Deep Learning

Master 2 SID - Parcours SD
Oral - 12 Décembre 2019

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Introduction

"The Application of Convolutional Neural Network for Pollen Bearing Bee Classification" de Tomyslav Sledevic, 2018 IEEE 6th Workshop on Advances in Information, Electronic and Electrical Engineering

Entrée de ruche avec des abeilles portant du pollen

Introduction

$$y = \begin{cases} y_1 \rightarrow \text{varroa} \\ y_2 \rightarrow \text{problème de fourmis} \\ y_3 \rightarrow \text{quelques varroas} \\ y_4 \rightarrow \text{bonne santé} \end{cases}$$

Abeille avec un varroa

Utilisation d'une Jetson Nano

Introduction - Plan

Objectifs : Classifier des images d'abeille (de faible qualité) selon leur état de santé et intégrer l'utilisation d'une Jetson Nano.

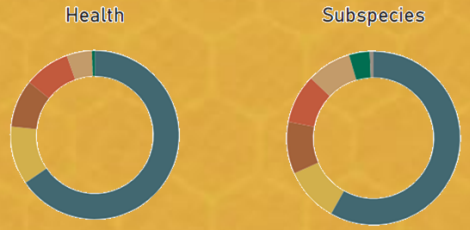
Partie 1 - Présentation de notre dataset et de l'architecture de notre CNN
Partie 2 - Présentation de nos résultats

Jeu de données

X

Jeu de données (5K images)

Y



Distribution des classes &
Sélection des labels

Subspecies (o)

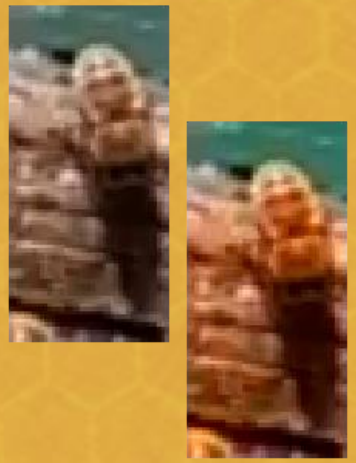
Pollen Carrying (x)

Zip Code (x)

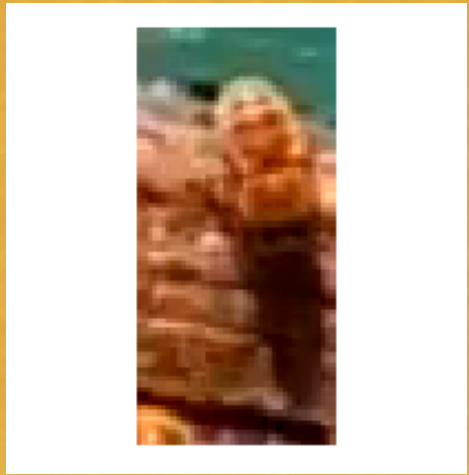
Health (o)

....

