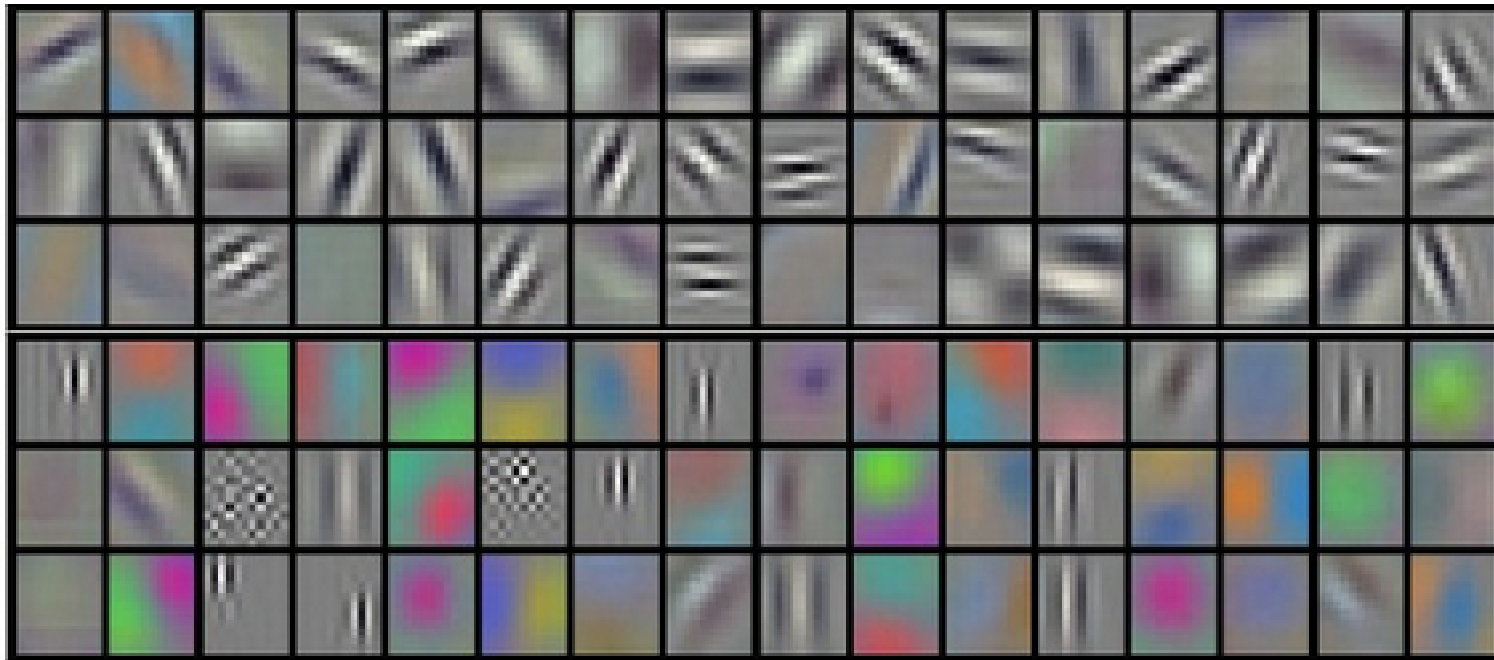
Different types of layers

convolution



Convolutional Neural Net

Different types of layers

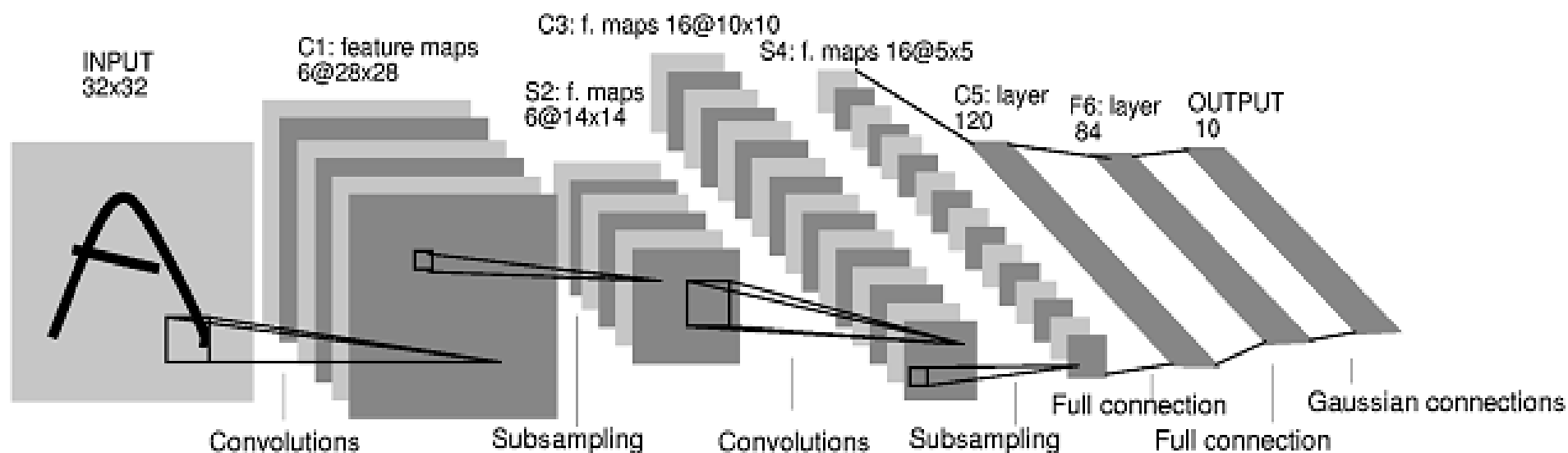


Example of learned filters

Convolutional Neural Net

Famous CNN architectures

LeNet

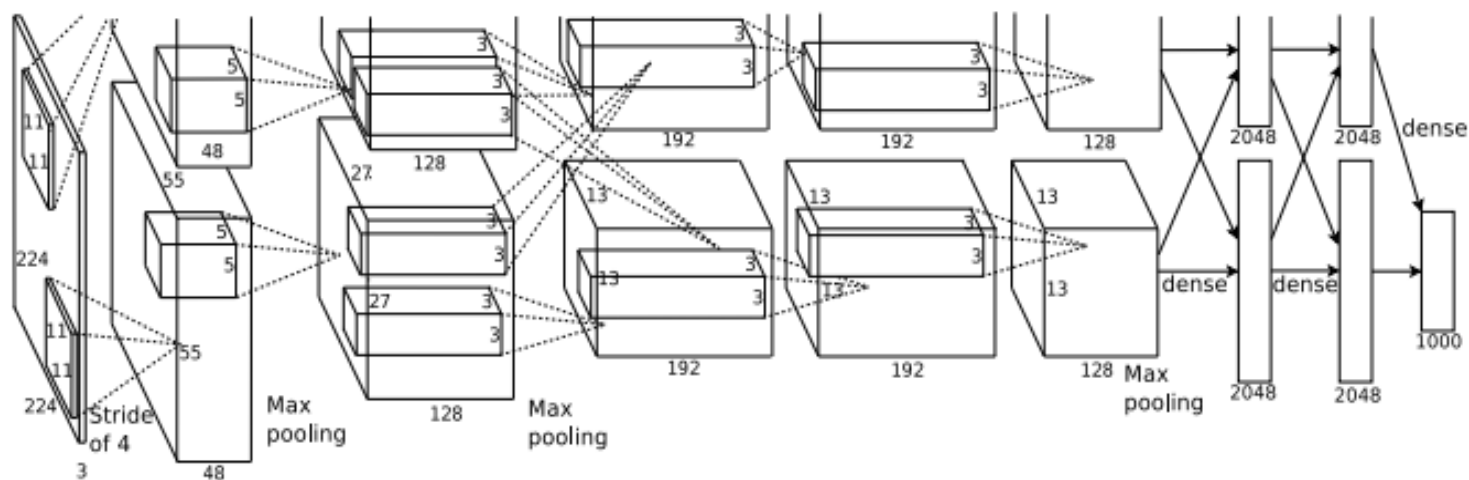


LeCun et al., 1998. Gradient-Based Learning Applied to Document Recognition (Proc. IEEE 1998).

