

The background of the slide features a dense, abstract pattern of small, semi-transparent colored circles. These circles are arranged in a grid-like fashion, creating a sense of depth and perspective as they appear to recede into the distance. The colors transition through various shades of blue, green, and white, with some red and orange hues visible at the bottom right corner.

CNN en RecetAI

Y como calcular los requisitos de
cualquier modelo para su
implementación

Fabian Trigo – PhD Física (CA)

Campos Receptivos

- David H. Hubel. (1959, 1959, 1969)
 - Estudia la respuesta neuronal de distintas figuras

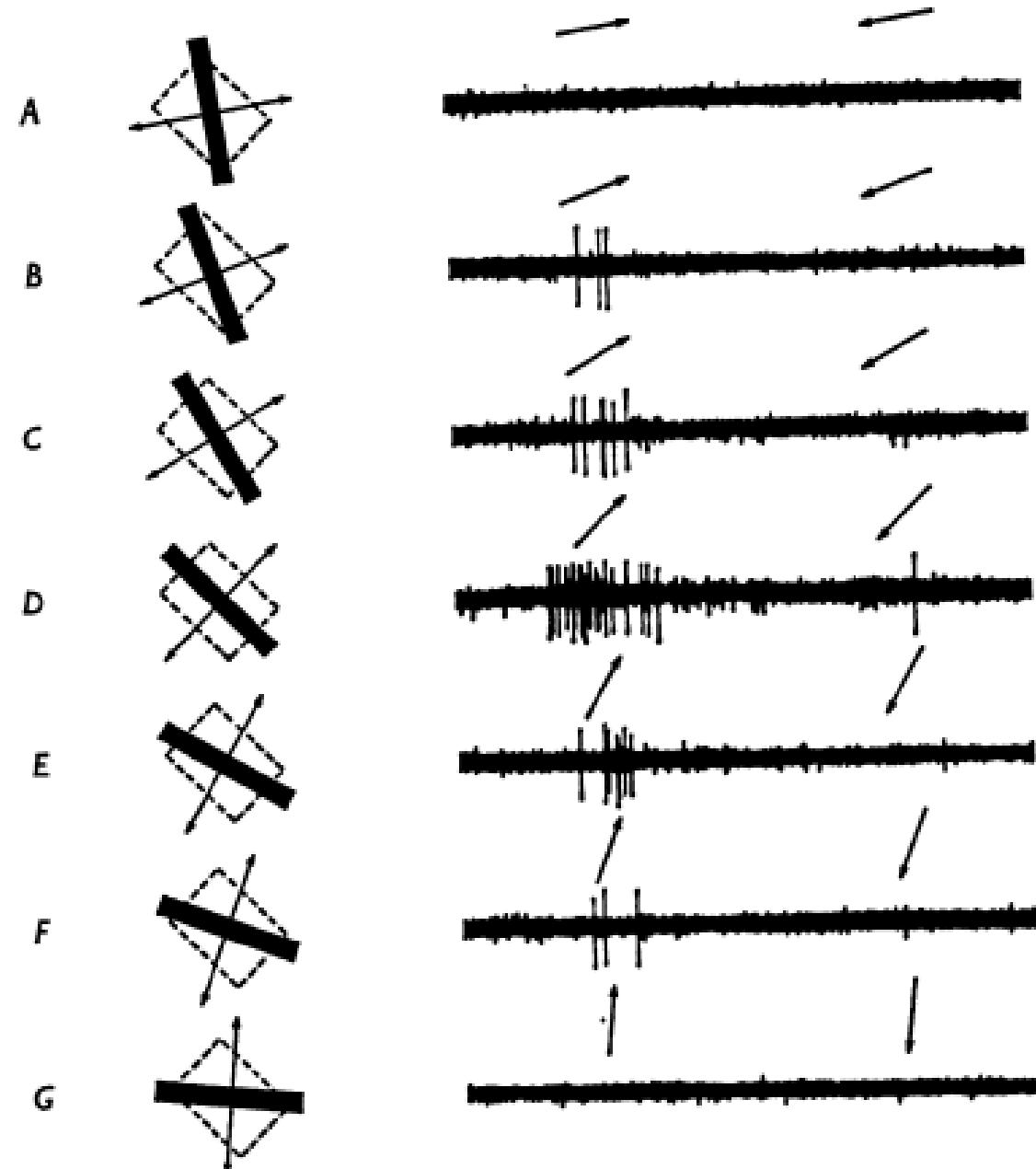
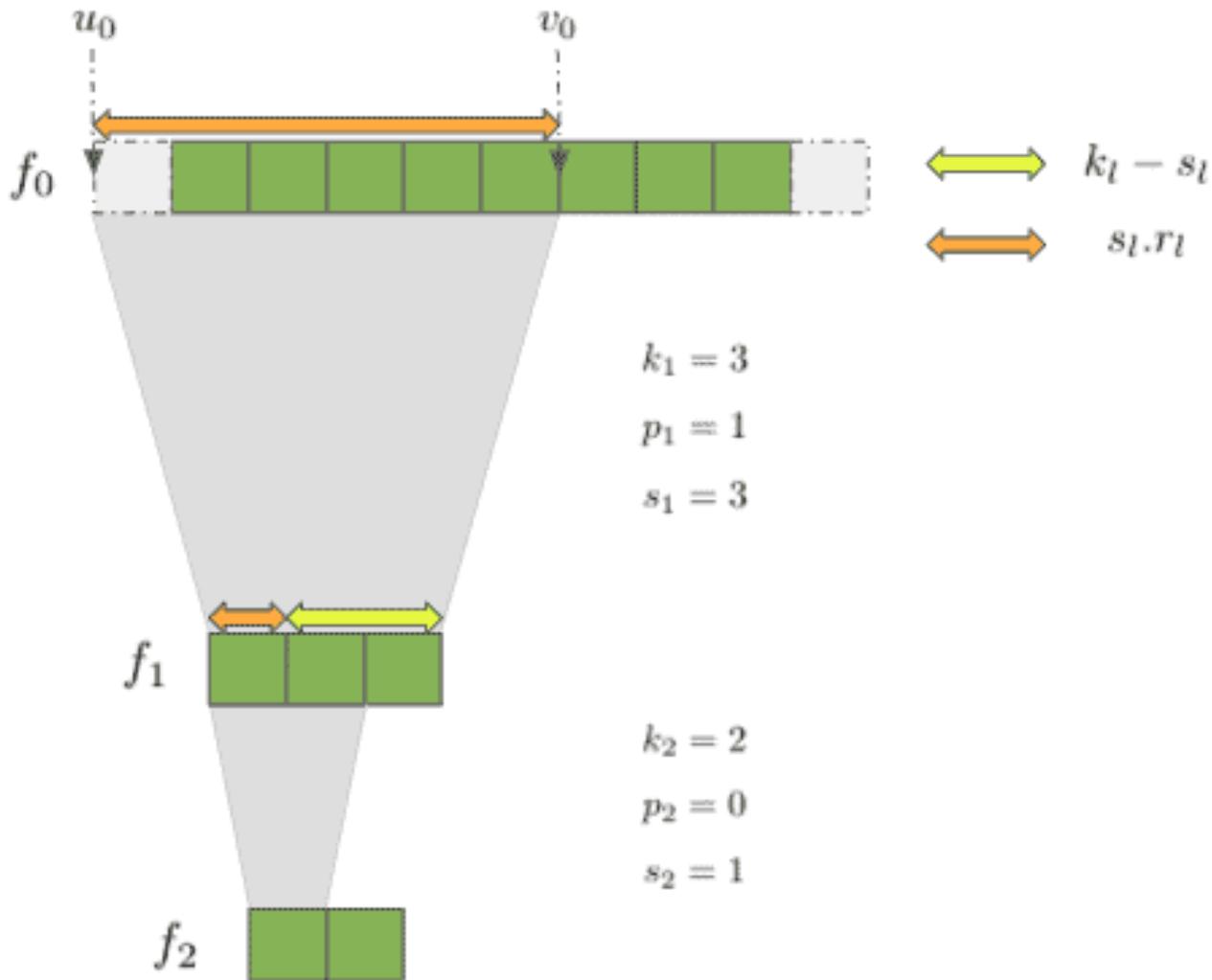


Fig. 2. Responses of a complex cell in right striate cortex (layer IV A) to various orientations of a moving black bar. Receptive field in the left eye indicated by dashed lines. Stimulus velocity 10°/sec. (Hubel and Wiesel, 1963).



- Fukushima K. Neocognitron: a self organizing neural network model for a mechanism of pattern recognition unaffected by shift in position. *Biol Cybern.* 1980;36(4):193-202. doi: 10.1007/BF00344251. PMID: 7370364.

Biol. Cybernetics 36, 193–202 (1980)

**Biological
Cybernetics**
© by Springer-Verlag 1980

Neocognitron: A Self-organizing Neural Network Model for a Mechanism of Pattern Recognition Unaffected by Shift in Position

Kuniyuki Fukushima

NHK Broadcasting Science Research Laboratories, Kinuta, Setagaya, Tokyo, Japan

Abstract. A neural network model for a mechanism of visual pattern recognition is proposed in this paper. The network is self-organized by “learning without a teacher”, and acquires an ability to recognize stimulus patterns based on the geometrical similarity (Gestalt) of their shapes without being affected by their positions. This network is given a nickname “neocognitron”. After completion of self-organization, the network has a structure similar to the hierarchy model of the visual

reveal it only by conventional physiological experiments. So, we take a slightly different approach to this problem. If we could make a neural network model which has the same capability for pattern recognition as a human being, it would give us a powerful clue to the understanding of the neural mechanism in the brain. In this paper, we discuss how to synthesize a neural network model in order to endow it an ability of pattern recognition like a human being.

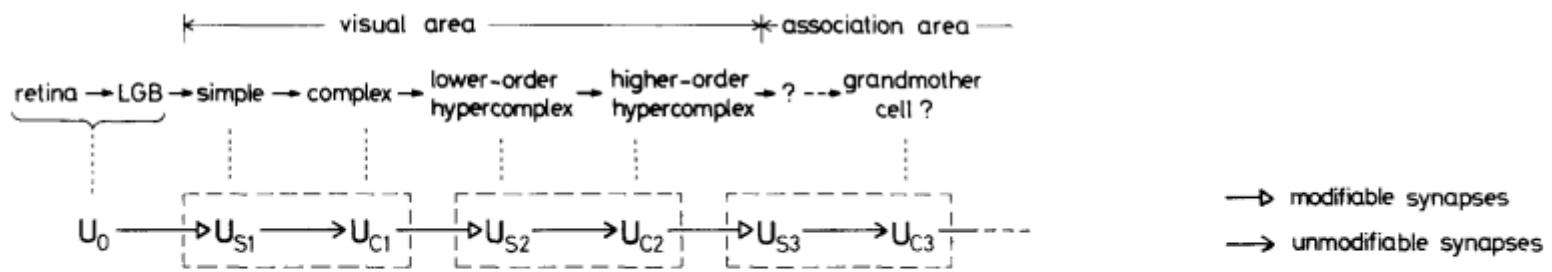


Fig. 1. Correspondence between the hierarchy model by Hubel and Wiesel, and the neural network of the neocognitron

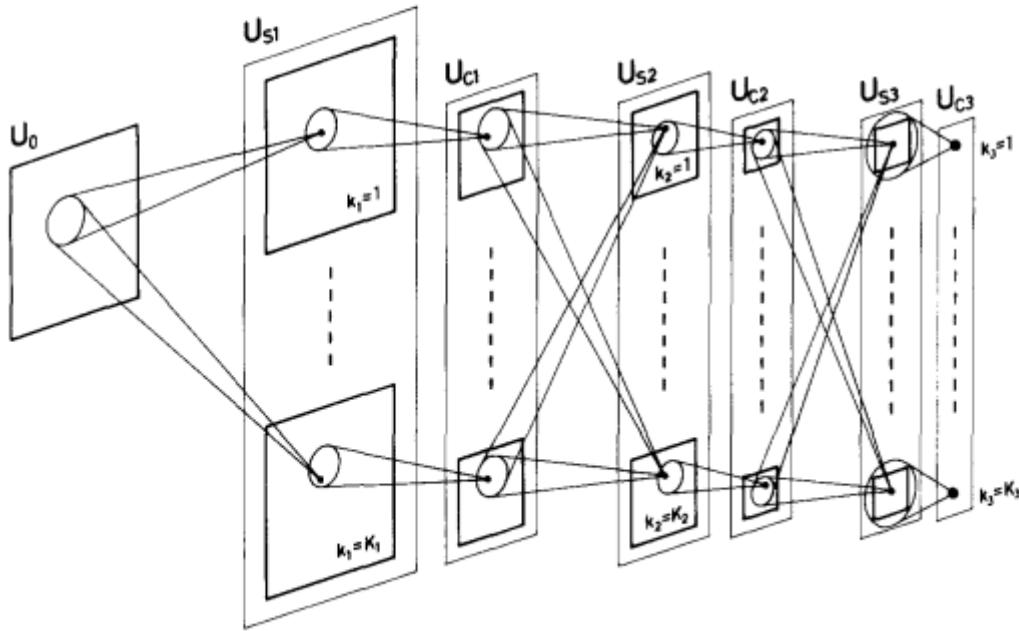


Fig. 2. Schematic diagram illustrating the interconnections between layers in the neocognitron

- Y. Lecun, L. Bottou, Y. Bengio and P. Haffner, "Gradient-based learning applied to document recognition," in Proceedings of the IEEE, vol. 86, no. 11, pp. 2278-2324, Nov. 1998, doi: 10.1109/5.726791.

