# Multi-Class Segmentation

advanced track

# WHO ARE WE ?

BME Senior Students

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# #1 Problem Definition

Animal body-parts Segmentation

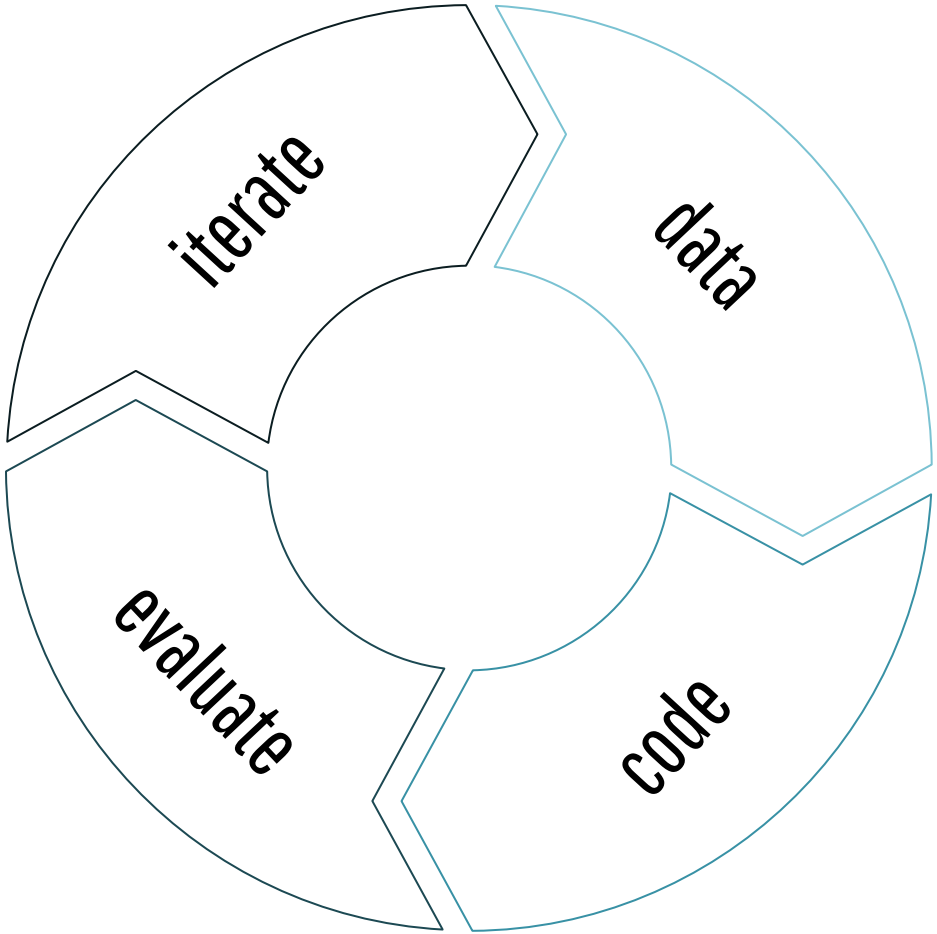
# Animal body-parts Segmentation

## WHY ?

Initial step for disease identification in different body parts

# #2 ML Cycle

# ML Cycle



ML Cycle

## DATA

*already provided*

- Image resizing to (256, 256)
- Reading images with corresponding encodings
- Splitting into train and validation sets ~ 80, 20 % split

## CODE

*main code steps*

- Data processing & splitting
- Model definition &training
- Result checking & evaluation

## EVALUATE

*metrics used*

- Optimizer = Adam optimizer
- Loss = Dice loss
- Metrics = IOU ~ Intersection Over Union

# ITERATE

ML Cycle

## Segmentation Approaches

UNet + EfficientNetB7
IOU ~ 0.63

UNet + ResNet34
IOU ~ 0.52

PSPNet + ResNext50
IOU ~ 0.48

FPN + EfficientNetB3
IOU ~ 0.59

## Learning Rates

0.1
- downright bad results
- almost no convergence

0.01
- noisy but tolerable
- as much time as default

0.001
- best results
- default value for a reason

## Optimizers

Adam Optimizer

RMSprop Optimizer

# #3 Approach Criticism

# Innovation ?

Architectures have been around for a while

Depending on previous experience

Final results are good or bad based on one’s own perspective

Comparisons

Unet > FPN > PSPNet

EfficientNet > ResNet > ResNext

ADAM > RMSprop

# #3 Results

# Metrics

Results

## Inference Time

test set:
~ 21 sec

single sample:
~ 0.12 sec

## IOU Score

training:
~ 0.7338

validation:
~ 0.6314

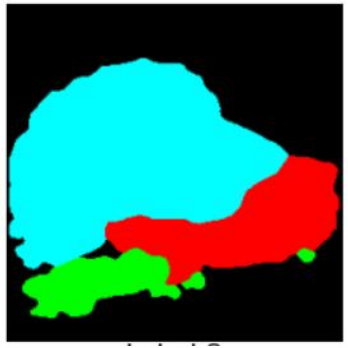
## DICE Loss

training:
~ 0.3404

validation:
~ 0.4444

# Segmentation Results

are the results any good ?



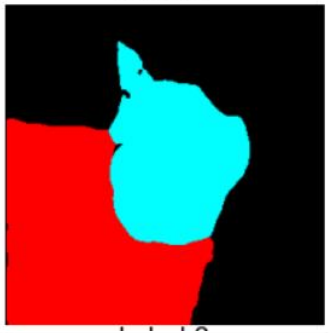
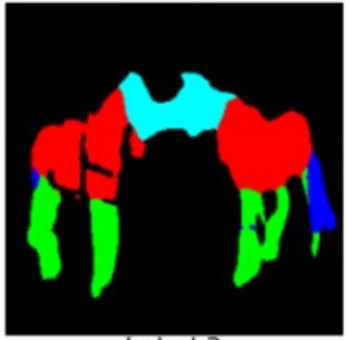
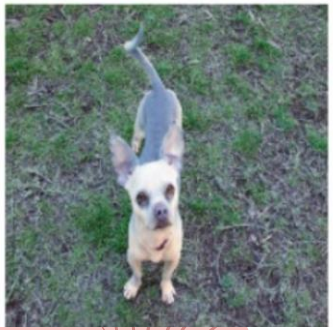
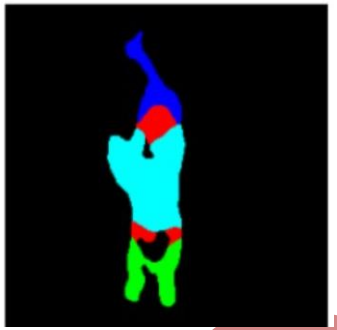


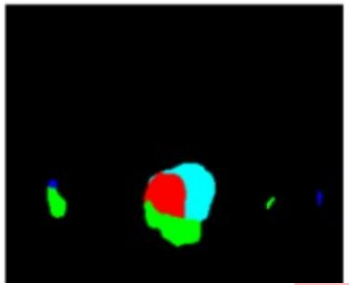
Image 3



Label 3







# THANK YOU FOR HAVING US !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