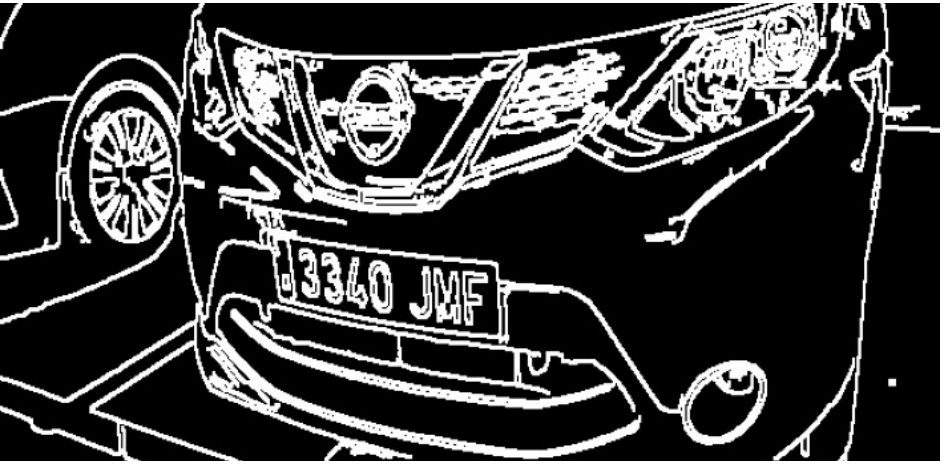
PLATE DETECTION

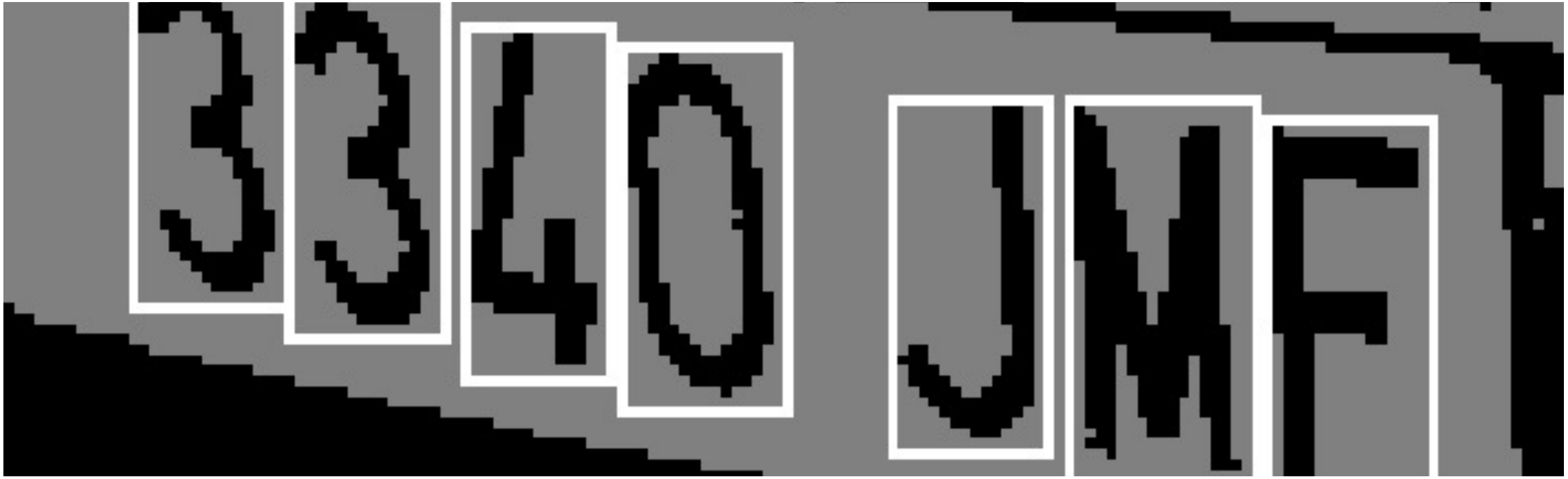
Pol Gràcia, Daniel Navarro & Miguel Esteban