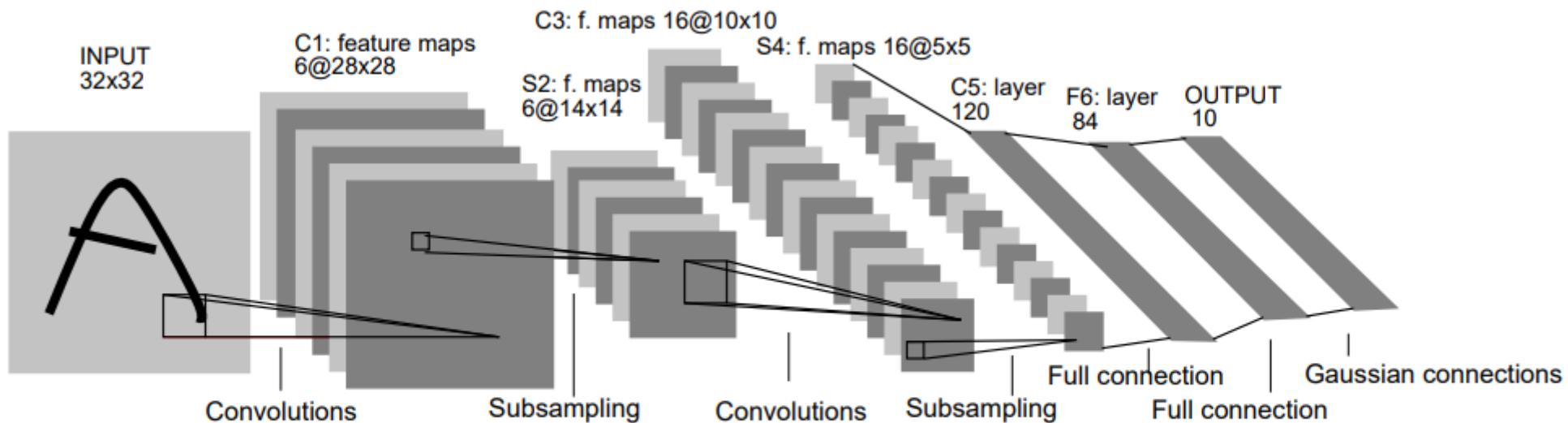
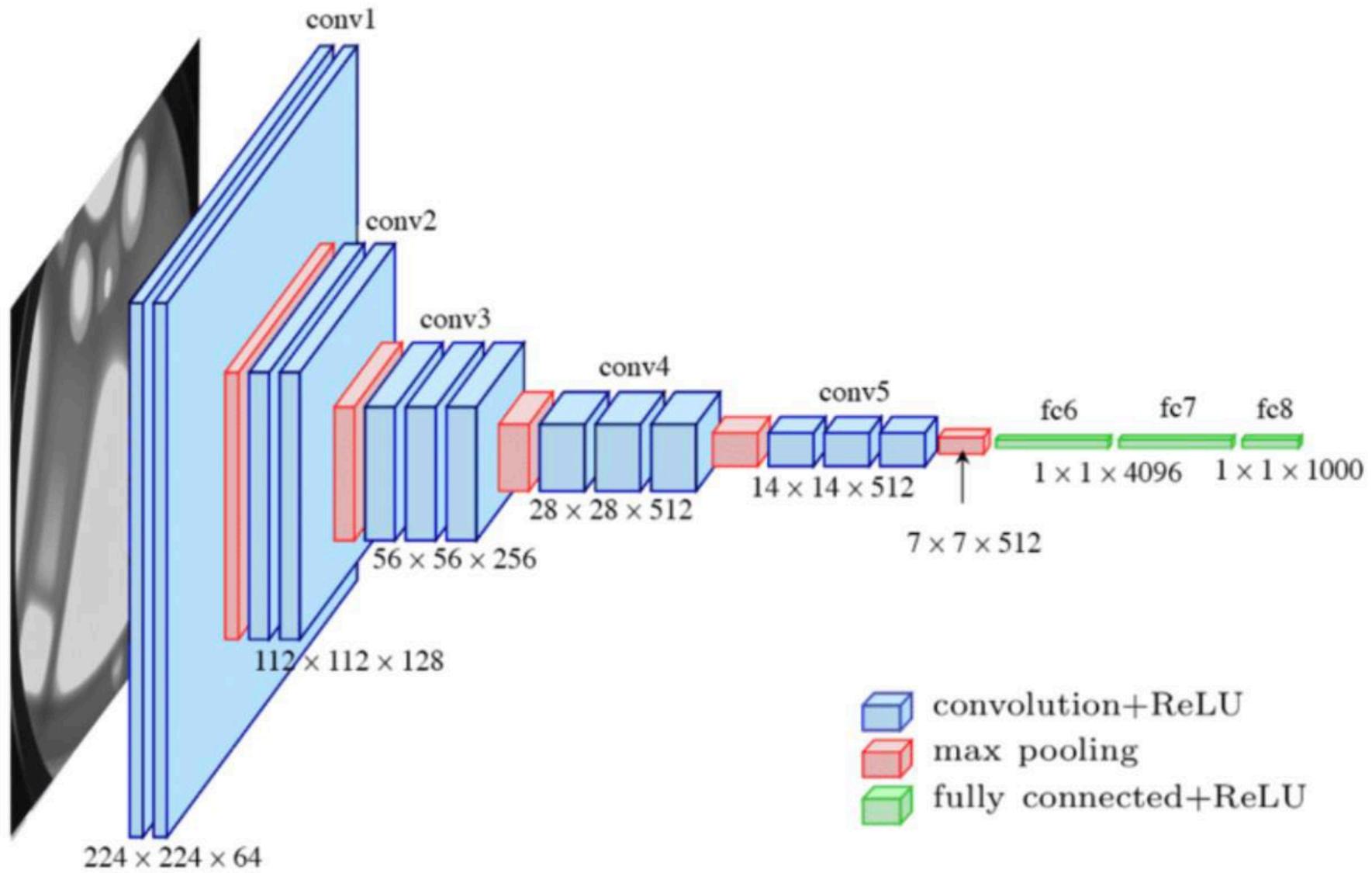
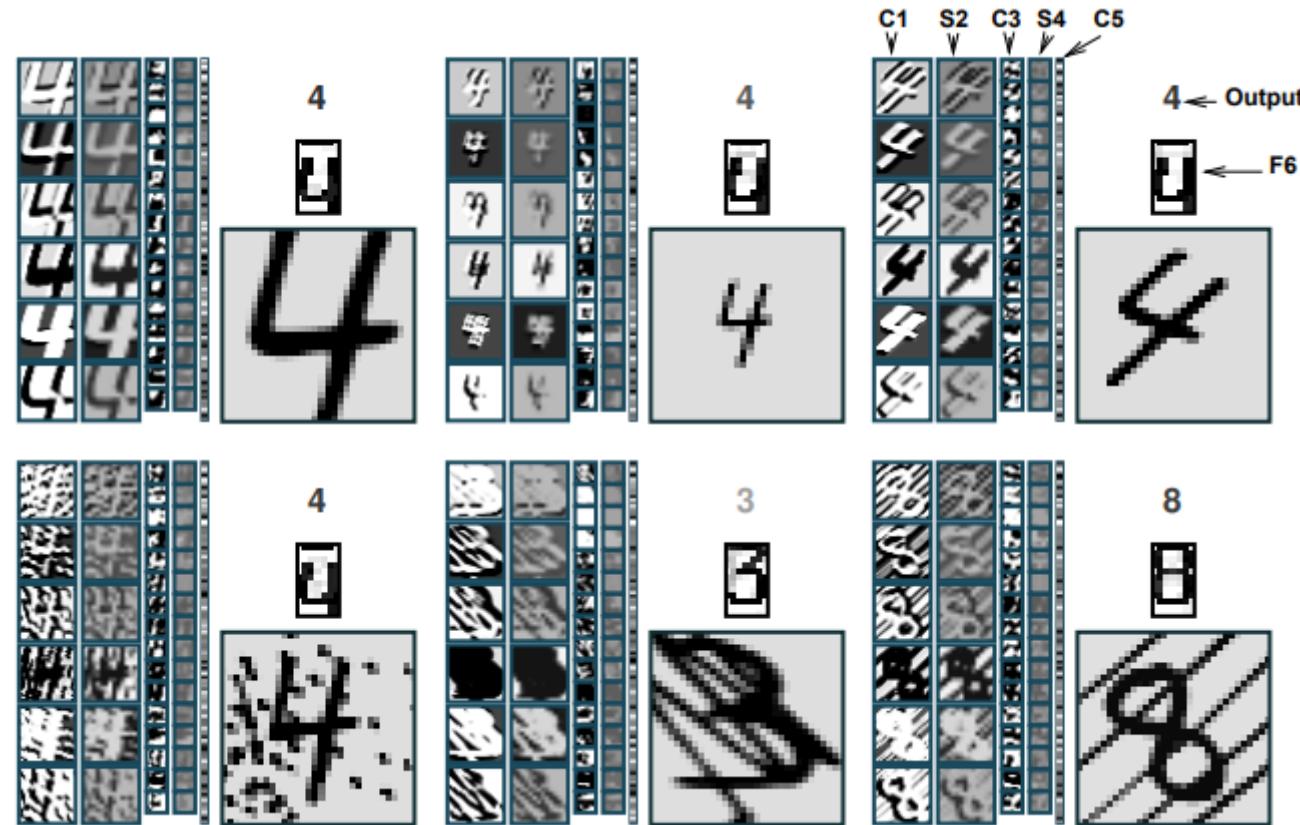


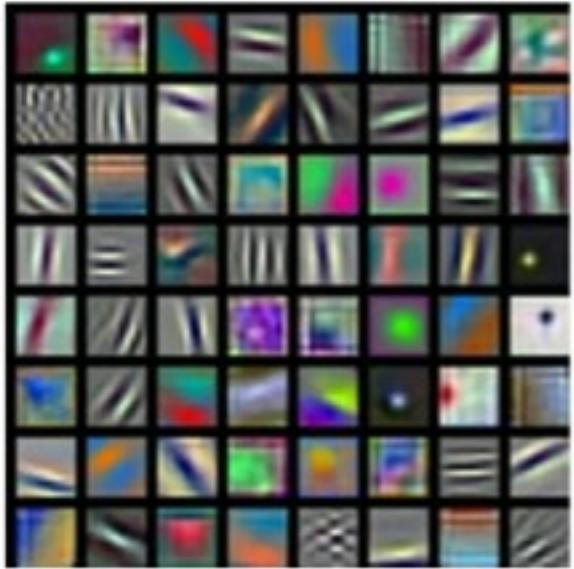
Fig. 2. Architecture of LeNet-5, a Convolutional Neural Network, here for digits recognition. Each plane is a feature map, i.e. a set of units whose weights are constrained to be identical.



