20BRS1143
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Google colab has been used to implement the program to plot facial landmarks:

```
import numpy as np
import pandas as pd
import dlib
import cv2
from google.colab.patches import cv2_imshow
import os
import random
from PIL import Image
```

```
df = pd.read_csv("/content/autism.csv")
num_classes = len(df["filepaths"].unique())
num_data = len(df)
```

```
print("Size of training data:", df.shape)
print("Number of unique classes:", num_classes)
```

```
Size of training data: (2938, 3)
Number of unique classes: 2938
```

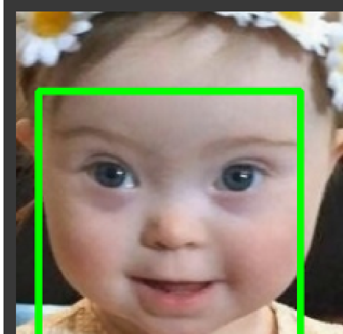
```
print(df.head(10))
```

```
               filepaths    labels dataset
0  test/autistic/001.jpg  autistic    test
1  test/autistic/002.jpg  autistic    test
2  test/autistic/003.jpg  autistic    test
3  test/autistic/004.jpg  autistic    test
4  test/autistic/005.jpg  autistic    test
5  test/autistic/006.jpg  autistic    test
6  test/autistic/007.jpg  autistic    test
7  test/autistic/008.jpg  autistic    test
8  test/autistic/009.jpg  autistic    test
9  test/autistic/010.jpg  autistic    test
```

```
img = cv2.imread('/content/0022.jpg')
gray=cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
# Initialize dlib's face detector
detector = dlib.get_frontal_face_detector()
# Detecting faces in the grayscale image
faces = detector(gray)
print(faces)
```

```
rectangles[[(15, 54) (194, 234)]]
```

```
# Creating a for loop in order to extract
# specific coordinates (x1,x2,y1,y2)
for face in faces:
  x1=face.left()
  y1=face.top()
  x2=face.right()
  y2=face.bottom()
# Drawing a rectangle around the face
  cv2.rectangle(img, (x1,y1), (x2,y2),(0,255,0),3)
cv2_imshow(img)
```

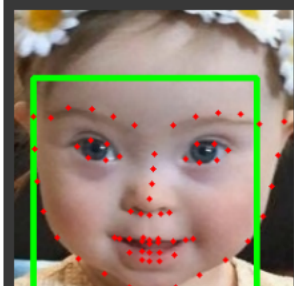


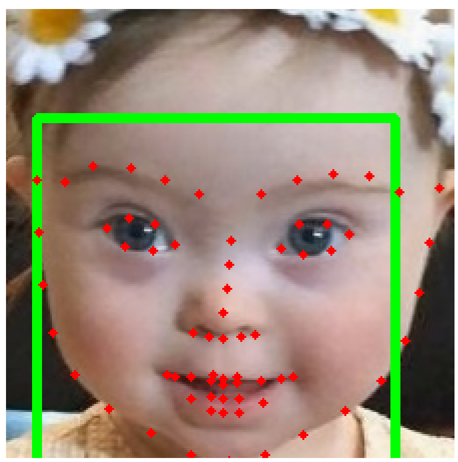
```
!wget http://dlib.net/files/shape_predictor_68_face_landmarks.dat.bz2
!bunzip2 "shape_predictor_68_face_landmarks.dat.bz2"
```

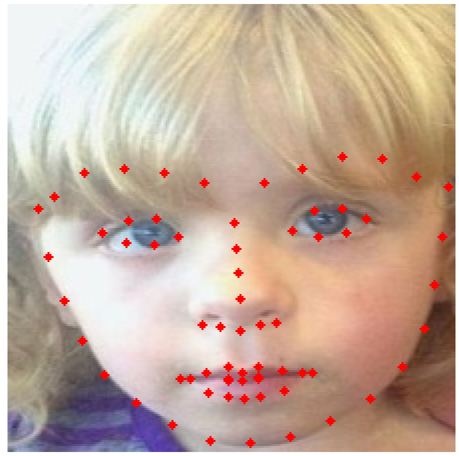
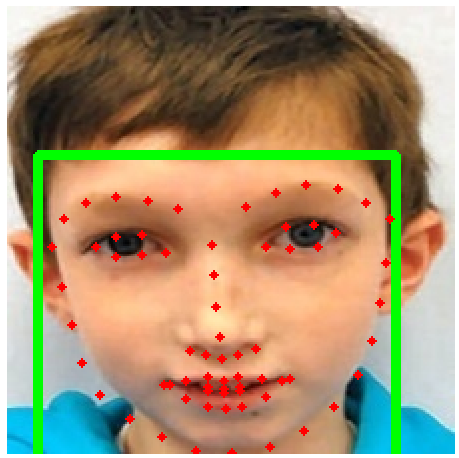
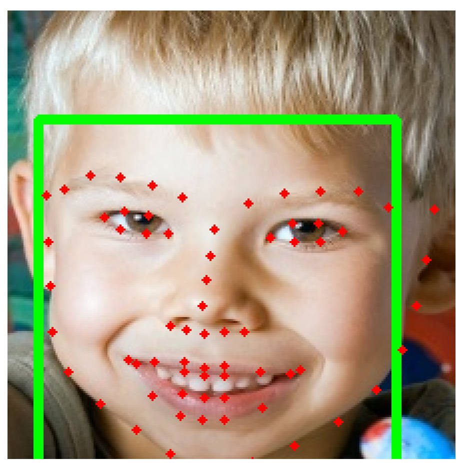
```
--2022-11-22 00:41:57--  http://dlib.net/files/shape_predictor_68_face_landmarks.dat.bz2
Resolving dlib.net (dlib.net)... 107.180.26.78
Connecting to dlib.net (dlib.net)|107.180.26.78|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 64040097 (61M)
Saving to: 'shape_predictor_68_face_landmarks.dat.bz2'

shape_predictor_68_ 100%[===================>]  61.07M  17.7MB/s    in 4.1s

2022-11-22 00:42:01 (14.9 MB/s) - 'shape_predictor_68_face_landmarks.dat.bz2' saved [64040097/64040097]

bunzip2: Output file shape_predictor_68_face_landmarks.dat already exists.
```

