

Université de Paris-Est Créteil

Faculté des Sciences et technologie

Master 2 Systèmes distribués et Technologies de la Data Science (STDS)

Présentation du projet

Module : Apprentissage profond

Deep Learning dans la détection et le diagnostic du
covid 19 en utilisant les modalités de radiologie



Présenté par :

Salem Aghiles BRAI



**FACULTÉ DES SCIENCES
ET TECHNOLOGIE**



INTRODUCTION



VUE ENSEMBLE



OBJECTIF DU PROJET



DATA SET



LA METHODE PROPOSEE



PRETRAITEMENT



L'ARCHITECTURE DE MODELE

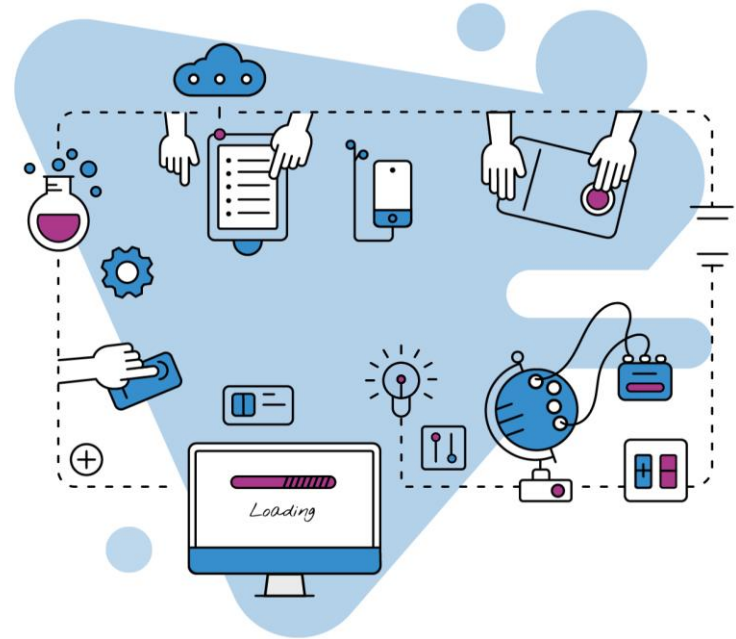


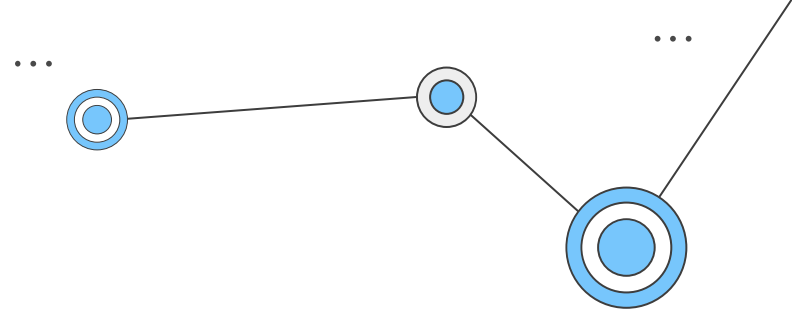
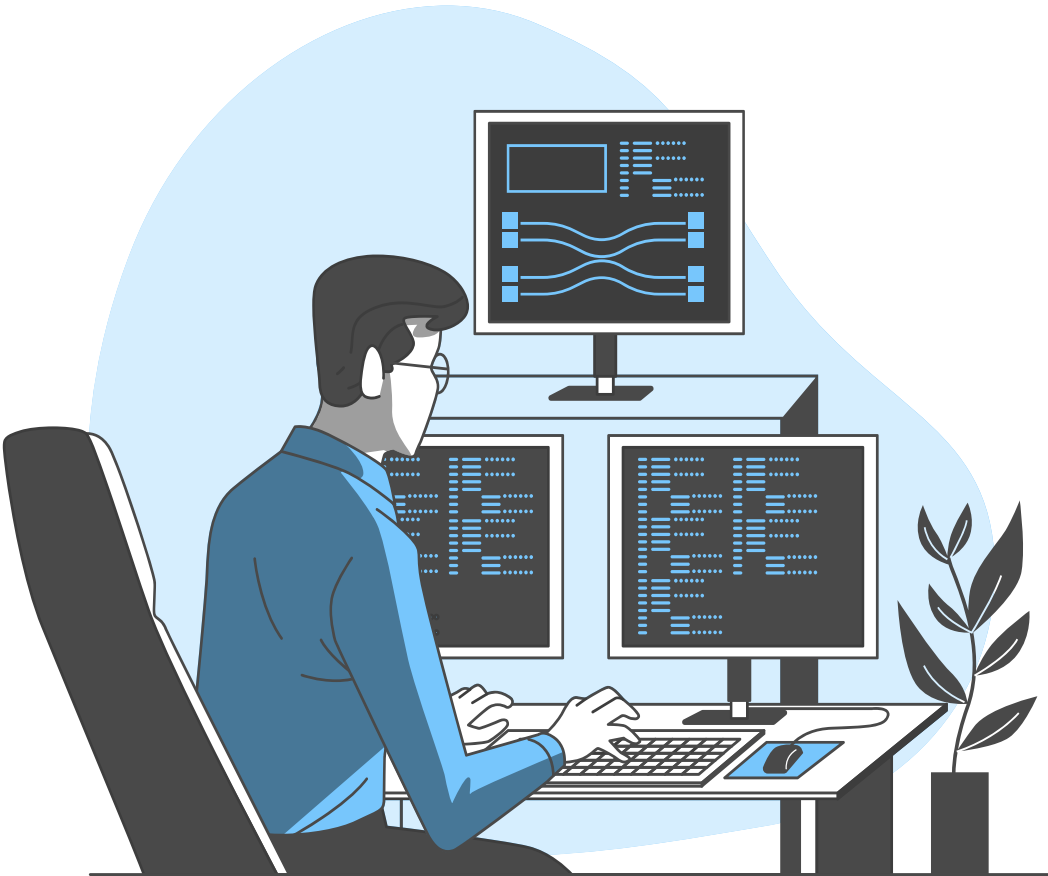
EVALUATION