LeNet5 y Filtros



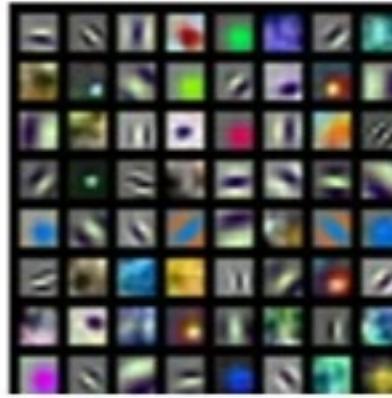
Filtros de la Primera Capa son menos abstractos



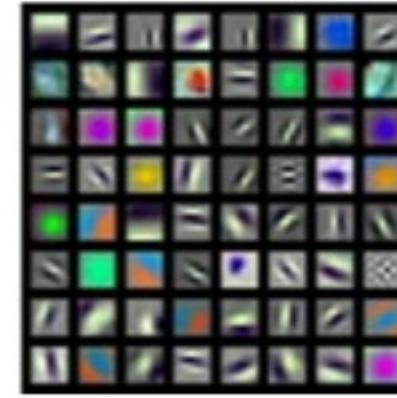
AlexNet:
 $64 \times 3 \times 11 \times 11$



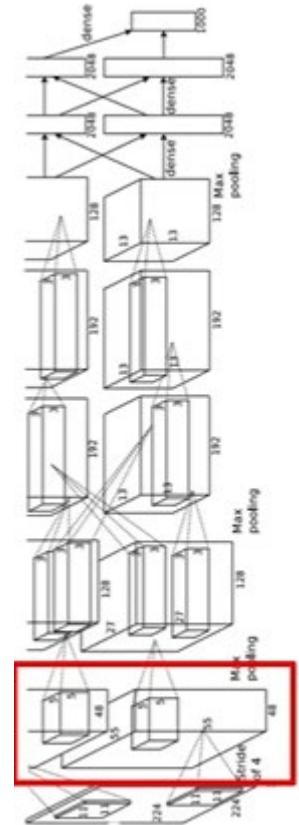
ResNet-18:
 $64 \times 3 \times 7 \times 7$



ResNet-101:
 $64 \times 3 \times 7 \times 7$



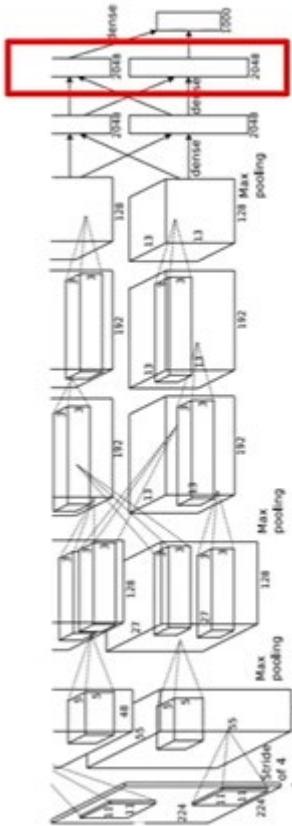
DenseNet-121:
 $64 \times 3 \times 7 \times 7$



Test image L2 Nearest neighbors in feature space

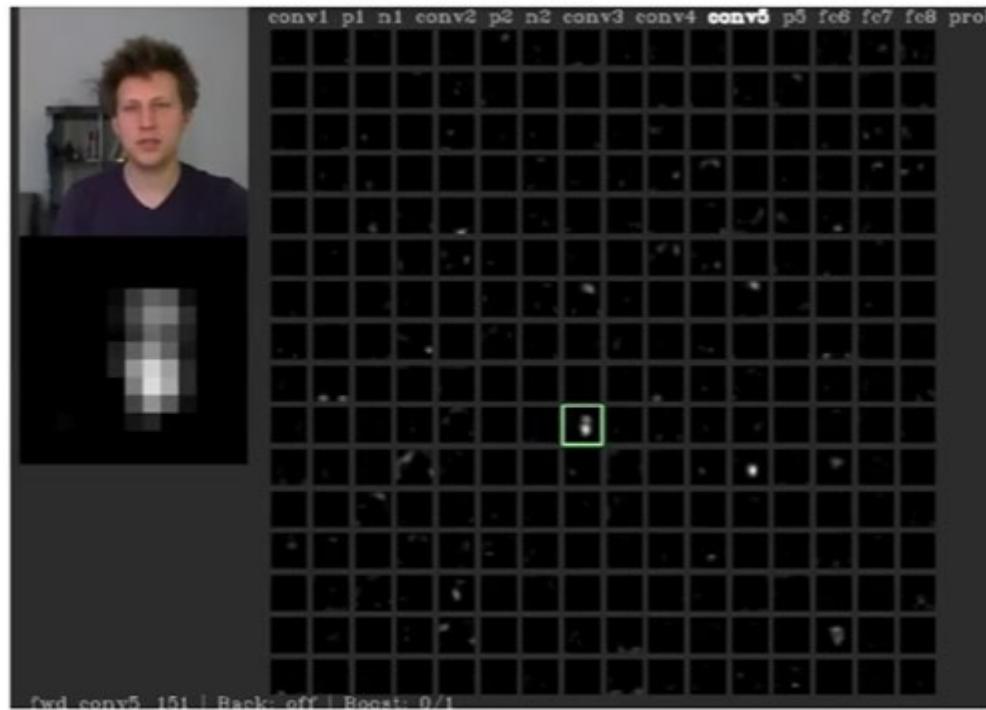


4096-dim vector



Features Abstractas correspondientes a caras

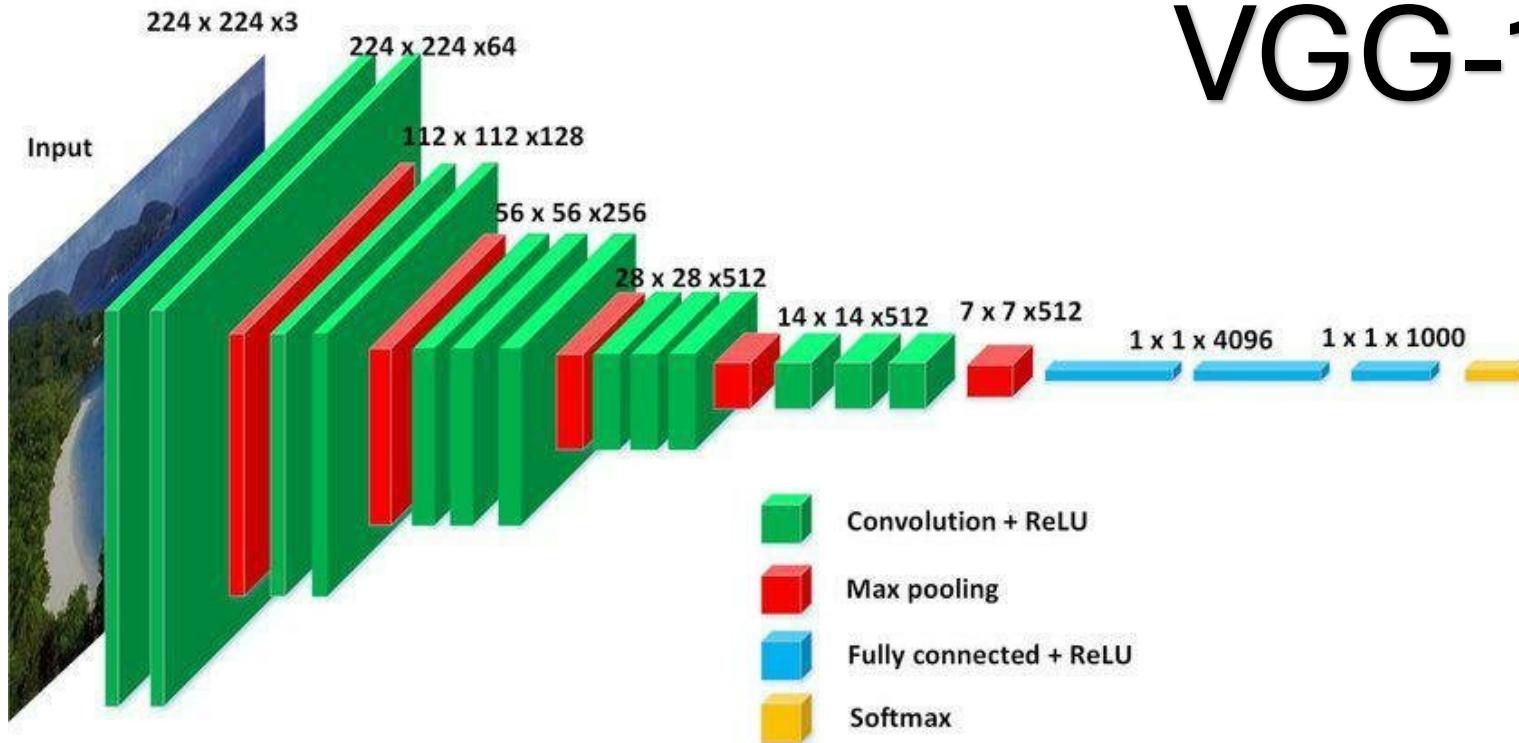
conv5 feature map is
128x13x13; visualize
as 128 13x13
grayscale images



Parches Maximamente Activos



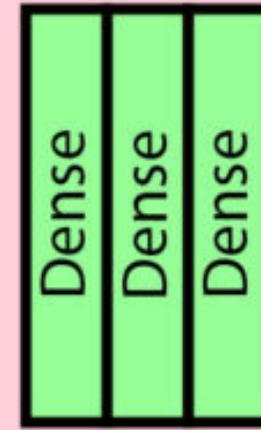
VGG-16



INPUT →

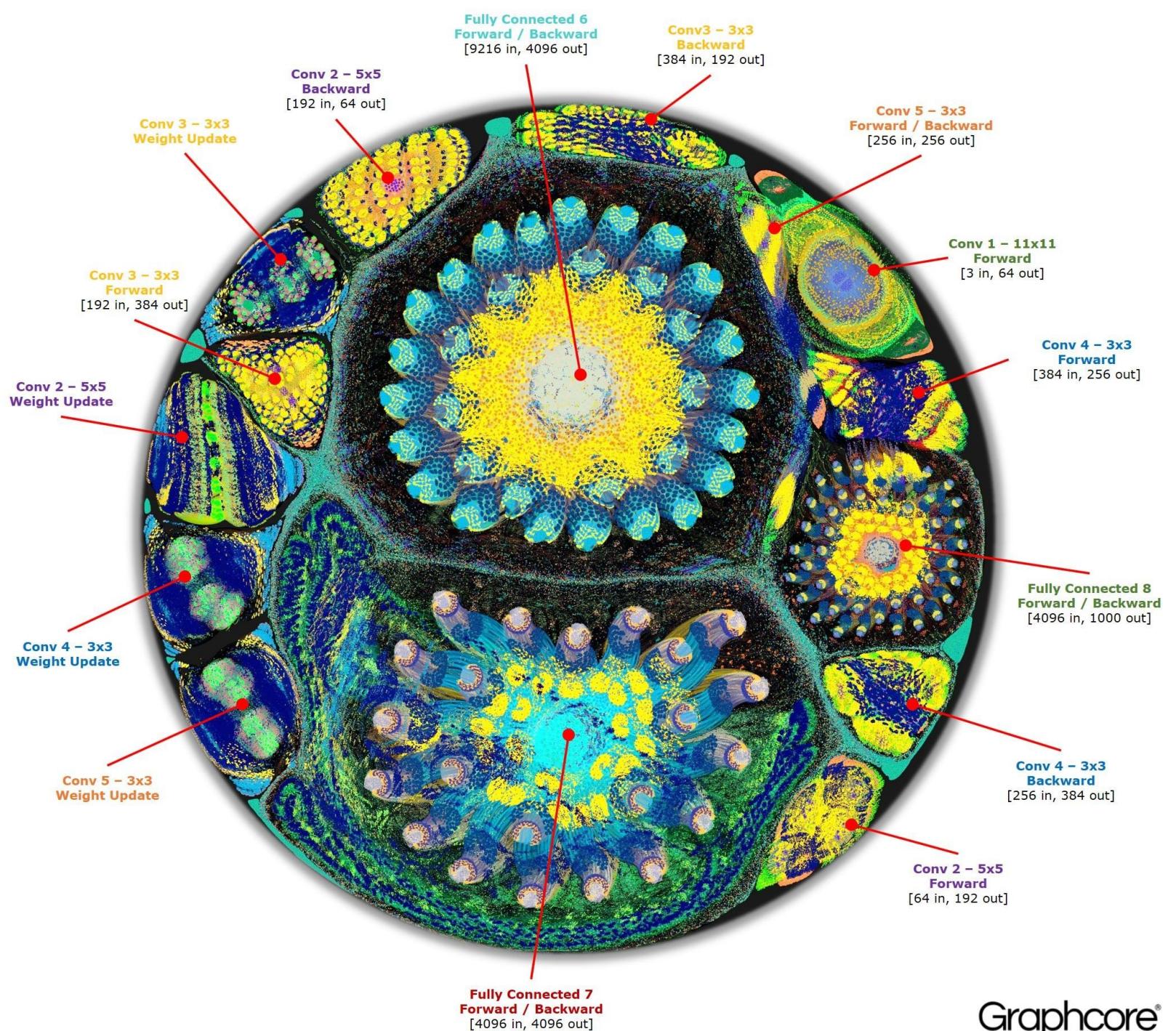


VGG - 16



→ **OUTPUT**







Tamaño en memoria RAM de una red

- Tengamos unos 32 bits de memoria, es lo default para muchos procesadores y el compilador muchas veces intenta hacer estas operaciones de forma eficiente
- A la hora de entrenar, toda la red debe alcanzar en la RAM
- A la hora de usar el modelo, inferencia, basta con que unas 2 capas quepan
- El objetivo es crear modelos que sean accesibles por la comunidad