PLATE LOCATOR



OUR APPROACH

- Noise reduction & edge preservation (*bilateral filter*)
- Gray scaling
- Canny edge detection (binarization)
- Dilation
- Sorted by x axis contour detection
- Only 12 biggest areas are kept



NUMBER DETECTION

OUR APPROACH

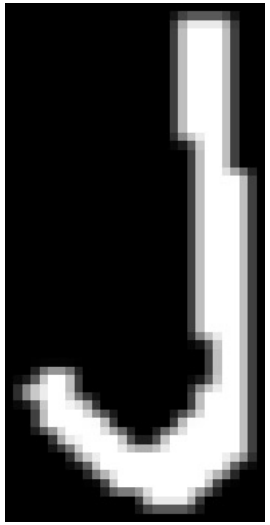
Inverse binary threshold

Connected components

$k = 4$

Check candidate

Resize to 60×30 pixels



DIN 1451

Aa Qq Rr

Aa Qq Rr

a

Nollendorfplatz

a b c d e f g h i j k l m

n o p q r s t u v w x y z

0123456789

TRAINING APPROACHES

Labeled images

Data augmentation

DATASETS

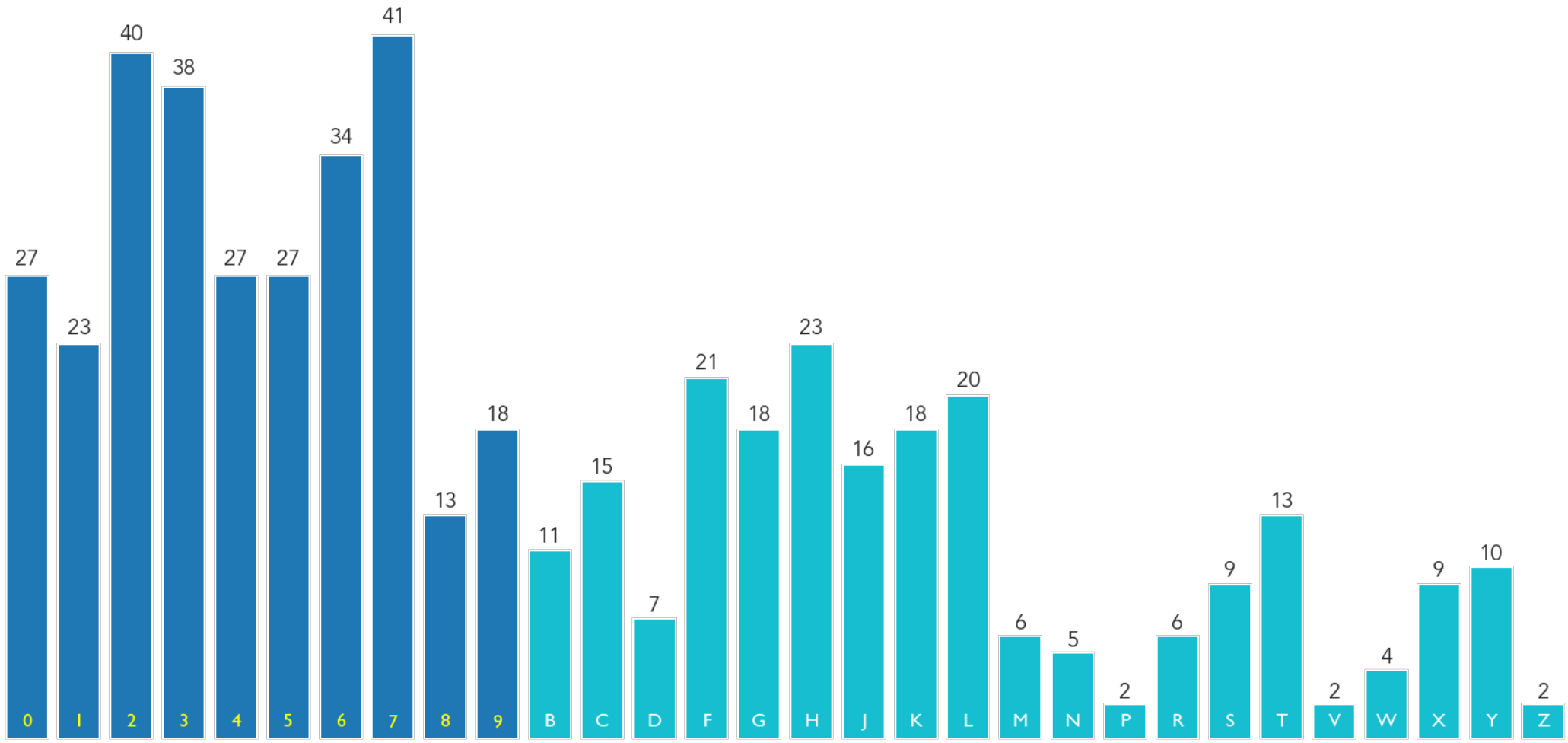
SVC, KNN & Decision Tree

- Fewer samples archive high accuracies
- Using the provided images, a **labeled dataset** is created

Deep Learning

- Huge ammount of samples are needed for Deep Learning models to classify correctly
- We adquired the base font mandated by the European Commision legislation. **DIN 1451**
- This font, along with the labeled dataset, is used to create a new dataset using **Data Augmentation**