CONCLUSION ET PERSPECTIVES

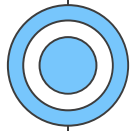
PLAN DE TRAVAIL



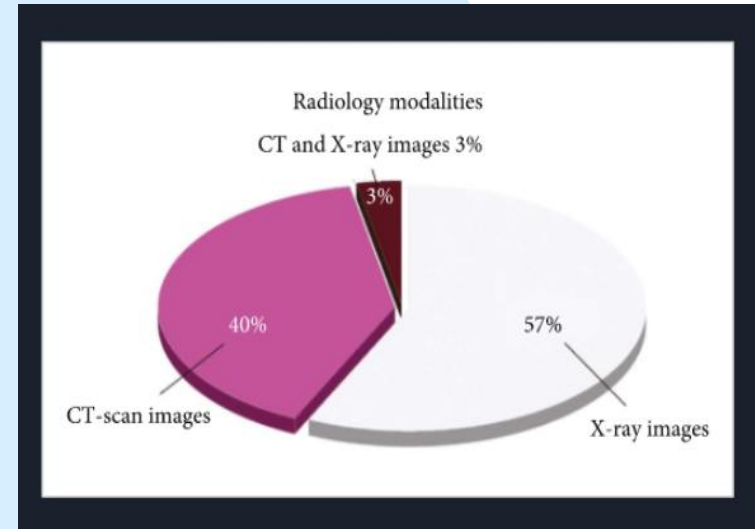
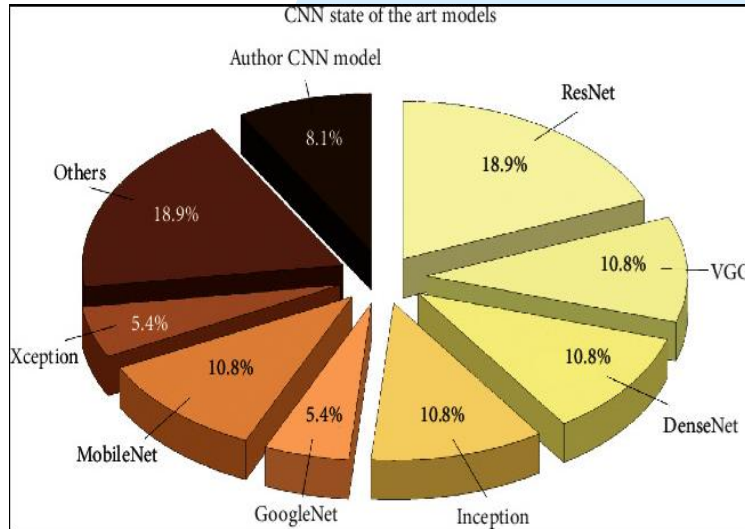


INTRODUCTION



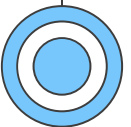


VUE ENSEMBLE



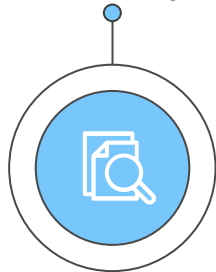
REFERENCE :