AlexNet

Calculo de Tamaños de Capas

Calculo de Tamaños de Capas								Calculo Memoria RAM			Total RAM	
Nombre de Capa	Input Size				Output Size				Operaciones	16 bits [MB]	32 bits [MB]	
	Pixeles por lado	Canales input	Filtros	Kernel Size	Strides	padding	padding vali	padding san				
C1	227	3	96	11	4 valid	55	57	35428800	67.5750732	135.1501465	76.6541748	153.30835
S2	55	1		3	2 valid	27	28	0	0	0		
C3	27		256	5	1 same	23	27	3521024	6.71582031	13.43164063	Inferencia RAM	
S4	27			3	2 valid	13	14	0	0	0	16 bits [MB]	32 bits [MB]
C5	13		384	3	1 same	11	13	464640	0.88623047	1.772460938	67.5750732	135.150146
C6	13		384	3	1 same	11	13	464640	0.88623047	1.772460938		
C7	13		256	3	1 same	11	13	309760	0.59082031	1.181640625		
S8	13			3	2 valid	6	7	0	0	0		
F9	6				1	7	6	0	0	0		
F10					1	1	0	0	0	0		
Out					1	1	0	0	0	0	0	
								0	0	0		

LeNet

Calculo de Tamaños de Capas

Labeling de Datos

Open Source **Data Labeling** Platform

The most flexible data labeling platform to fine-tune LLMs, prepare training data or validate AI models.

[Quick Start](#)[!\[\]\(8bbc1f1299a246c196d33c27b686a2d7_img.jpg\) Join Community](#)

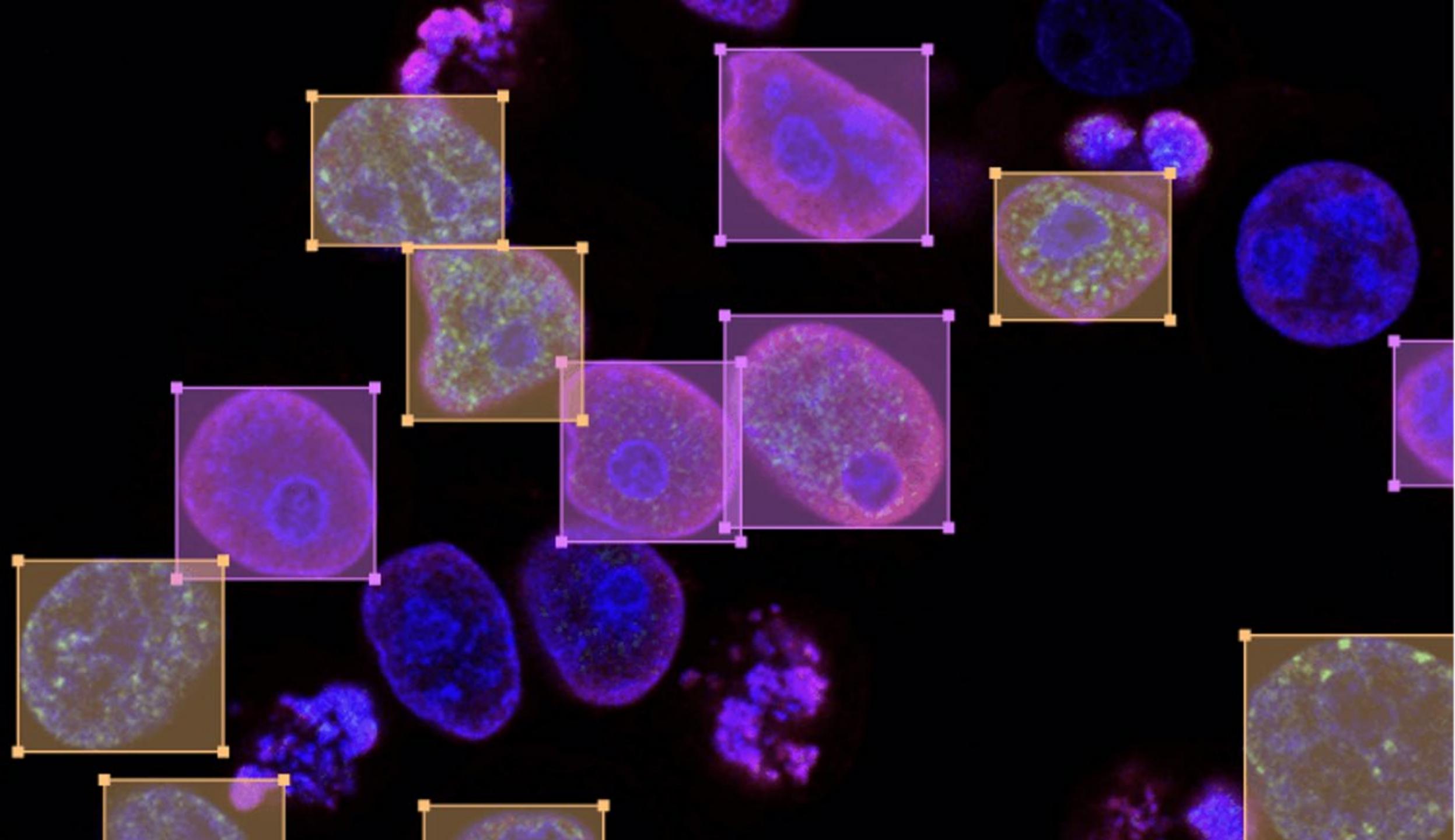
LAST COMMIT: JULY 17, 2024 | LATEST VERSION: 1.12.1

Quick Start

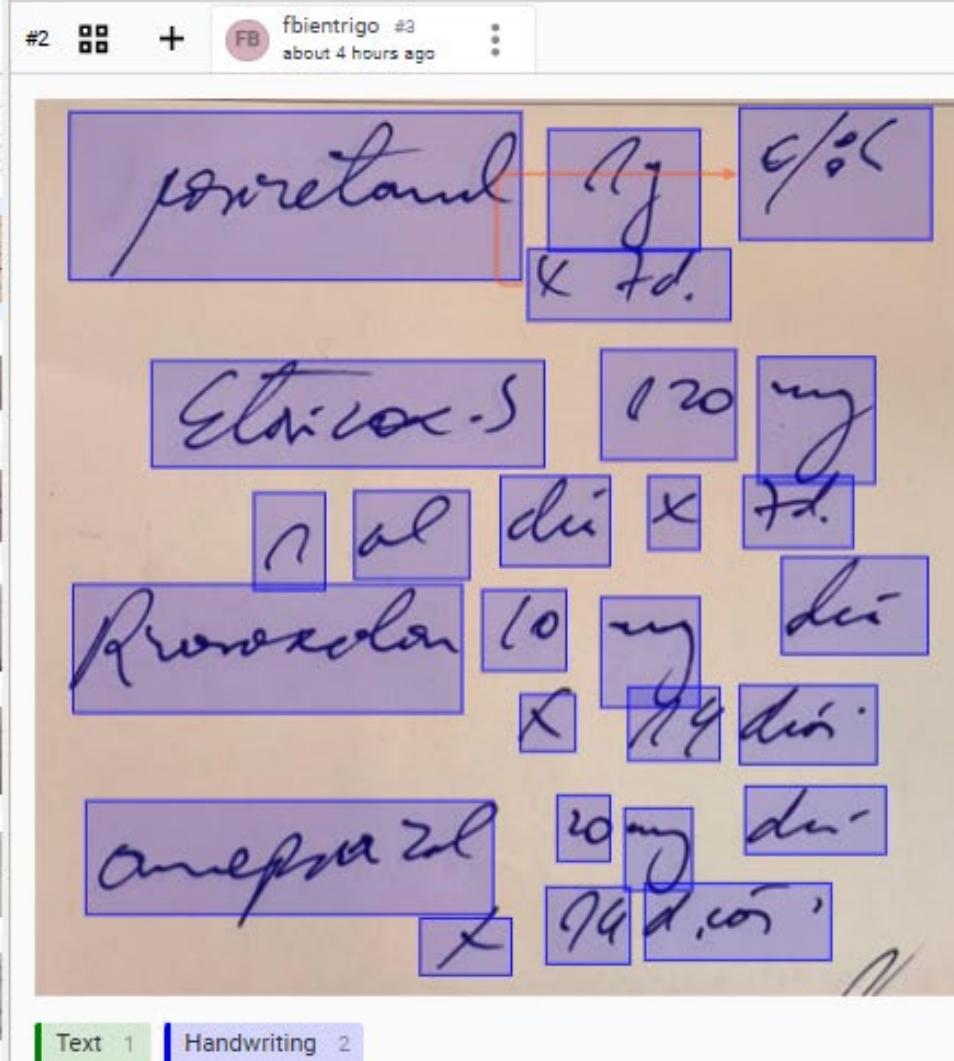
PIP BREW GIT DOCKER

```
1 # Install the package  
# into python virtual environment  
2 pip install -U label-studio  
3  
4 # Launch it!  
5 label-studio
```





	Upload filename		
<input type="checkbox"/>	4fa171a8-24050301x.png	2	</>
<input type="checkbox"/>	0b5c6446-24050302x.png	1	</>
<input type="checkbox"/>	1e54c351-24050303x.png	0	</>
<input type="checkbox"/>	be40fdf3-24050304x.png	0	</>
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<input type="checkbox"/>	0ff80903-24050309x.png	0	</>
<input type="checkbox"/>	0973ae45-24050310x.png	0	</>



Text 1 Handwriting 2

Update

Info History

Selection Details

Regions Relations

Manual By Time ↑ ↻

1 Handwriting
paracetamol

2 Handwriting
1g

3 Handwriting
c/8h

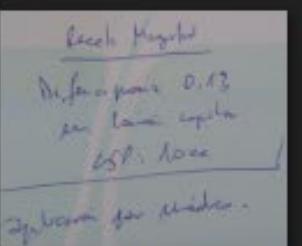
4 Handwriting



240517.rar



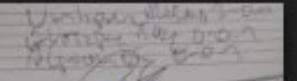
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24050201x.jpeg



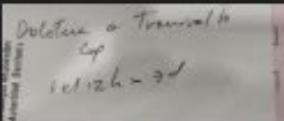
24050202.txt



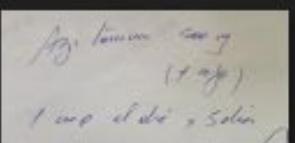
24050202x.jpeg



24050203.txt



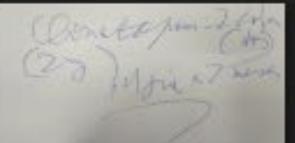
24050203x.jpeg



24050204x.jpeg



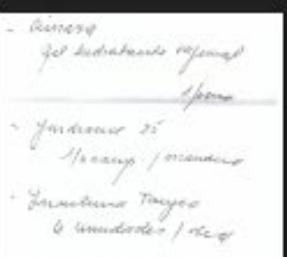
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24050205x.jpeg