58 images: 505 characters

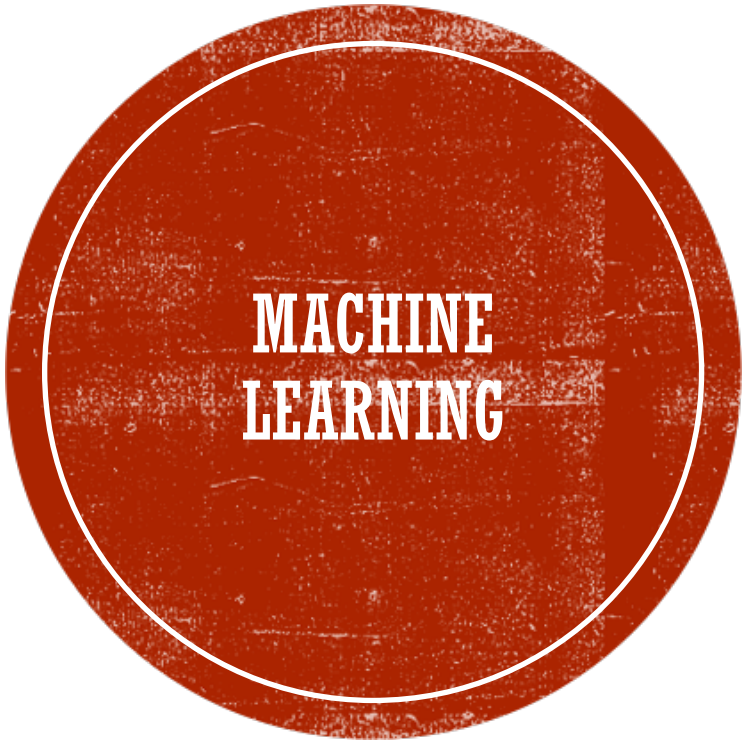


MODEL PARAMETERS

SVC

KNN,

Decision Tree



SVC

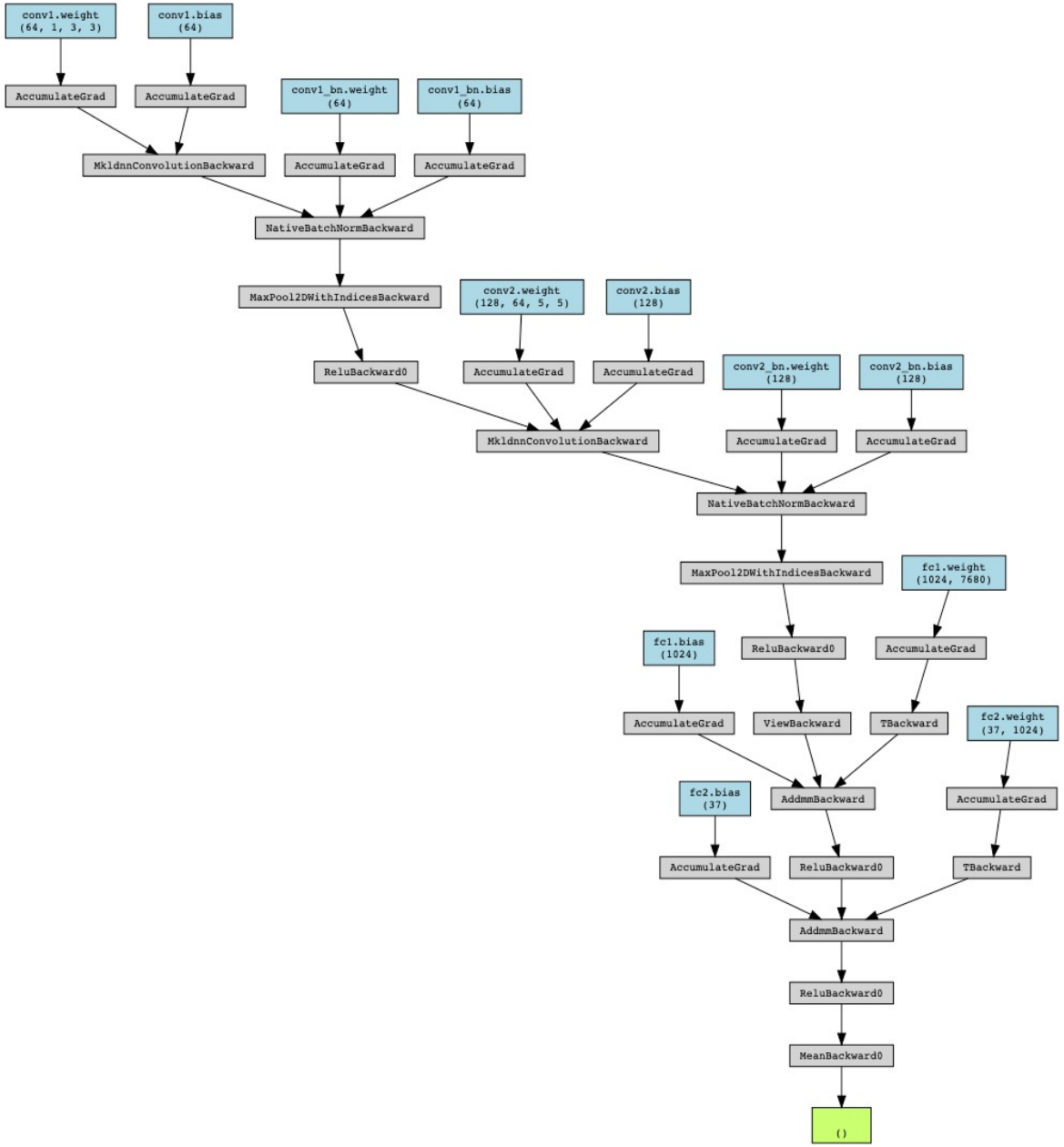
- Kernel type
- C

KNN

- Algorithm
- Neighbours

Decision Tree

- Criterion
- Features
- Splitter

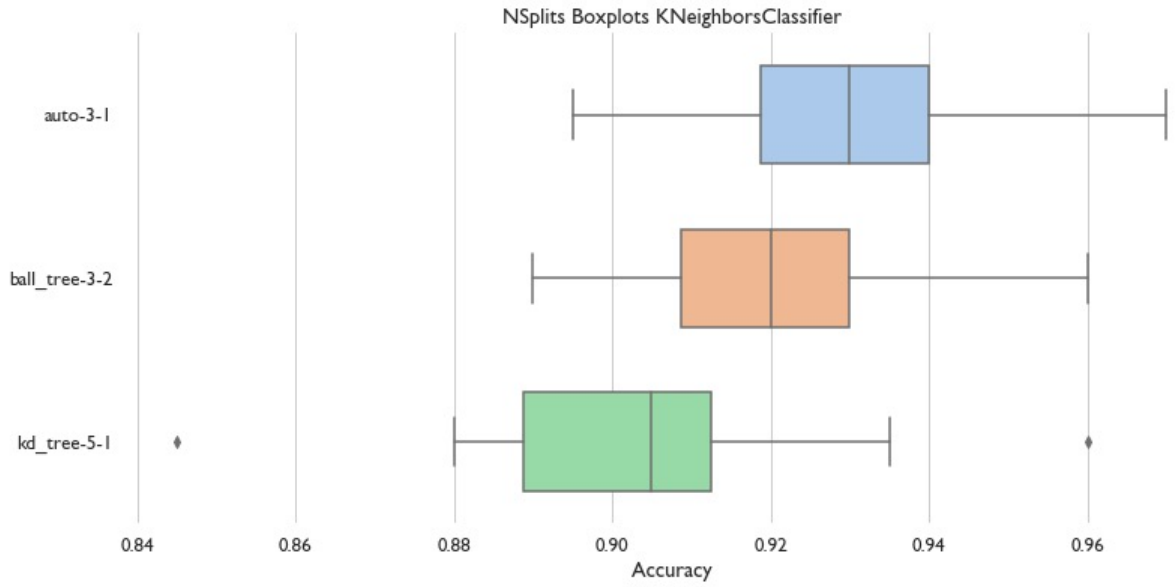