Mustafa Ghaderzadeh, Farkhondeh Asadi, "Deep Learning in the Detection and Diagnosis of COVID-19 Using Radiology Modalities: A Systematic Review", Journal of Healthcare Engineering, vol. 2021, Article ID 6677314, 10 pages, 2021. <https://doi.org/10.1155/2021/6677314>

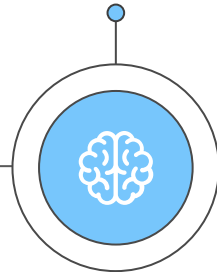


OBJECTIFS

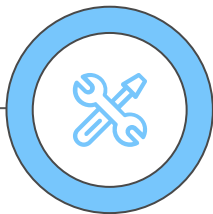
L'utilisation de Deep
Learning



Création d'un Modèle
De classification



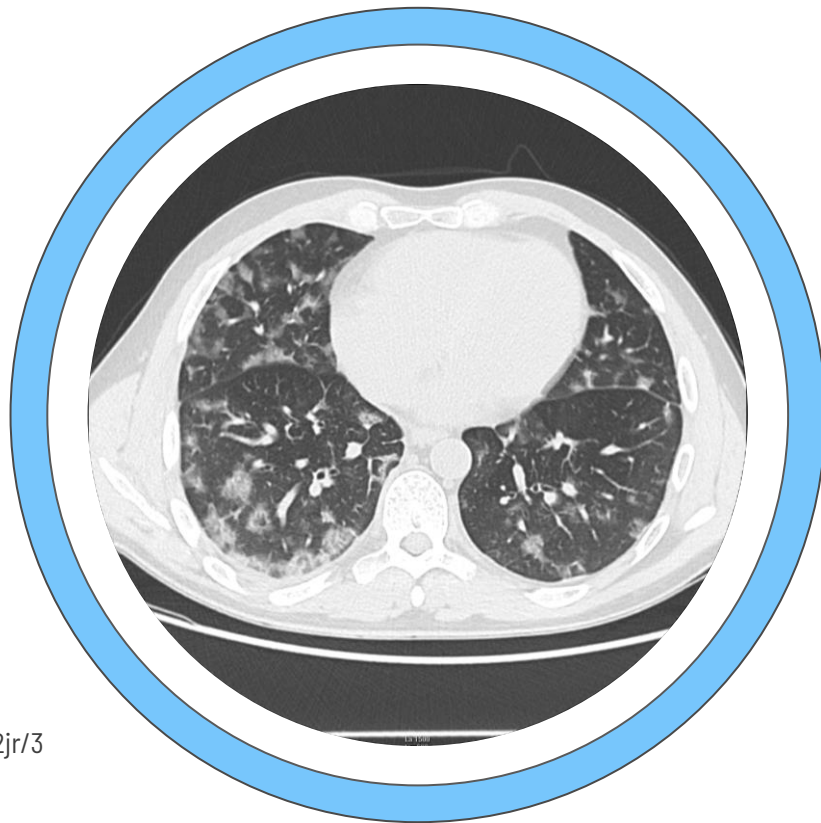
Utilisation des
différentes modalités
radiologiques



DATA SET

- 2 différentes modalités radiologique
- Environs 17600 images
- Cas Covid et Non Covid
- Répartition de 80% entraînement et 20% pour le test

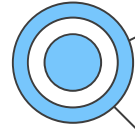
Source : <https://data.mendeley.com/datasets/8h65ywd2jr/3>



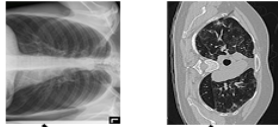
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LA METHODE PROPOSEE



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Pré-traitement

Modèle

Classification

Model Architecture

Non - Covid
Covid

01

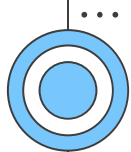
Prétraitement

02

Modèle d'apprentissage

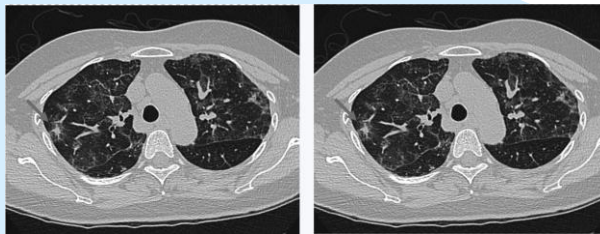
03

Résultats

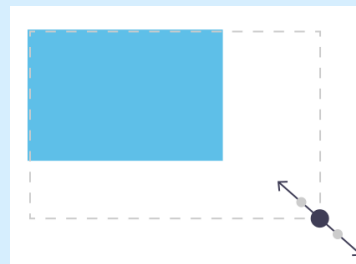


PRETRAITEMENT

- Grayscale

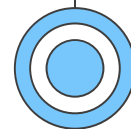
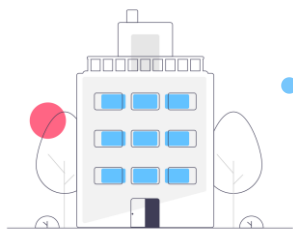