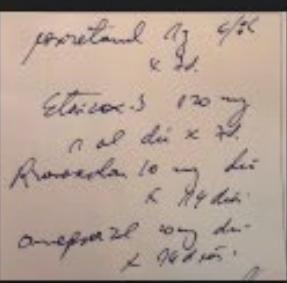
24050301.txt



24050301x.png



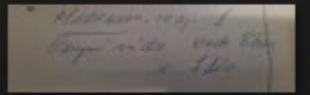
24050302.txt



24050302x.png



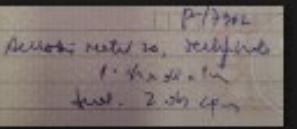
24050303.txt



24050303x.png



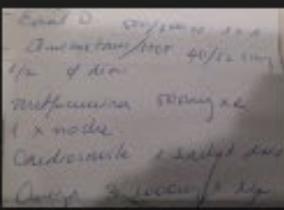
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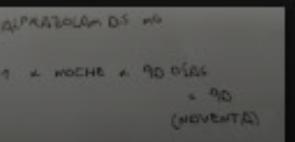
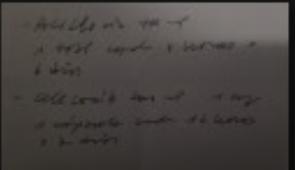
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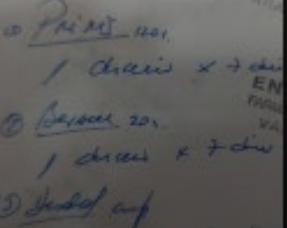
24050305.txt



24050305x.png



24050307x.png



24050308x.png



24050309.txt

Datasets > 24050203.txt

1 Doloten o Tramavolta
2 comp
3 1 c/ 12h x 7 d

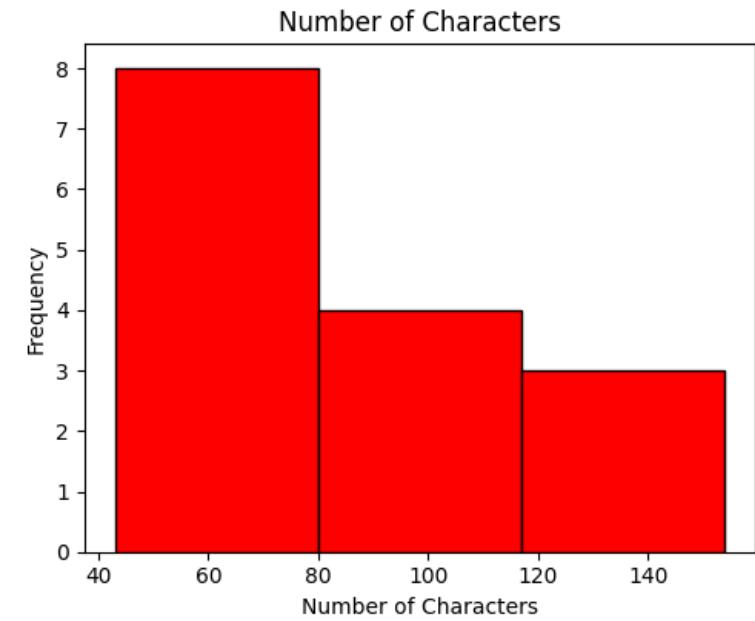
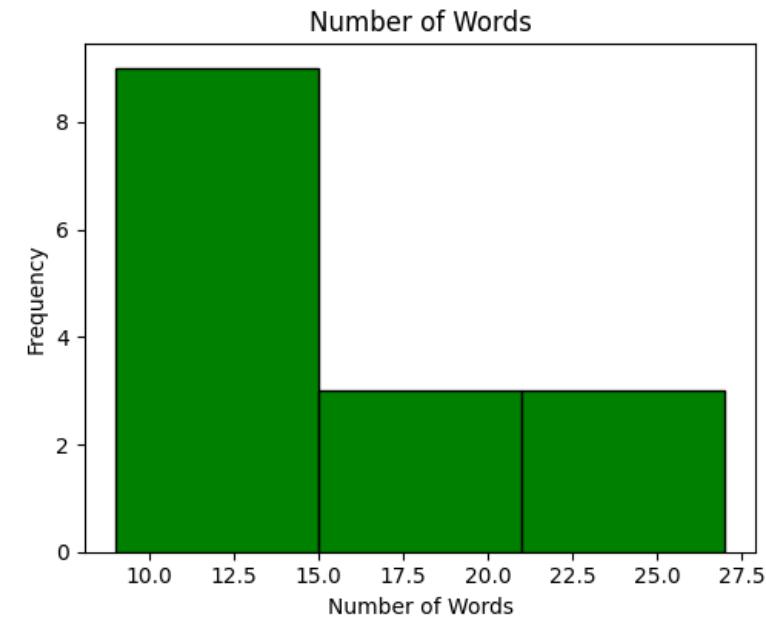
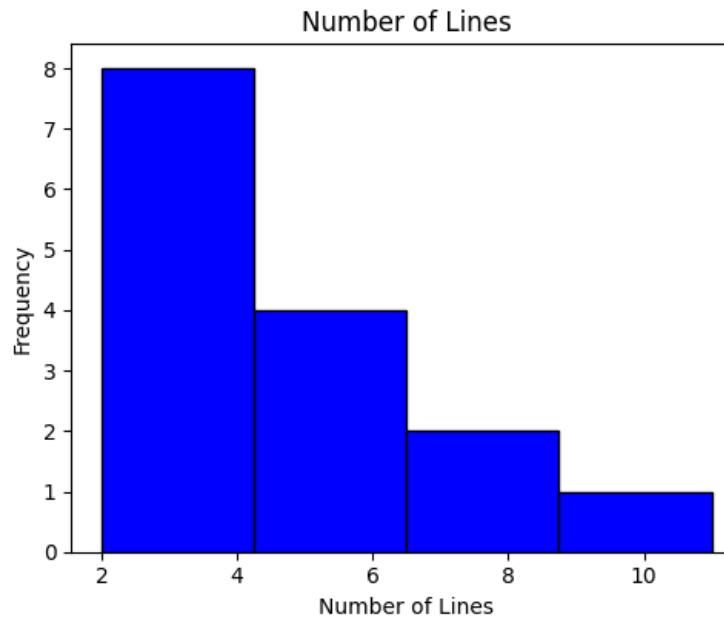
Datasets > 24050202.txt

1 Venlafaxina XR75MG 2-0-0
2 QUETiapina 1mg 0-0-1
3 Alprazolam 0,5mg 0-0-1

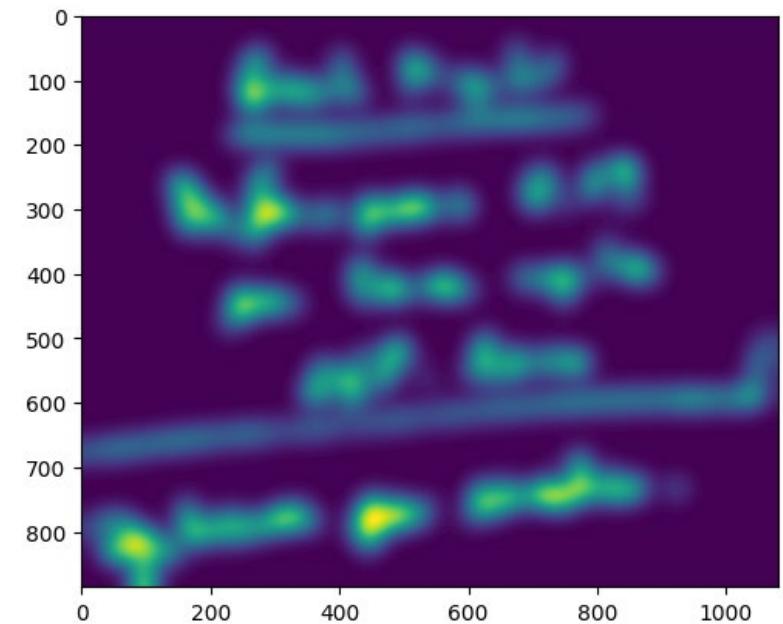
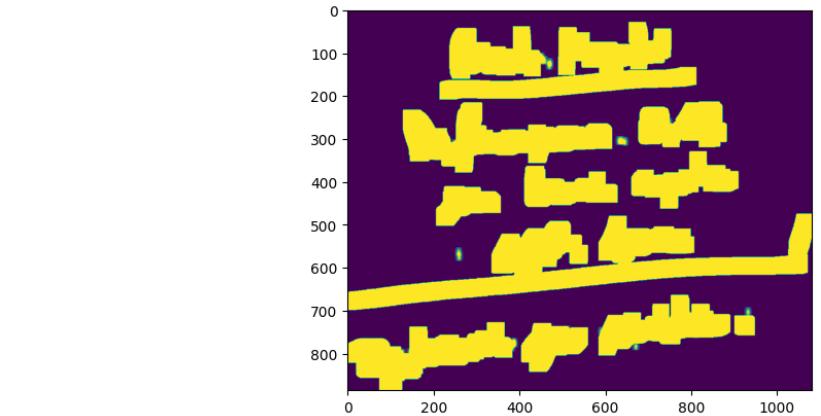
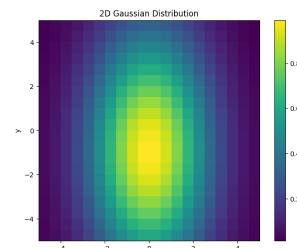
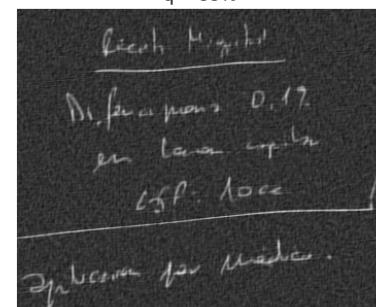
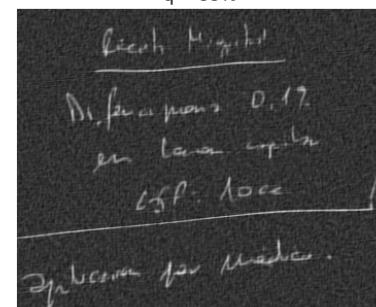
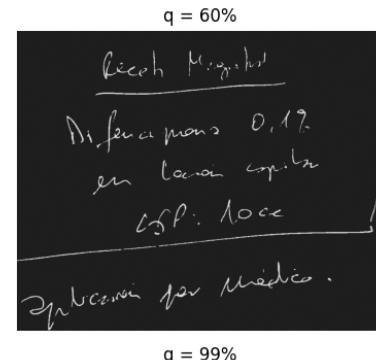
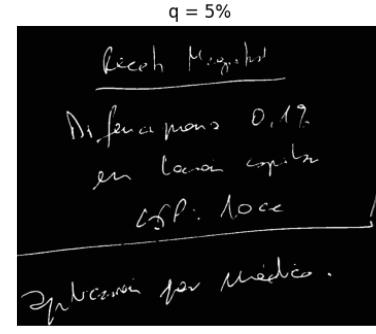
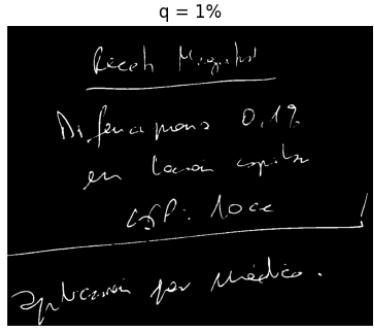
Datasets > 24050201.txt