DEEP LEARNING

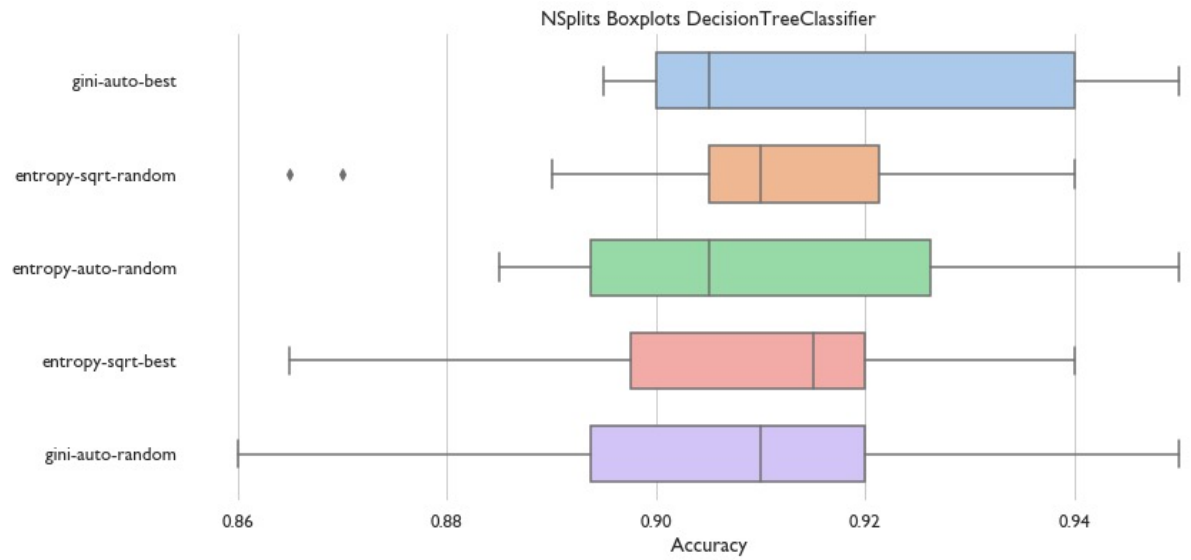
MODEL COMPARATION

SVC, KNN, Decision Tree & Deep Learning

Augmented Dataset & K-Folds: 20

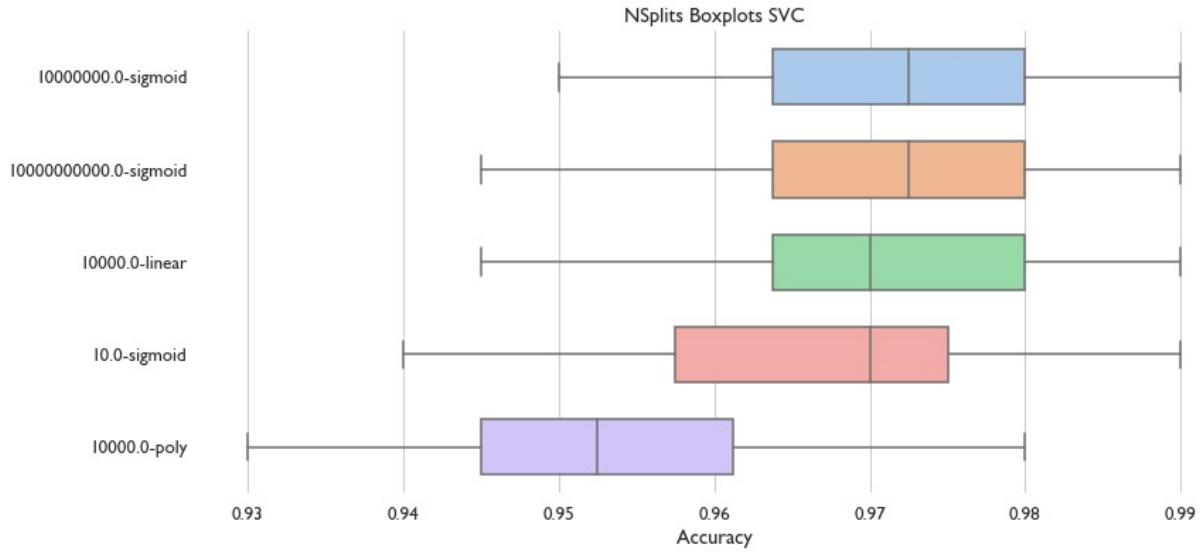


Dataset accuracy: 0.97256



Dataset accuracy: 0.84372

KNN & DECISION TREE