- Resizing image to 256x256

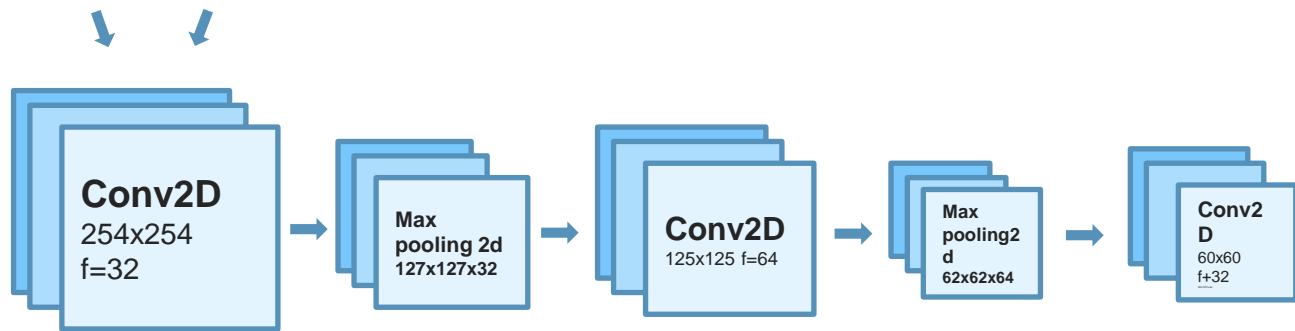
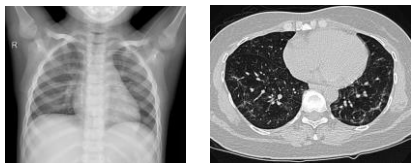


- Image Normalization

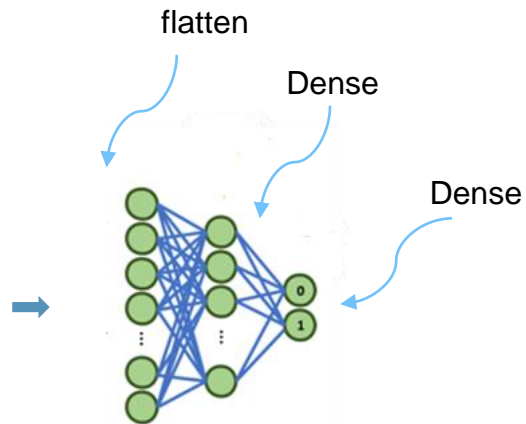
$$\text{Transformed.Values} = \frac{\text{Values} - \text{Minimum}}{\text{Maximum} - \text{Minimum}}$$



VUE D'ENSEMBLE DU MODELE PROPOSE



Feature Learning



Classification

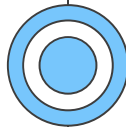
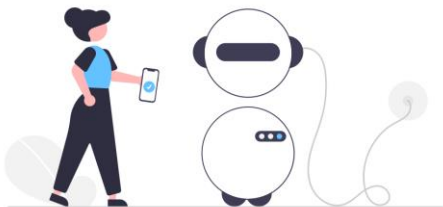


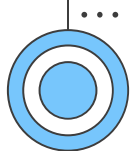
L'ARCHITECTURE DU MODELE

```
# Model architecture
model = models.Sequential()
model.add(layers.Conv2D(32, (3, 3), activation='relu', input_shape=(256, 256, 1)))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(32, (3, 3), activation='relu'))
model.add(layers.Flatten())
model.add(layers.Dense(128, activation='relu'))
model.add(layers.Dense(2))
model.summary()
model.compile(optimizer='adam',
              loss=tf.keras.losses.SparseCategoricalCrossentropy(from_logits=True),
              metrics=['accuracy'])
```

Model: "sequential"

