

# **DATA SCIENCE PRACTICUM - PROJECT 2**

## **CILIA SEGMENTATION**

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## APPROACHES CONSIDERED

- U-net
- Optical Flow with SVM
- Optical Flow with MLP
- Optical Flow with Random Forest
- DenseNet
- The One Hundred Layer Tiramisu

# **U-NET**

## **Features considered:**

- Gray Scale Intensity with resize
- Gray Scale Intensity with zero padding

**Analysis :** This was just a beginning using just resize and zero padding as data preprocessing ensuring all images were of the same size. Accuracy 6.5% and 5.4%

## OPTICAL FLOW WITH SVM

- Extracted the pixel movement vector using Optical Flow
- Extracted the FFT for each frame
- Resized the features to a 1D array and combined each of them into a dataframe along with the original image and mask
- Applied Equal Sample Rate on the resultant Dataframe on the mask filtering 25% of 0 values and 75% of 2
- Passed the resultant Dataframe through SVM with radial basis function ('rbf') as the kernel

Accuracy : Unable to scale, taking too much time

## OPTICAL FLOW WITH MLP

- Extracted the pixel movement vector using Optical Flow
- Extracted the FFT for each frame
- Resized the features to a 1D array and combined each of them into a dataframe along with the original image and mask
- Applied Equal Sample Rate on the resultant Dataframe on the mask filtering 25% of 0 values and 75% of 2
- Passed it into 3 hidden layer MPL classifier with 20 nodes each.

Accuracy : 26%

## **OPTICAL FLOW WITH RANDOM FOREST**

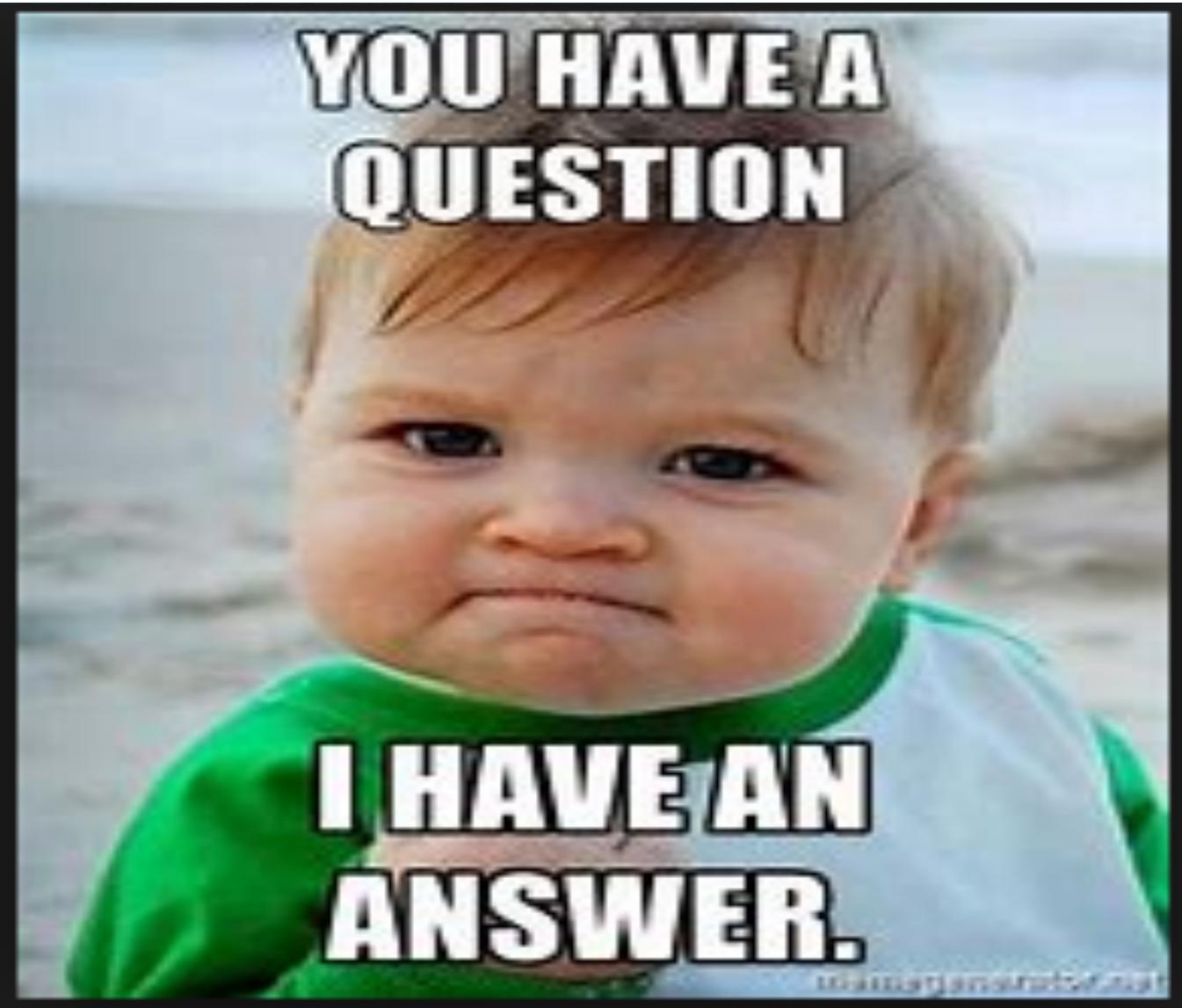
- Extracted the pixel movement vector using Optical Flow
- Extracted the FFT for each frame
- Resized the features to a 1D array and combined each of them into a dataframe along with the original image and mask
- Applied Equal Sample Rate on the resultant Dataframe on the mask filtering 25% of 0 values and 75% of 2
- Passed the resultant Dataframe through Random Forest model with 100 trees and depth of 10

**Accuracy : 27.6%**

## **DENSENET AND TIRAMISU 100 LAYER NETWORK**

- Researched both of them but ran out of time before we could execute them

QUESTIONS



**YOU HAVE A  
QUESTION**

**I HAVE AN  
ANSWER.**

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