Convolutional Neural Net

Famous CNN architectures

AlexNet



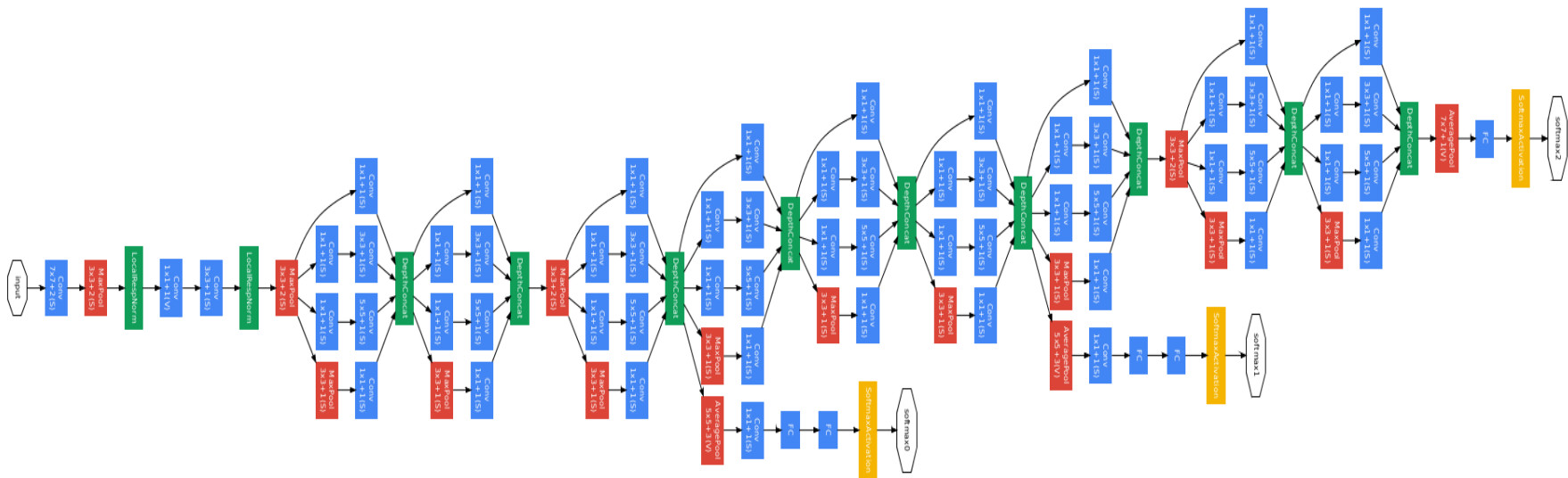
<http://www.cs.toronto.edu/~fritz/absps/imagenet.pdf>

ImageNet Classification with Deep Convolutional Neural Networks

Convolutional Neural Net

Famous CNN architectures

GoogleNet



Going Deeper with Convolutions

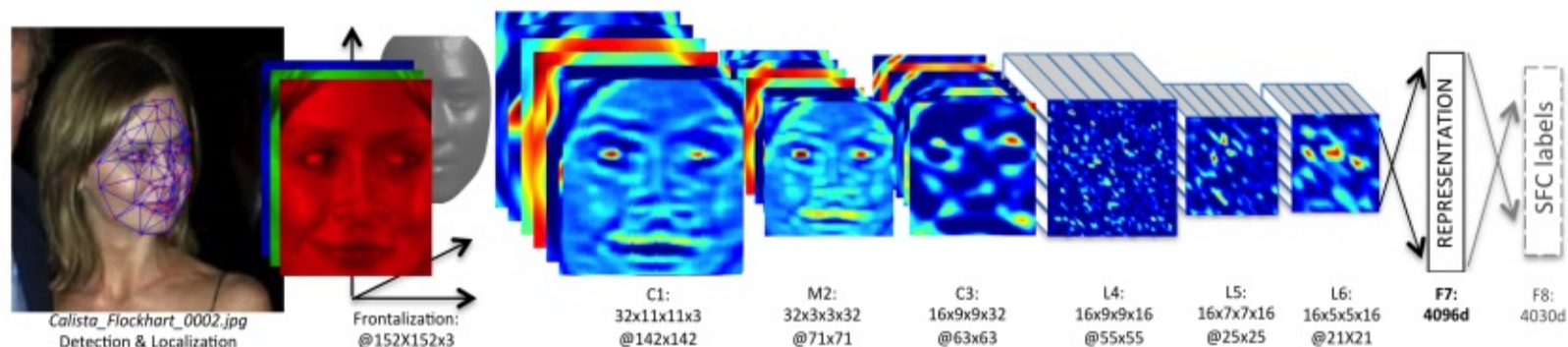
Best performance in ImageNet 2014 (ILSVRC-14)