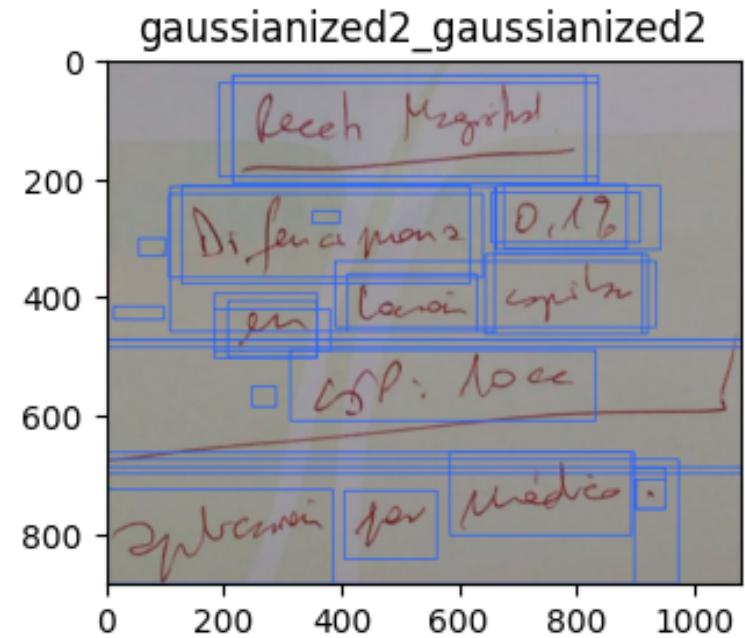
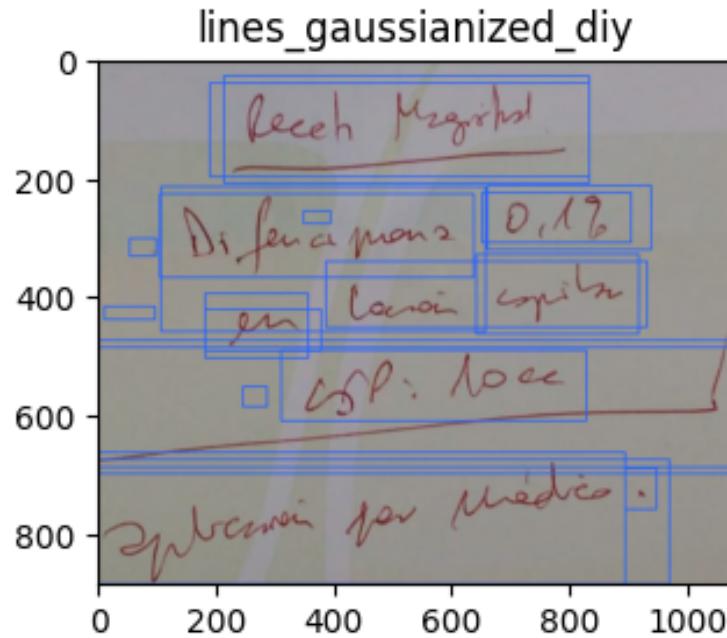
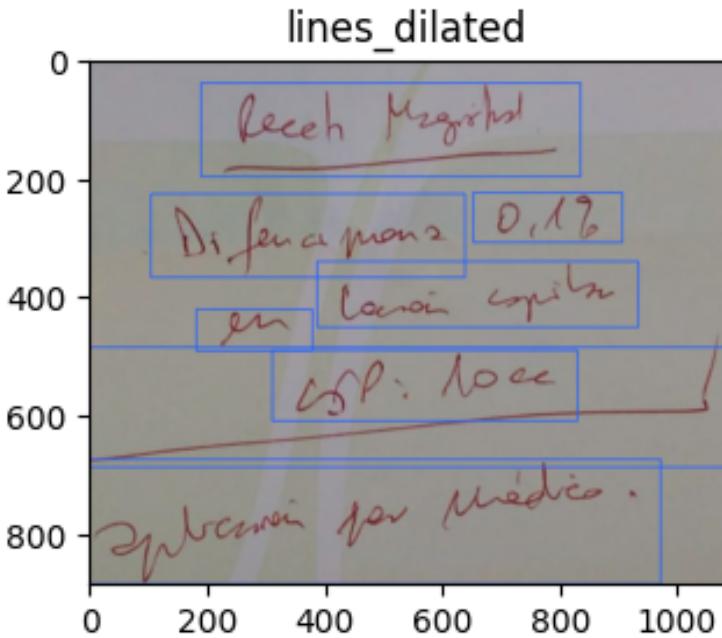
1 Receta Magistral
2 Difenciprona 0,1%
3 en loción capilar
4 csp: 10cc
5 Aplicación por Médico .
6

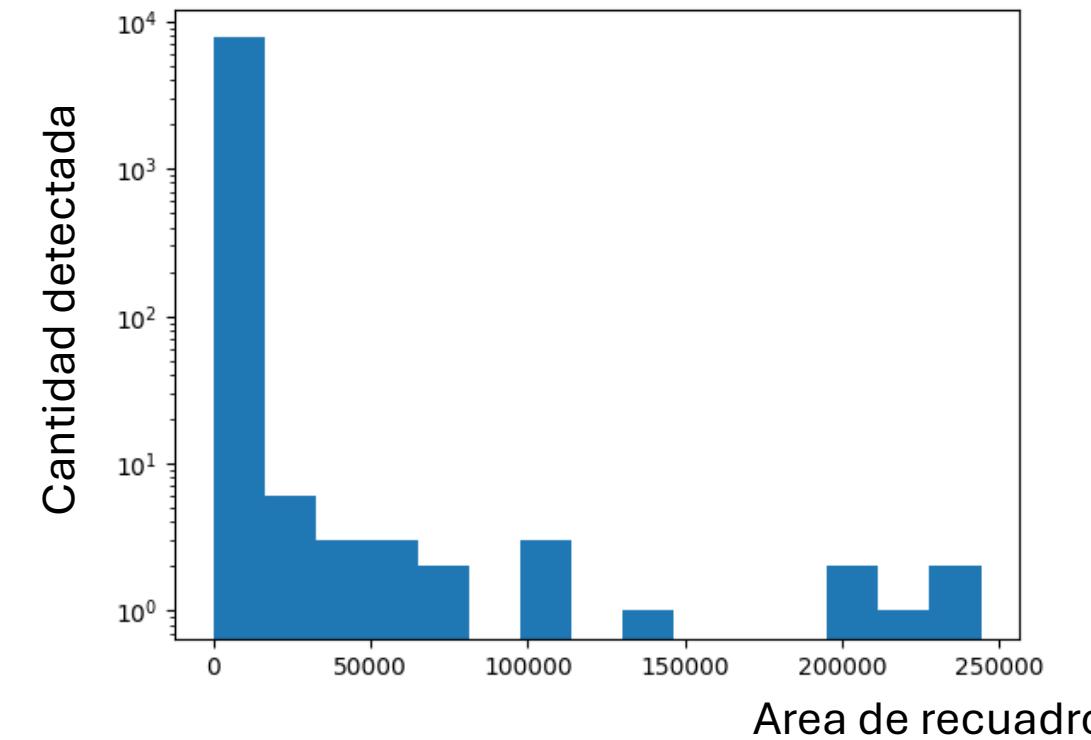
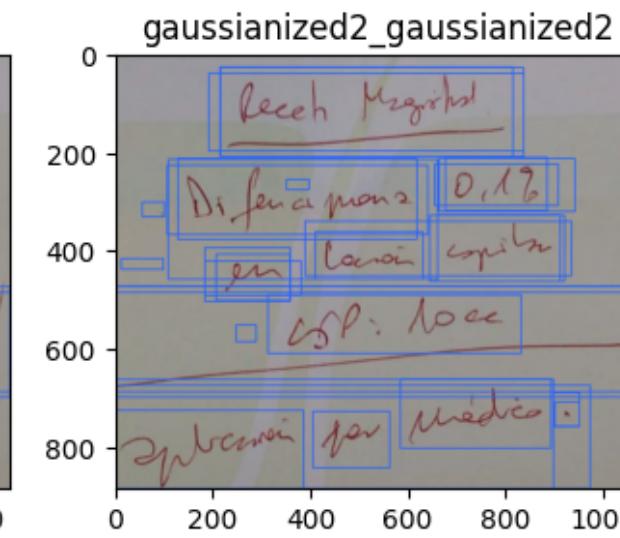
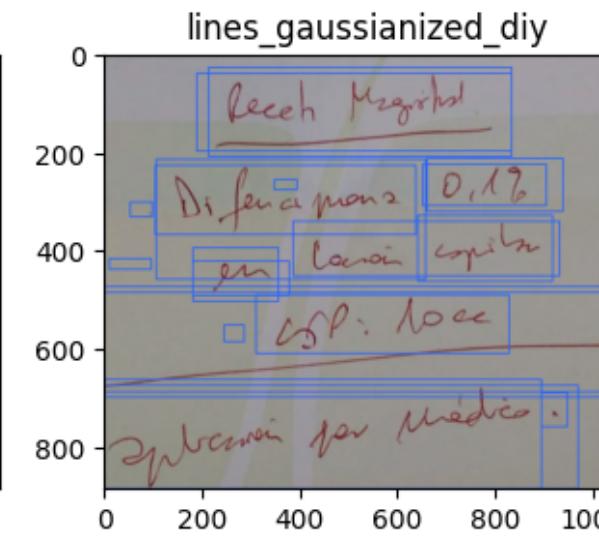
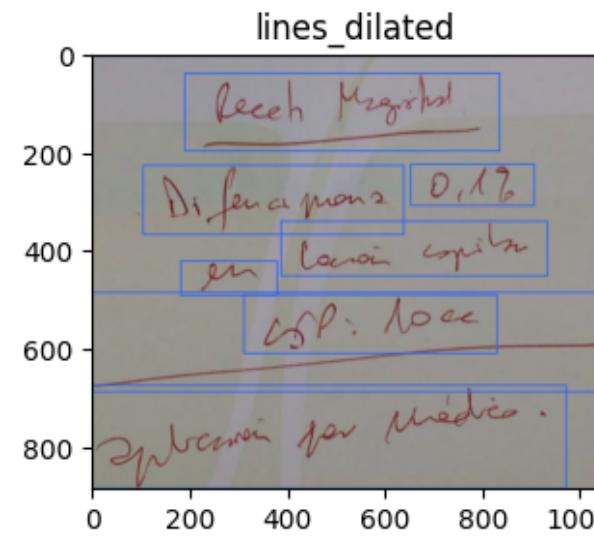
Histograms using Freedman-Diaconis Rule Method