Layer (type)	Output Shape	Param #
=====		
conv2d (Conv2D)	(None, 254, 254, 32)	320
max_pooling2d (MaxPooling2D)	(None, 127, 127, 32)	0
conv2d_1 (Conv2D)	(None, 125, 125, 64)	18496
max_pooling2d_1 (MaxPooling2D)	(None, 62, 62, 64)	0
conv2d_2 (Conv2D)	(None, 60, 60, 32)	18464
flatten (Flatten)	(None, 115200)	0
dense (Dense)	(None, 128)	14745728
dense_1 (Dense)	(None, 2)	258
=====		
Total params: 14,783,266		
Trainable params: 14,783,266		
Non-trainable params: 0		

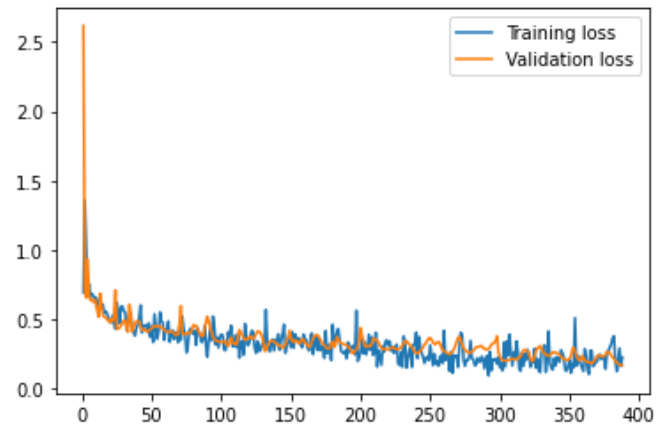
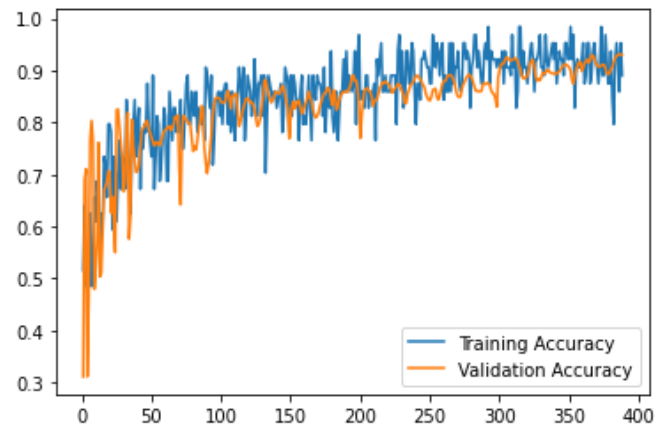


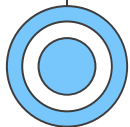


EVALUATION

- Training Accuracy de 95 %
- Validation Accuracy de 93 %

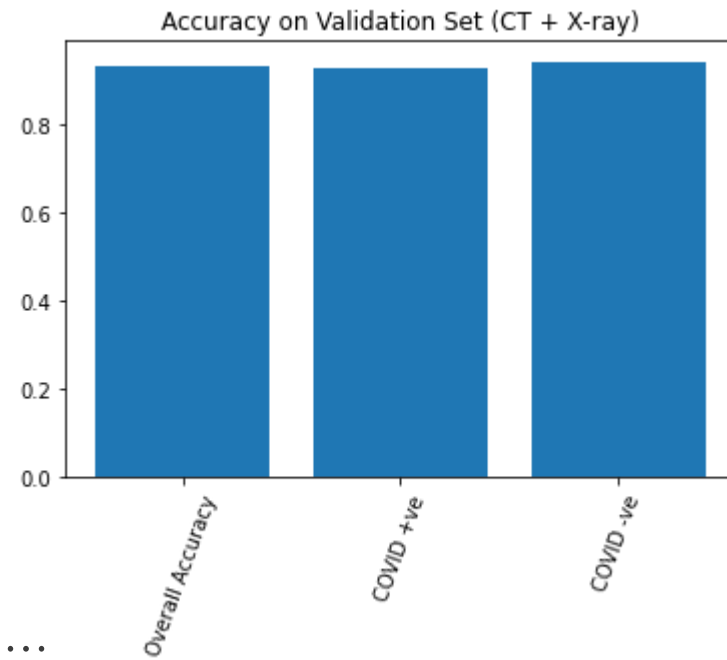
à partir de l'époque 300 les deux courbes
(Loss, Accuracy) commencent à s'aplatir





EVALUATION

- Accuracy on COVID positive images: 92,5%
- Accuracy on COVID negative images: 94%
- Accuracy on Validation set: 93%



CONCLUSION ET PERSPECTIVES

- Data Augmentation
- Validation croisée
- Utilisation des GPU pour optimiser le temps du calcul





**MERCI
POUR VOTRE ATTENTION!**