CVPR, 2015

Convolutional Neural Net

Famous CNN architectures

DeepFace



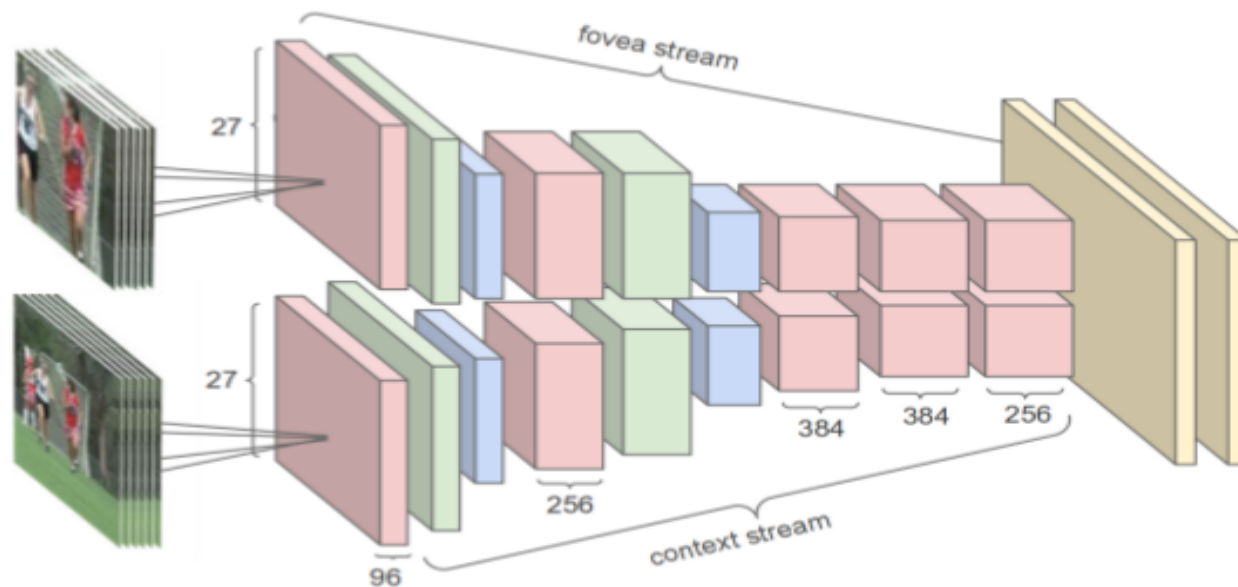
DeepFace: Closing the Gap to Human-Level Performance in Face Verification, CVPR-2014

<https://research.facebook.com/publications/480567225376225/deepface-closing-the-gap-to-human-level-performance-in-face-verification/>

Convolutional Neural Net

Famous CNN architectures

Large-Scale Video Classification with Convolutional Neural Networks

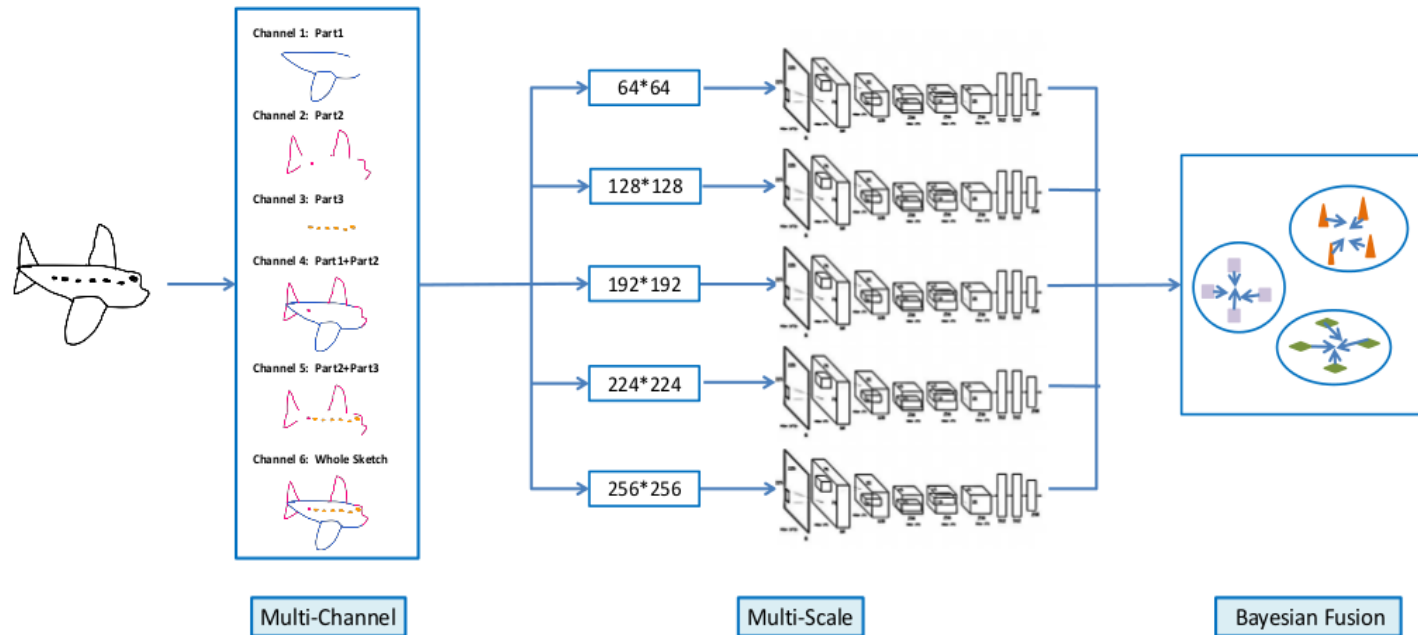


Andrej Karpathy, George Toderici, Sanketh Shetty, Thomas Leung, Rahul Sukthankar, and Li Fei-Fei. 2014. Large-Scale Video Classification with Convolutional Neural Networks. In Proceedings of the 2014 IEEE Conference on Computer Vision and Pattern Recognition (CVPR '14). IEEE Computer Society, Washington, DC, USA,