Dataset accuracy: 0.9750

SVC

ANALYSIS OF VARIANCE

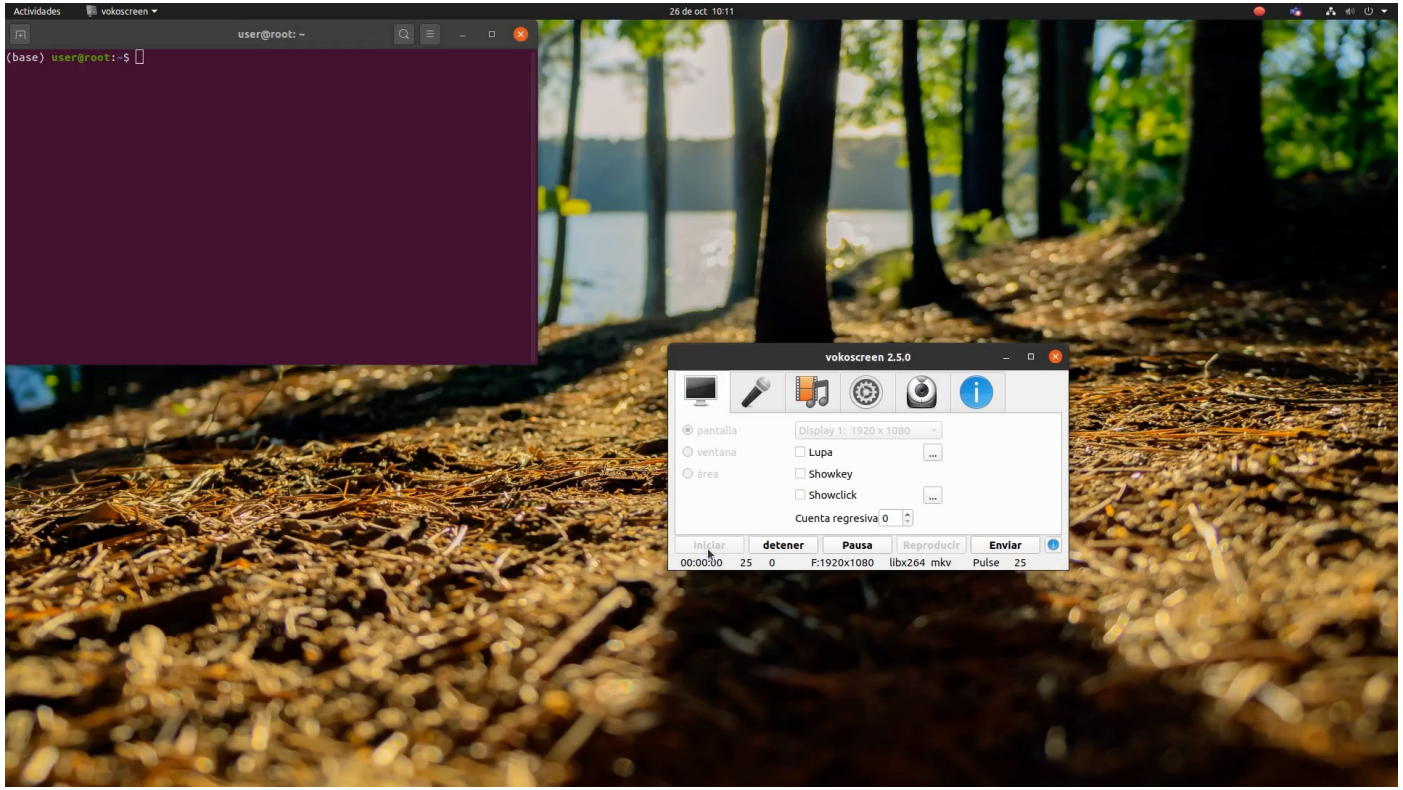
Models	DL – DT – KNN – SVC
p-value	$2.32 \cdot e^{-7}$

Models	SVC – DT	SVC – KNN	DT – KNN
p-value	$1.62 \cdot e^{-13}$	$3.93 \cdot e^{-12}$	0.0256

Model	SVC	DT	KNN	DL
Accuracy	0.9750	0.84372	0.97256	0.93659

As can be seen on the table, all models are different. Subsequently we select SVC as it has the higher mean accuracy

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$$
$$H_1: \mu_i \neq \mu_j$$
$$\alpha = 0.05$$


Actividades
vokoscreen
26 de oct 10:11
user@root: ~
(base) user@root:~$
vokoscreen 2.5.0
pantalla
ventana
área
Display 1: 1920 x 1080
Lupa
Showkey
Showclick
Cuenta regresiva 0
Iniciar
detener
Pausa
Reproducir
Enviar
00:00:00 25 0 F:1920x1080 libx264 mkv Pulse 25

DEMO


OUR CODE WILL BE AVAILABLE ON
OUR GITHUB REPOSITORY SHORTLY