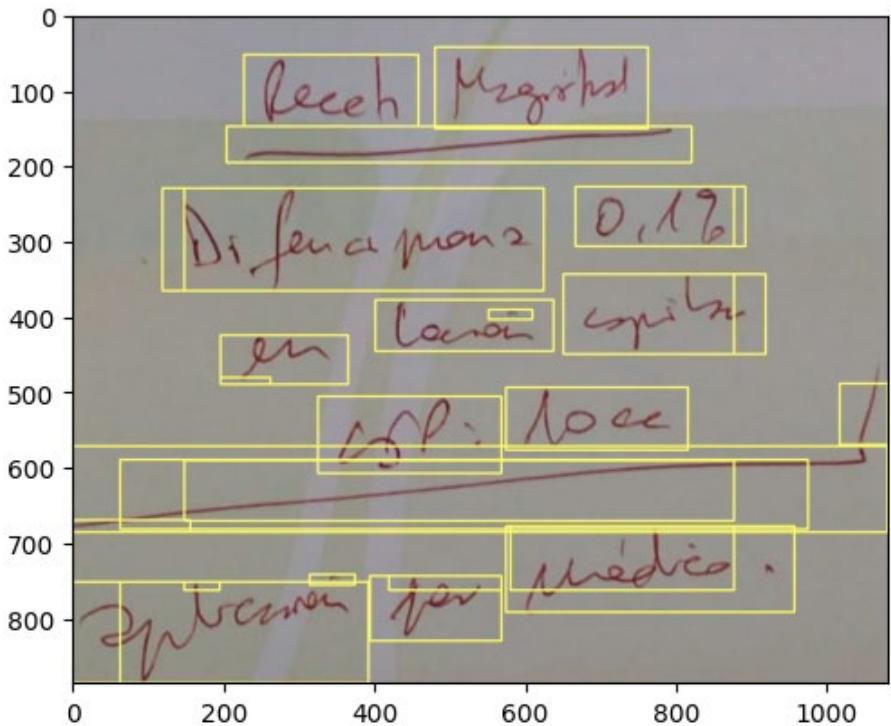


Proceso de Reconocer las Palabras









```

for line in sorted_contours_lines:
    # roi of each line
    x, y, w, h = cv2.boundingRect(line)
    roi_line = dilated2[y:y+w, x:x+w]

    # draw contours on each word
    (cnt, heirarchy) = cv2.findContours(roi_line.copy(), cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_NONE)
    sorted_contour_words = sorted(cnt, key=lambda cntr : cv2.boundingRect(cntr)[0])

    for word in sorted_contour_words:
        if cv2.contourArea(word) < 400:
            continue

        x2, y2, w2, h2 = cv2.boundingRect(word)
        words_list.append([x+x2, y+y2, x+x2+w2, y+y2+h2])
        cv2.rectangle(img3, (x+x2, y+y2), (x+x2+w2, y+y2+h2), (255,255,100),2)

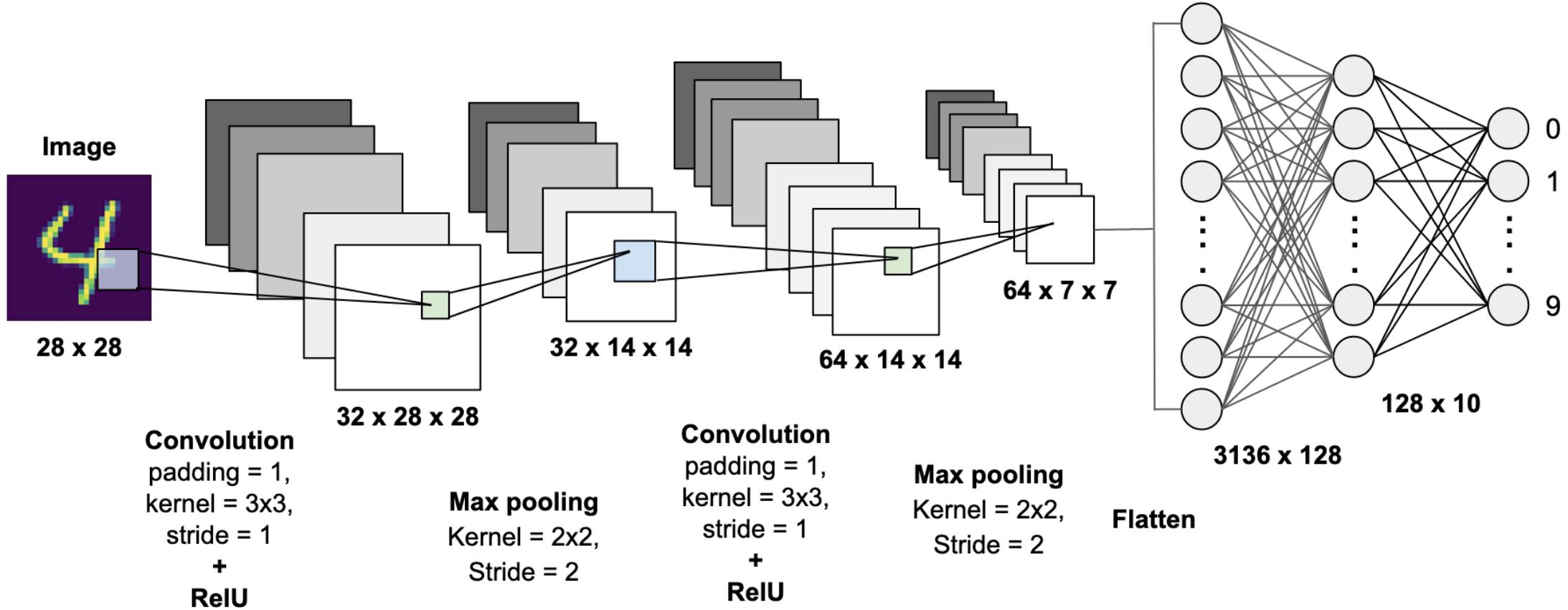
```

La misma estrategia clasifica lineas

Modelo con menos de 10 datos

The screenshot shows a Jupyter Notebook interface with several tabs at the top: File, Edit, Selection, View, Go, ..., 02_wordstatistics.ipynb, word.png, and TERMINAL. The TERMINAL tab is active, displaying command-line output from a Python script named WordDetector. The output includes several 'Head of line' messages, file processing logs, and deprecation warnings related to Matplotlib's get_cmap function. The word.png tab is also active, showing a grayscale image of a handwritten medical document. The document contains several words and numbers, each enclosed in a colored rectangular box indicating its detected bounding box. The words visible include 'tumicu', 'Soo my', '(Y uje)', 'el otre', and 'Solus'. The bounding boxes are color-coded: purple, blue, green, and yellow.

```
Head of line: 4  
Head of line: 4  
Head of line: 4  
Head of line: 4  
Processing file C:\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\Datasets\24050202x.jpg  
beg  
11  
\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\WordDetector\main.py:68: MatplotlibDeprecationWarning: The get_cmap function was deprecated in Matplotlib 3.7 and will be removed two minor releases later. Use ``matplotlib.colormaps[name]`` or ``matplotlib.colormaps.get_cmap(obj)`` instead.  
colors = plt.cm.get_cmap('rainbow', num_colors)  
Head of line: 2  
Head of line: 2  
Processing file C:\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\Datasets\24050203x.jpg  
beg  
11  
\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\WordDetector\main.py:68: MatplotlibDeprecationWarning: The get_cmap function was deprecated in Matplotlib 3.7 and will be removed two minor releases later. Use ``matplotlib.colormaps[name]`` or ``matplotlib.colormaps.get_cmap(obj)`` instead.  
colors = plt.cm.get_cmap('rainbow', num_colors)  
Head of line: 2  
Head of line: 2  
Processing file C:\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\Datasets\24050204x.jpg  
beg  
11  
\Users\fbien.DESKTOP-6FMEAR7\Desktop\medicalHTR\WordDetector\main.py:68: MatplotlibDeprecationWarning: The get_cmap function was deprecated in Matplotlib 3.7 and will be removed two minor releases later. Use ``matplotlib.colormaps[name]`` or ``matplotlib.colormaps.get_cmap(obj)`` instead.  
colors = plt.cm.get_cmap('rainbow', num_colors)  
Head of line: 5  
Head of line: 5  
Head of line: 5  
Head of line: 5  
Head of line: 5
```



STEAM

STEAL

STEAM

TEAM

STEAM

STREAM

Substitution

Deletion

Insertion

$$WER = \frac{S + D + I}{N}$$

where...

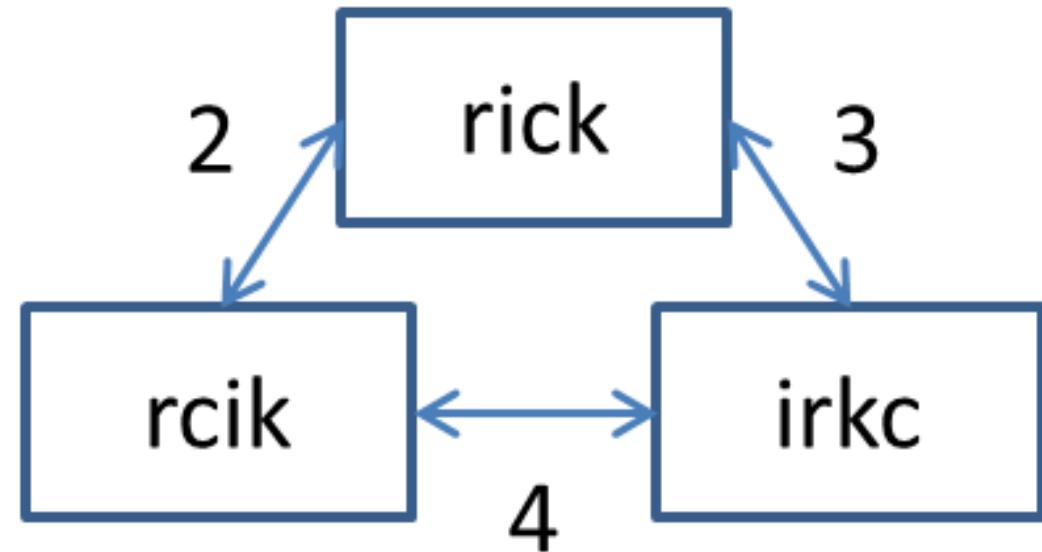
S = number of substitutions

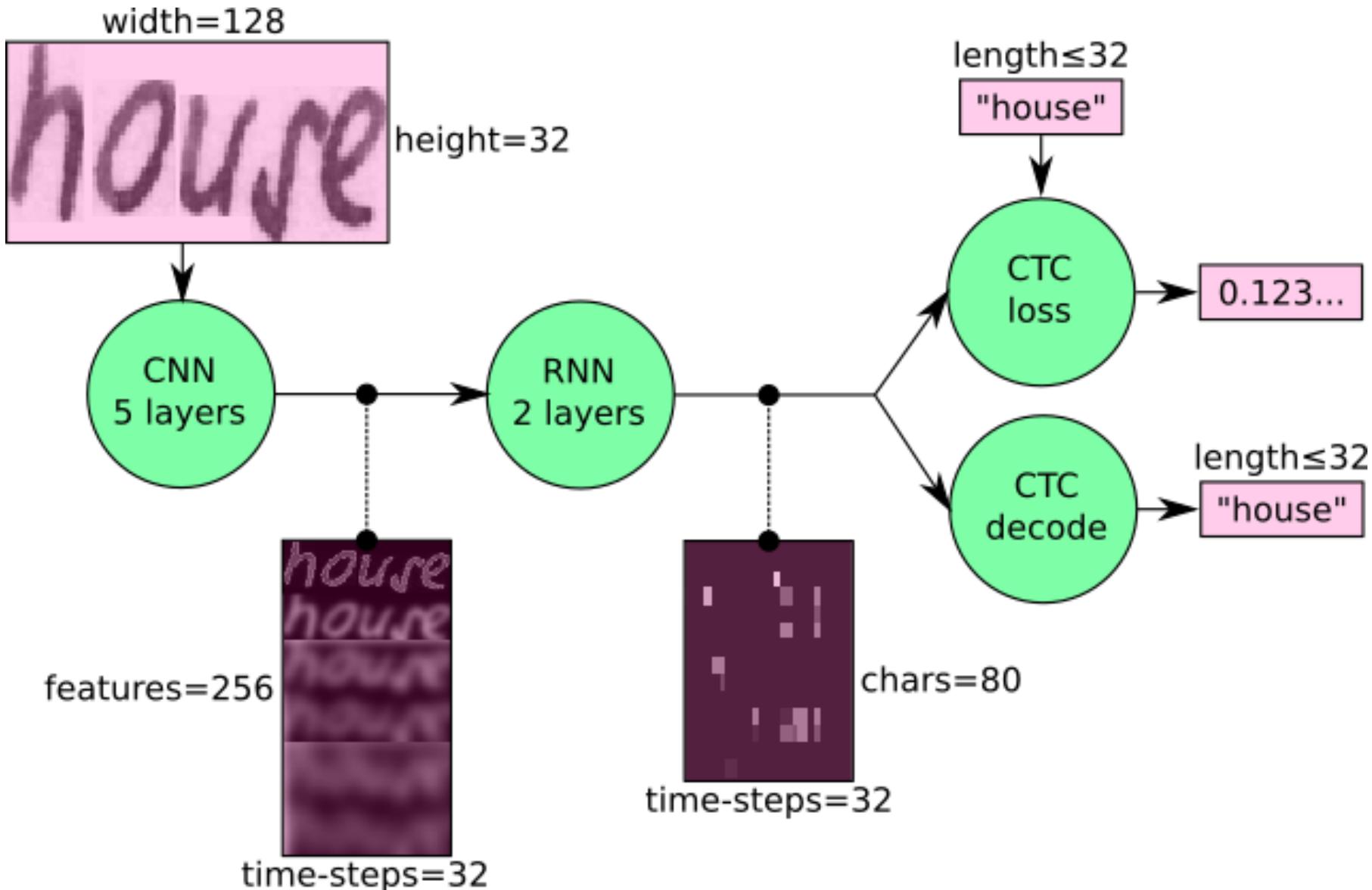
D = number of deletions

I = number of insertions

N = number of words in the reference

Levenshtein







Que se hace distinto?