Convolutional Neural Net

Famous CNN architectures

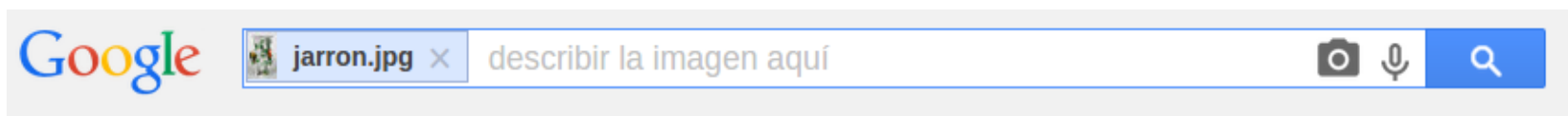
Sketch-a-Net: Sketch Classification



Sketch-a-Net that Beats Humans

YU, YANG, SONG, XIANG, HOSPEDALES
BMVC-2015

Content Based Image Retrieval



Web **Imágenes** Noticias Maps Más ▾ Herramientas de búsqueda

Imágenes visualmente similares

Notificar imágenes

Q:query



Content Based Image Retrieval

Search Products in Retail Catalogs



Content Based Image Retrieval

impresee.com/#/landing/home

Perspective Trans W 6.1 Implementati 2d mixture of gal Active Contours, SPARSE represen CS231n Convolut Unsupervised Fe

Impresee

Success Stories

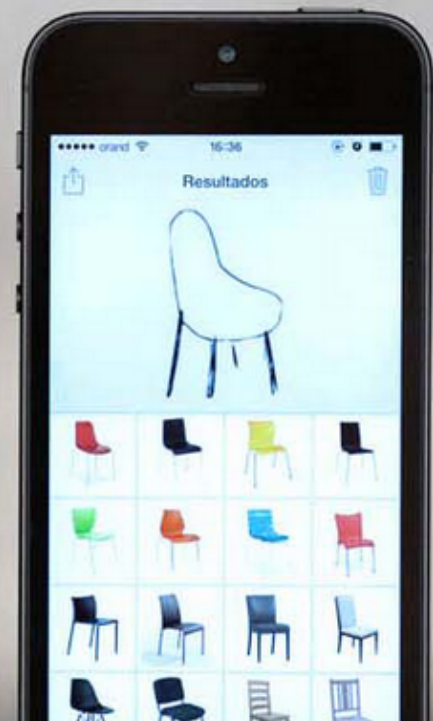
EN

impresee

Find what you see or imagine

Impresee lets you find those products you imagine or see. Draw or capture it with your smartphone and find it!

Try it Now!



Find the right products at the right time

Content Based Image Retrieval

Local Descriptors (SIFT, ...)

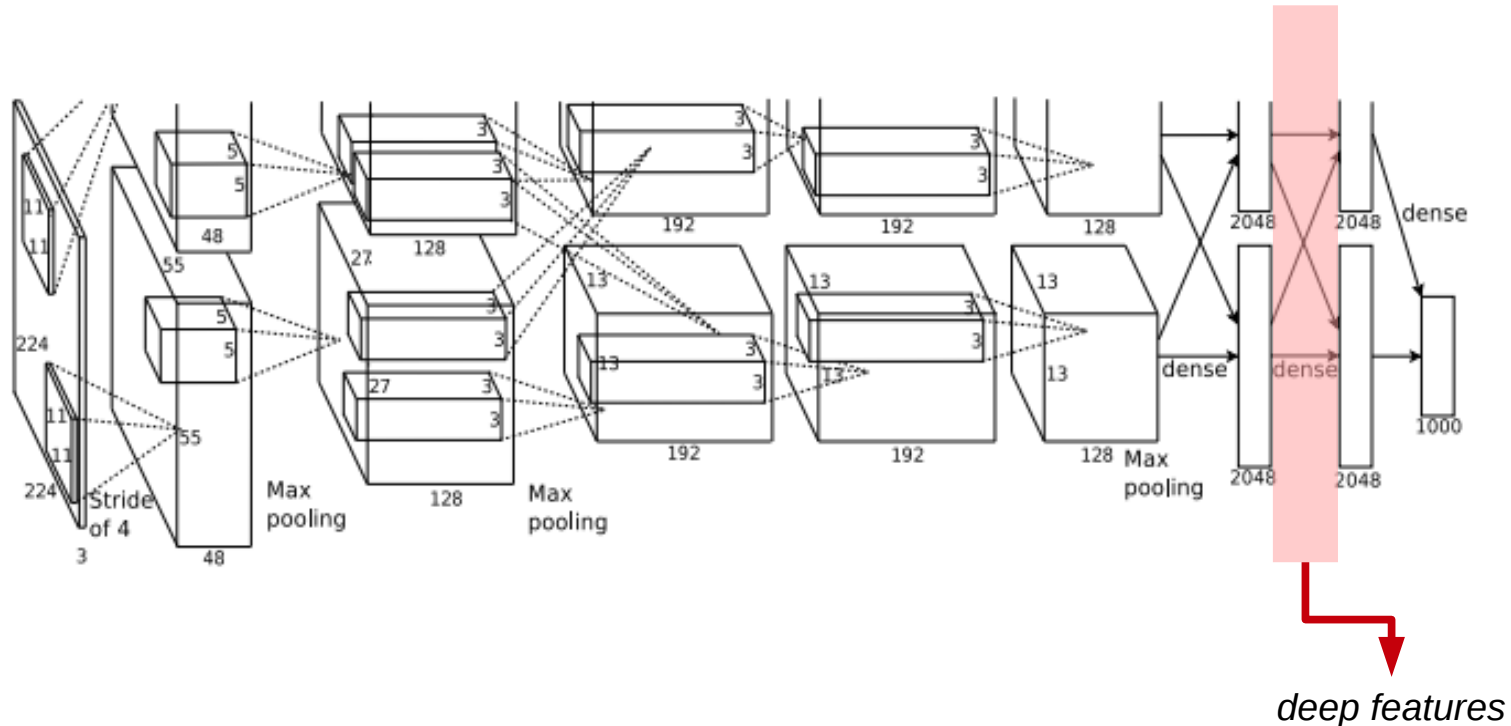
Bag of Features (BoF)