Prétraitements

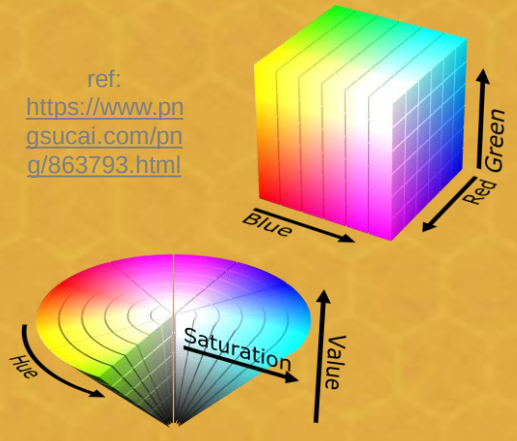


Renforcement



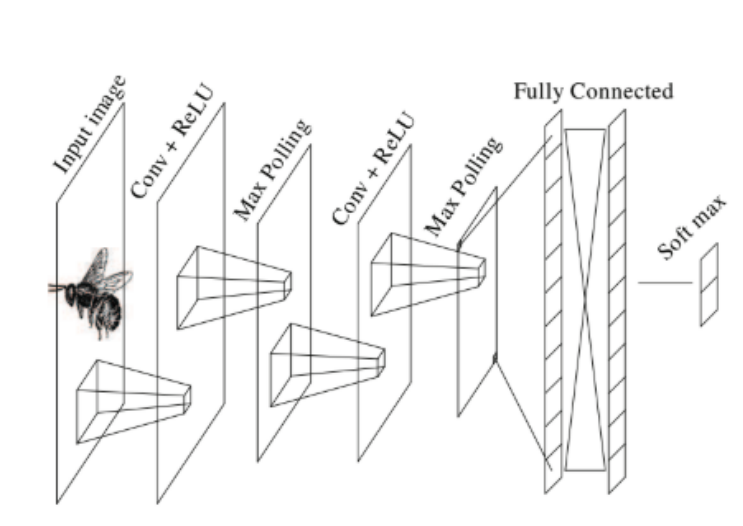
Padding

ref:
https://www.pngsucai.com/png/863793.html

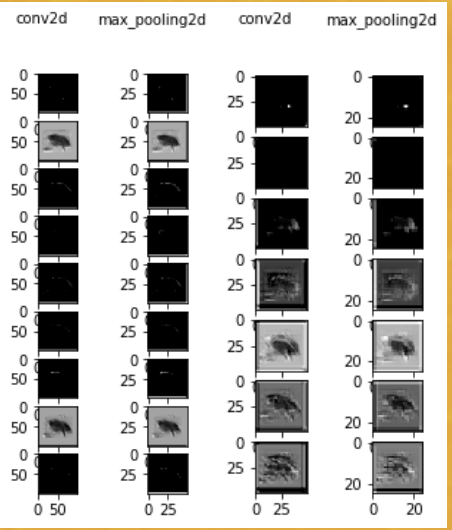


RGB / HSV

Modèle



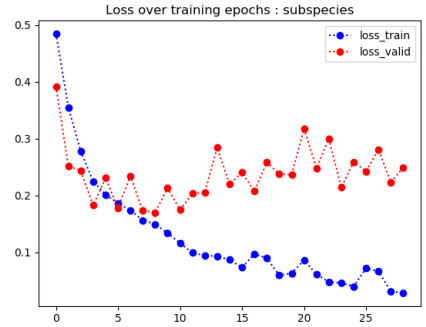
Structure



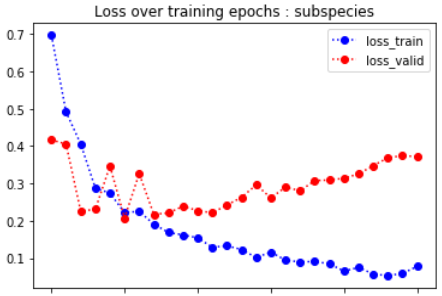
Caractéristiques extraites

Test size = 30%, Max_Epochs = 100, Batchsize = 8

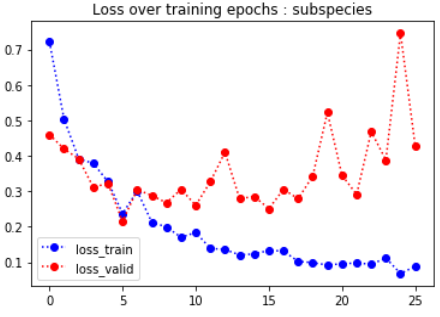
HSV 3 layers



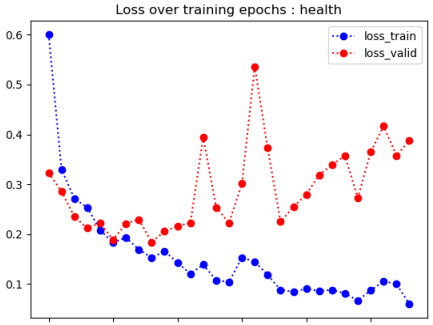
HSV 2 layers

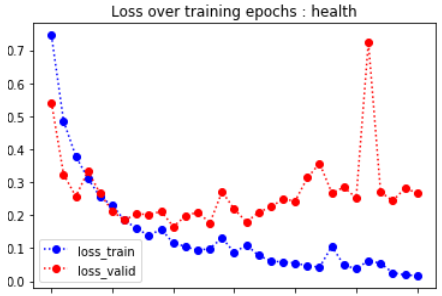


RGB enh 2 layers



RGB 2 layers





Résultats

	HSV	HSV	RGB enh	RGB
	100 epoch	100epoch	100 epoch	100epoch
	3 layers	2 layer	2 layer	2 layer
Subspecies(%)	90.89	90.65	89.02	87.8
Health (%)	90.81	90.65	91.71	89.11
2 carac (%)	82.44	82.11	81.54	77.89

Jetson nano

- -Dotée d’un GPU
- -Faible coût
- -Petite taille

Jetson

Jetson:	HSV		RGB	
	3 layers		2 layer	
	20 images	200 images	20 images	200 images
Subspecies	0.07s	0.46s	0.03s	0.39s
	14.53 fps	2.19 fps	29.47 fps	2.54fps
Health	0.04s	0,45s	0,04s	0.39s
	25.51 fps	2.20fps	27,57s	2.56fps

Bibliographie

Article	"The Application of Convolutional Neural Network for Pollen Bearing Bee Classification" de Tomyslav Sledevic, 2018 IEEE 6th Workshop on Advances in Information, Electronic and Electrical Engineering
Dataset	https://www.kaggle.com/jenny18/honey-bee-annotated-images
Utilisation de la Jetson Nano	https://www.dlology.com/blog/how-to-run-keras-model-on-jetson-nano/

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