- Transfer Learning
 - Al existir pocos datos, es bueno que el modelo aprenda a leer otro texto con menor dificultad, que gane experiencia
 - Avisos de medicamentos LASA

foreigners of tradition. Puis cordialement,
his characters. Merci de faire le changement
be discovered and trained. à jour ma situation.

IAM

RIMES

and mount and pilot & fun

the battle plan goes

enjoy with

For his drifter,

un maner, no man.

of your hand lost fast

ICFHR16

NorHand

Del Rei Don bernardo ~

in service, the Queen fury when not in actual

miro y delo que fijo ~

capacity are, as per Ch. XI. A. 1. the audience, 2. the

Rei Sisebuto delos goffos ~

without sense

Rodrigo

ICFHR14

Al Rev. ^{no} Pro. s. Mio e Poco ^{no}

accordo ^{raum} entro nella Camera, dove

entro nella Camera, dove
ogni mia figlia. Tutti i Moralisti
e nei con-

LAM

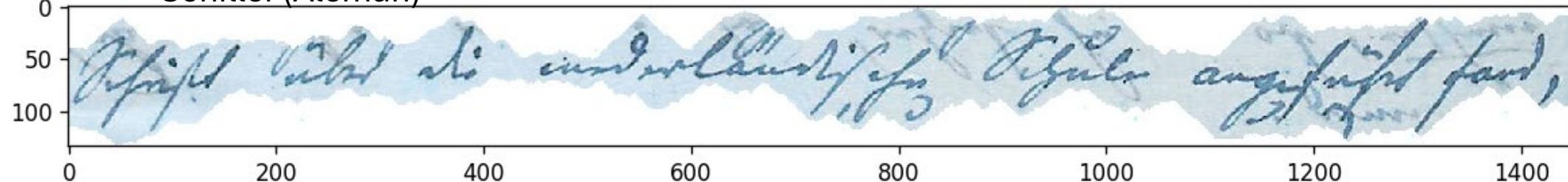
How to Choose Pretrained Handwriting Recognition Models for Single Writer Fine-Tuning

Vittorio Pippi^{1[0009–0001–7365–6348]}, Silvia Cascianelli^{1[0000–0001–7885–6050]},
Christopher Kermorvant^{23[0000–0002–7508–4080]}, and
Rita Cucchiara^{1[0000–0002–2239–283X]}

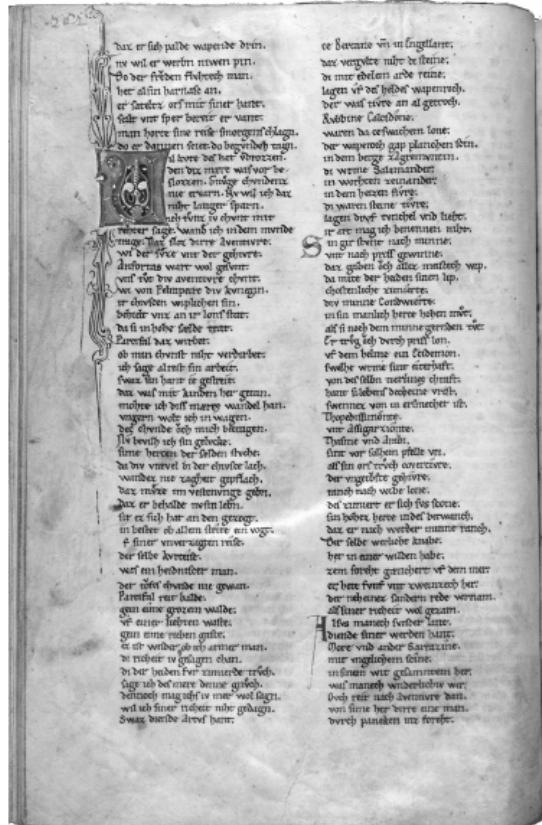
	Leopardi		Washington		Saint Gall	
	CER	WER	CER	WER	CER	WER
IAM	57.0	95.6	50.5	88.7	49.9	97.7
RIMES	68.0	97.2	48.2	96.2	51.2	98.5
Rodrigo	88.6	99.5	84.3	104.2	55.2	111.4
ICFHR14	75.0	105.6	83.6	128.8	83.7	106.9
ICFHR16	80.5	104.5	87.8	127.4	80.1	106.3
NorHand	49.1	95.4	64.9	101.4	76.0	114.4
LAM	23.4	57.3	78.8	103.8	78.0	99.5



Schiller (Aleman)

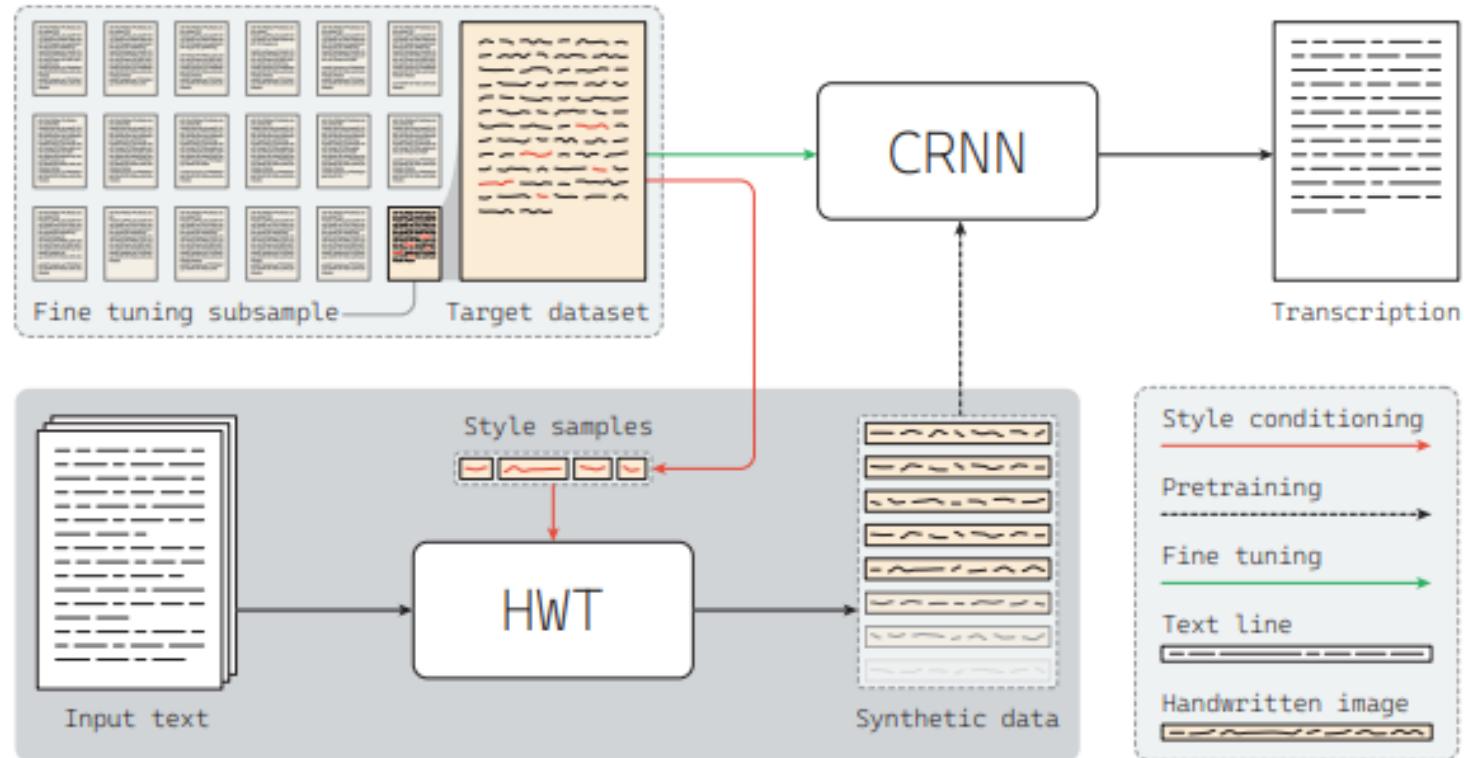


Saint Gal (Latin)



HKR

Шаги членения.	Член членов	Шаг стечки,	Член стекло,
двоичн., двойк.	двою, двою	Куда? Зачем?	"тогда? Зачем?"
Нам это	Нам это	не узнатъ.	не узнатъ
В густой ли- нице	В чистой ли- нице	он увиделъ зол- ко,	он увиделъ вика
Бархат., шко- личину.	Бархатъ вакину	А, точнее, много...	А, точнее, много...
Она ликовала в	Она ликовала в	зарослихъ полей,	зарослихъ лесахъ,
Окончукъ лапы	Окончукъ лапы	и основы пасты	и основы пасты
Из горла	Из горла	перевалочного писца	перевалочного писца
Толчками крови.	Баражение кровь,	густая, словно градъ	чуткая, словно градъ
Кем? Кем? Нотном?	Кем? Кем? Бараки?	Окотчищими шапки?	Окотчищими паски?
Сплющимъ пол- тикамъ	Сплющимъ бараками	что не узнатъ	что не узнатъ
Спер, толкнемъ	Спер, толкнемъ	и ворчи, соеди- ли	и ворчи, соедини
Большую	Баражую	неподатливую шапку	неподатливую шапку
Гомонящимъ пол- тикамъ	Гомонящимъ бараками	изобилии,	изобилии,





paracetamol 1g c/8h
x 7d.

Etoricoxib 120 mg
1 al día x 7d.

Rivaroxaban 10 mg día
x 14 días.

omepreazol 20mg día
x 14 días.



paracetamol 1g c/8h
x 7d.

Etoricoxib 120 mg
1 al día x 7d.

Rivaroxaban 10 mg día
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omepreazol 20mg día
x 14 días.



Base de datos de LASA para avisos

- Para evitar catastrofes, el modelo debe de ser explicable, transparente
 - Mediante una base de datos se da aviso para cualquier medicamento encontrado en LASA



Institute for Safe Medication Practices

ISMP's List of Confused Drug Names

This list of confused drug names, which includes look-alike and sound-alike name pairs, consists of those name pairs that have been published in the *ISMP Medication Safety Alert!*[®] and the *ISMP Medication Safety Alert! Community/Ambulatory Care Edition*. Events involving these medications were reported to ISMP through either the ISMP National Medication Errors Reporting Program (ISMP MERP) or ISMP National Vaccine Errors Reporting Program (ISMP VERP). We hope you will use this list to determine which medications

require special safeguards to reduce the risk of errors. This may include strategies such as: using both the brand and generic names on prescriptions and labels; including the purpose of the medication on prescriptions; configuring computer selection screens to prevent look-alike names from appearing consecutively; and changing the appearance of look-alike product names to draw attention to their dissimilarities. Both the FDA-approved and the ISMP-recommended tall man (mixed case) letters have been included in the list below.

Updated February 2015

Drug Name	Confused Drug Name
Abelcet	amphotericin B
Accupril	Aciphex
acetazOLAMIDE	acetoHEXAMIDE
acetic acid for irrigation	glacial acetic acid
acetoHEXAMIDE	acetazOLAMIDE
Aciphex	Accupril
Aciphex	Aricept
Activase	Cathflo Activase
Activase	TNKase
Actonel	Actos
Actos	Actonel
Adacel (Tdap)	Daptacel (DTaP)
Adderall	Inderal
Adderall	Adderall XR
Adderall XR	Adderall
ado-trastuzumab emtansine	trastuzumab

Drug Name	Confused Drug Name
Amikin	Kineret
aMILoride	amLODIPINE
amiodarone	amantadine
amLODIPINE	aMILoride
amphotericin B	Abelcet
amphotericin B	Ambisome
Anacin	Anacin-3
Anacin-3	Anacin
antacid	Atacand
Anticoagulant Citrate Dextrose Solution Formula A	Anticoagulant Sodium Citrate Solution
Anticoagulant Sodium Citrate Solution	Anticoagulant Citrate Dextrose Solution Formula A
Antivert	Axert
Anzemet	Avandamet
Apidra	Spiriva
Apresoline	Priscoline
arnatinhan	Anorastat