VLAD

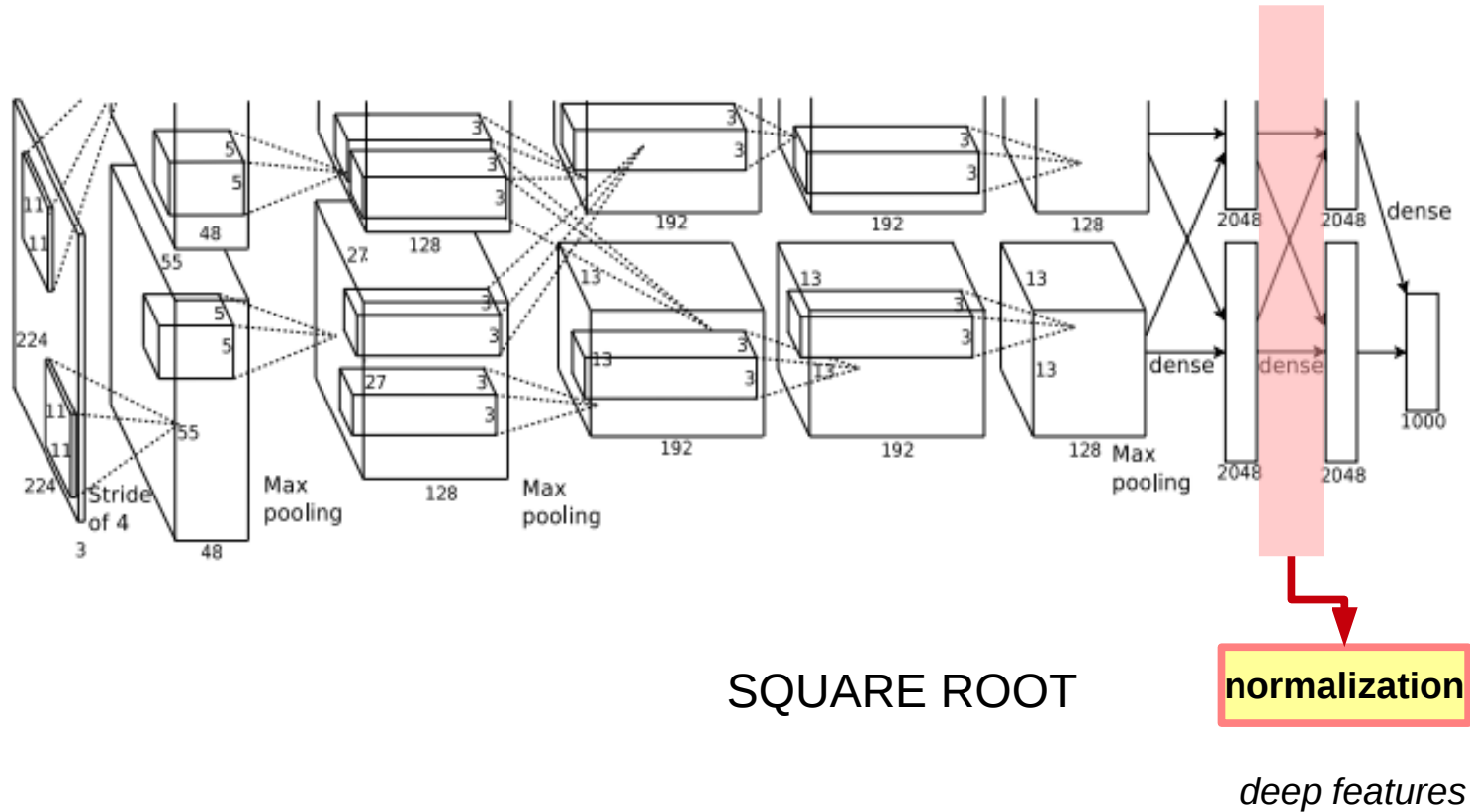
Fisher Vector

Triangulation embedding and democratic aggregation

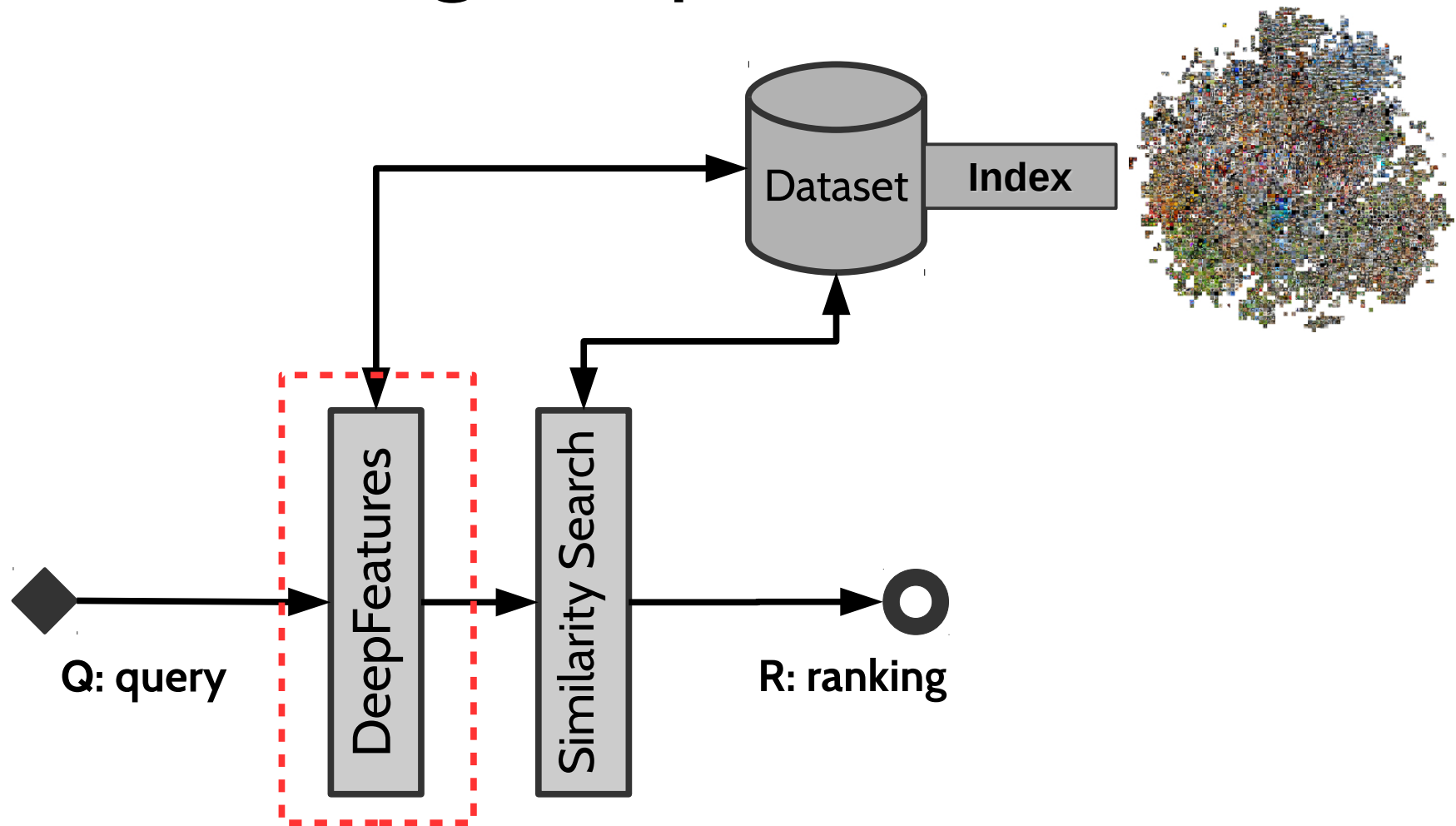
Content Based Image Retrieval using Deep Features



Content Based Image Retrieval using Deep Features

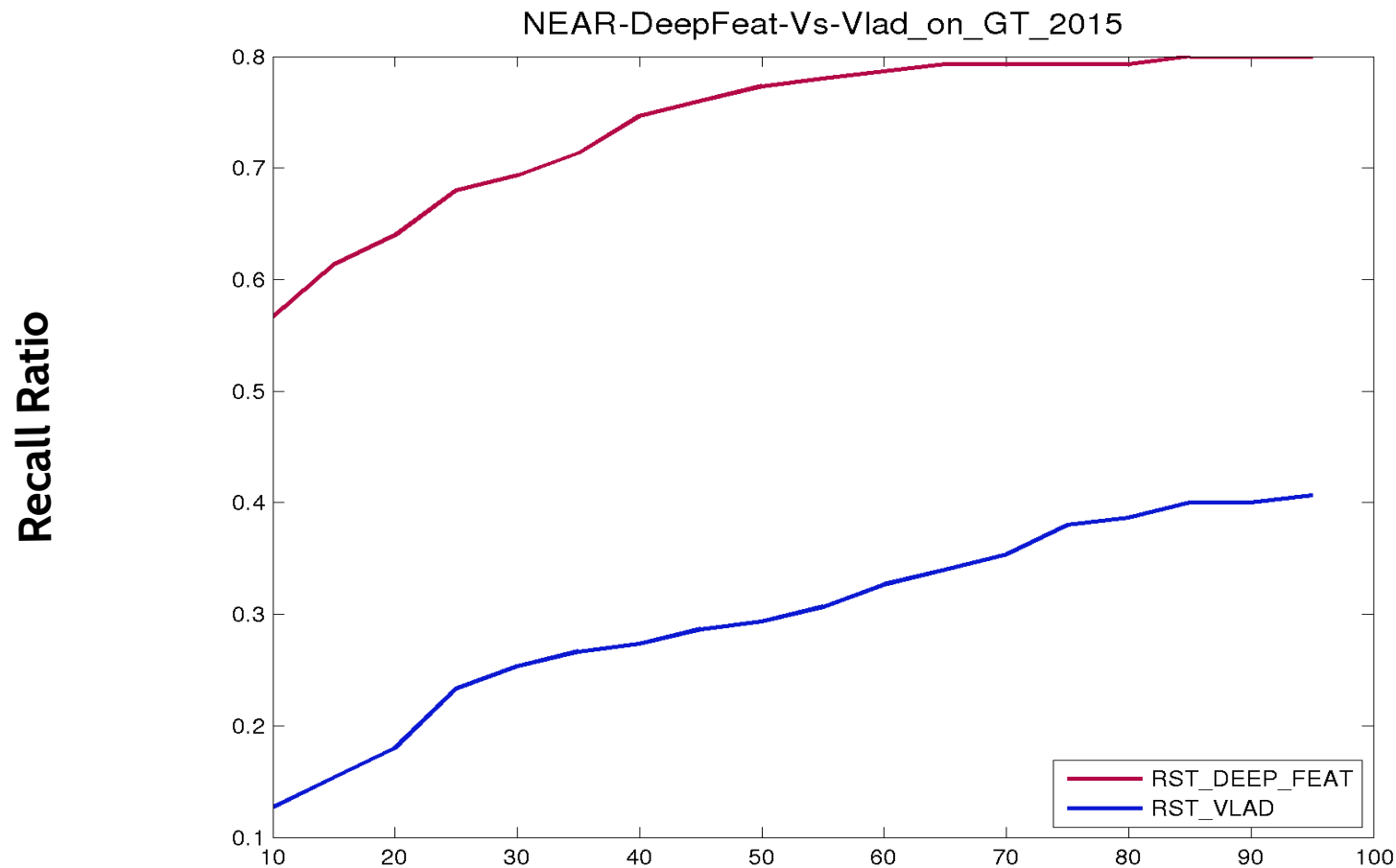


Content Based Image Retrieval using Deep Features

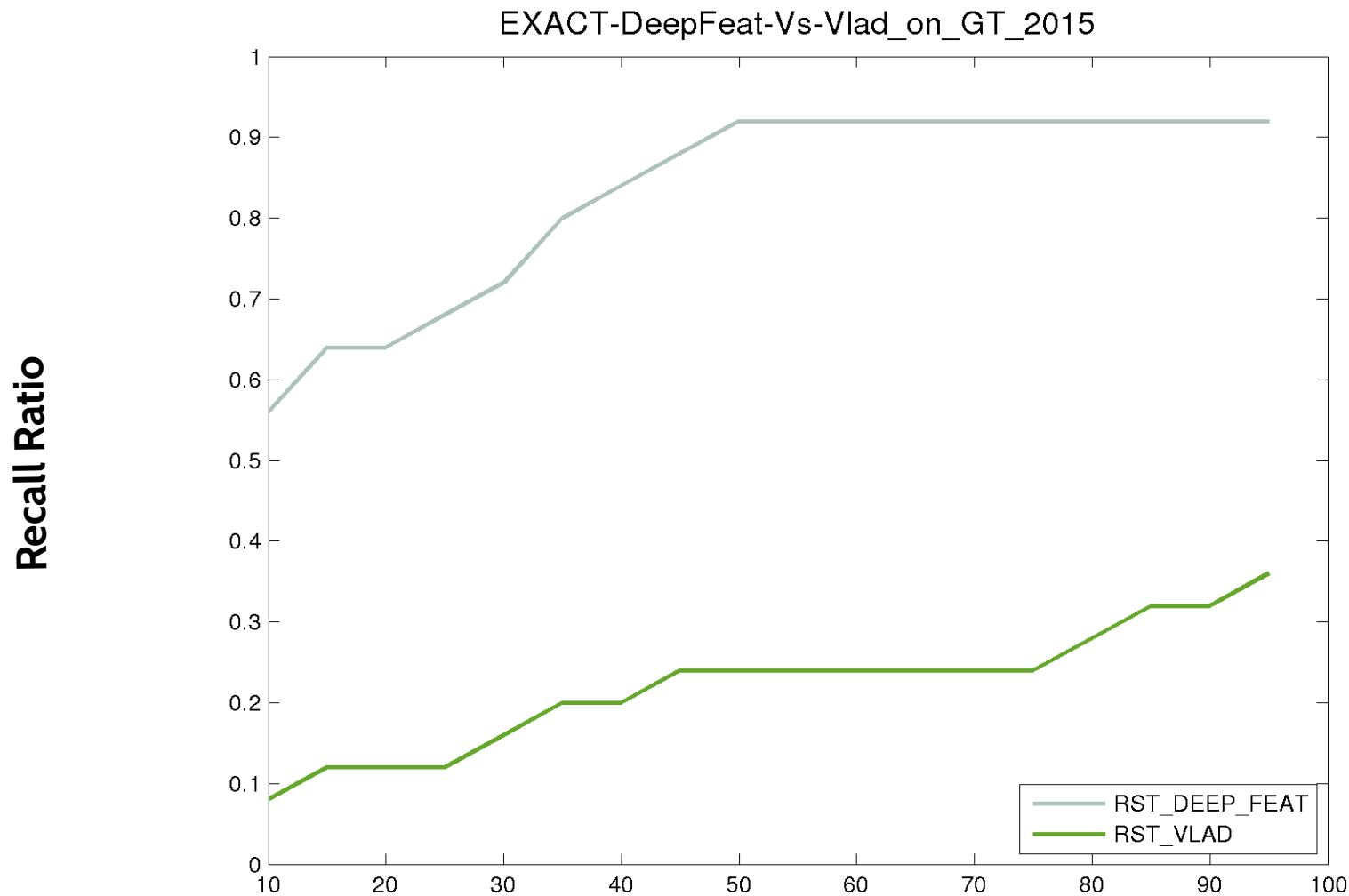


A large collection of small, tilted photographs arranged in a grid-like pattern. The photos depict various objects and scenes, including furniture (sofas, chairs, tables), kitchen items (cups, bowls, blenders), and everyday objects (scissors, a hot dog sign, a potted plant). The images are presented in a collage format, with each photo having a white border and being slightly rotated. The objects are diverse, ranging from a red cup to a potted plant, a hot dog sign, and a pair of scissors. The background is white, and the photos are arranged in a way that they overlap slightly, creating a dense visual field of everyday items.

Content Based Image Retrieval using Deep Features



Content Based Image Retrieval using Deep Features



Content Based Image Retrieval using Deep Features



CAMARA



SKU:

1837273

Categoría:

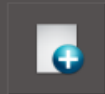
Sillas

Descripción:

Sillón Ejecutivo con masajeador negro
Genérico



CAMARA



SKU:

1738321

Categoría:

Comodas

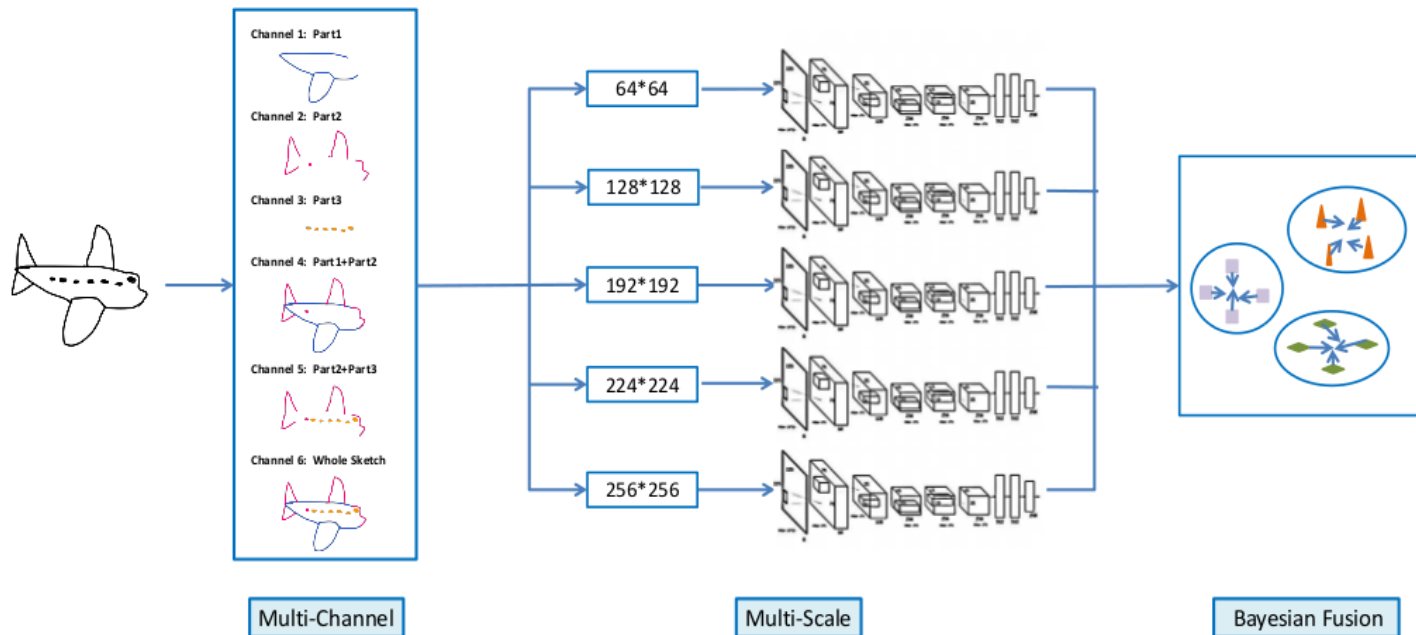
Descripción:

Cómoda 3 cajones 55x31x70 cm cedro
Tvilum



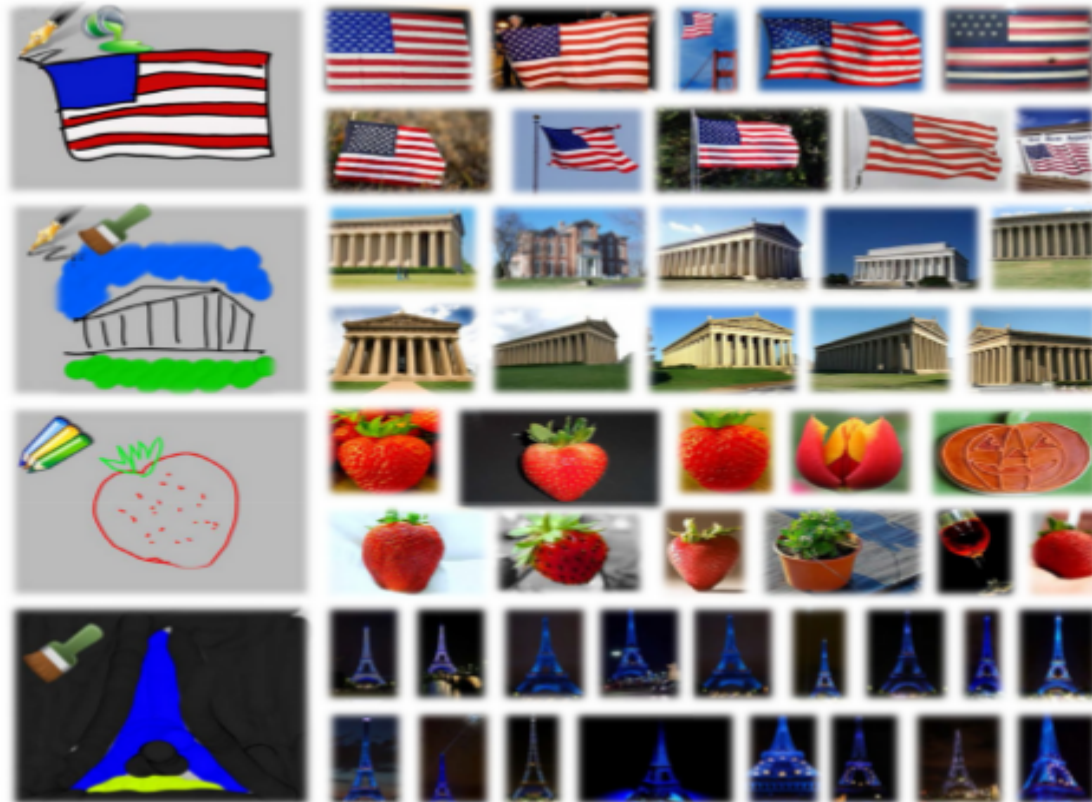
Current Research

Sketch Based Image Retrieval using DeepFeatures



Current Research

Sketch Based Image Retrieval with Color



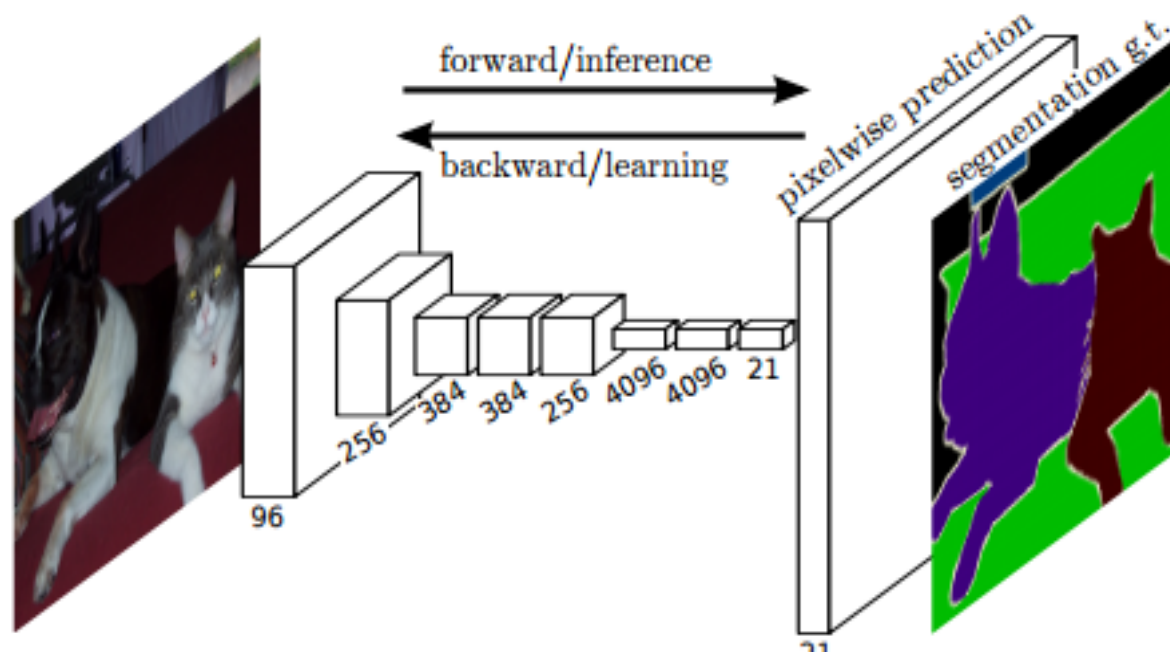
Current Research

Characterize the cases where deep features works



Current Research

Deep Learning for Segmentation



Current Research

One Shot Object Detection