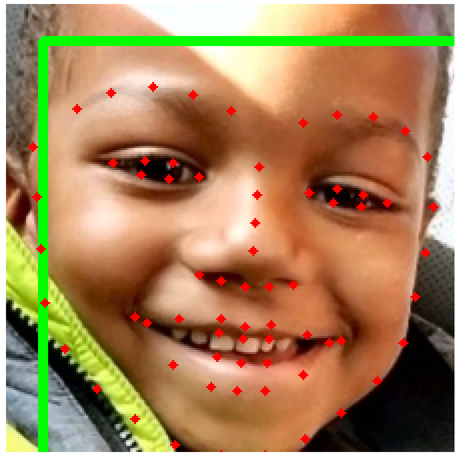
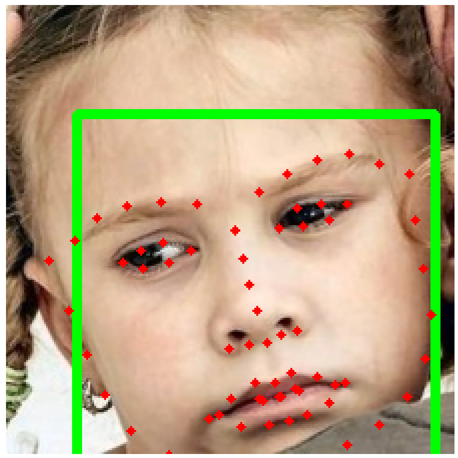
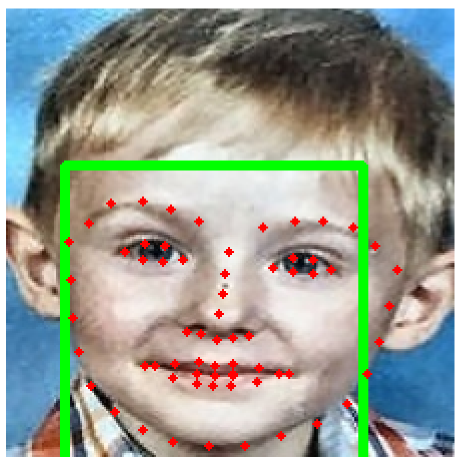
```
p = "shape_predictor_68_face_landmarks.dat"
# Initialize dlib's shape predictor
predictor = dlib.shape_predictor(p)
# Get the shape using the predictor
landmarks=predictor(gray, face)
```

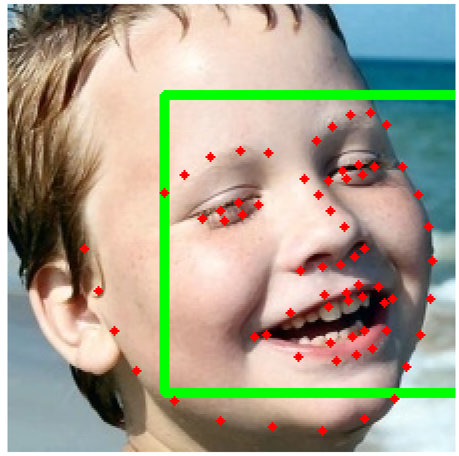
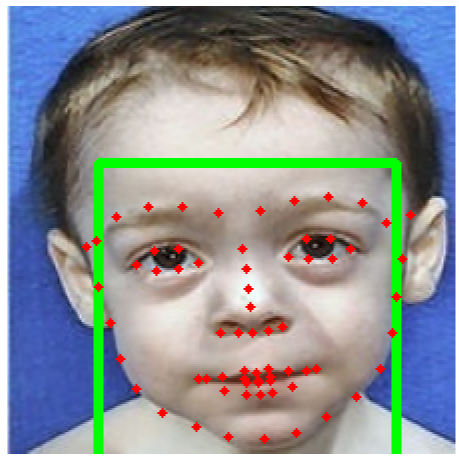
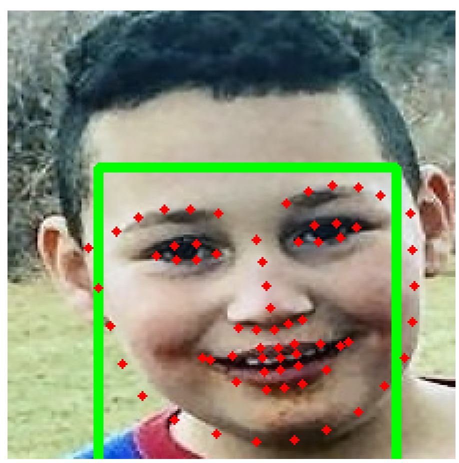
```
for n in range(0,68):
    x=landmarks.part(n).x
    y=landmarks.part(n).y
    cv2.circle(img, (x, y), 2, (0, 0, 255), -1)
cv2_imshow(img)
```



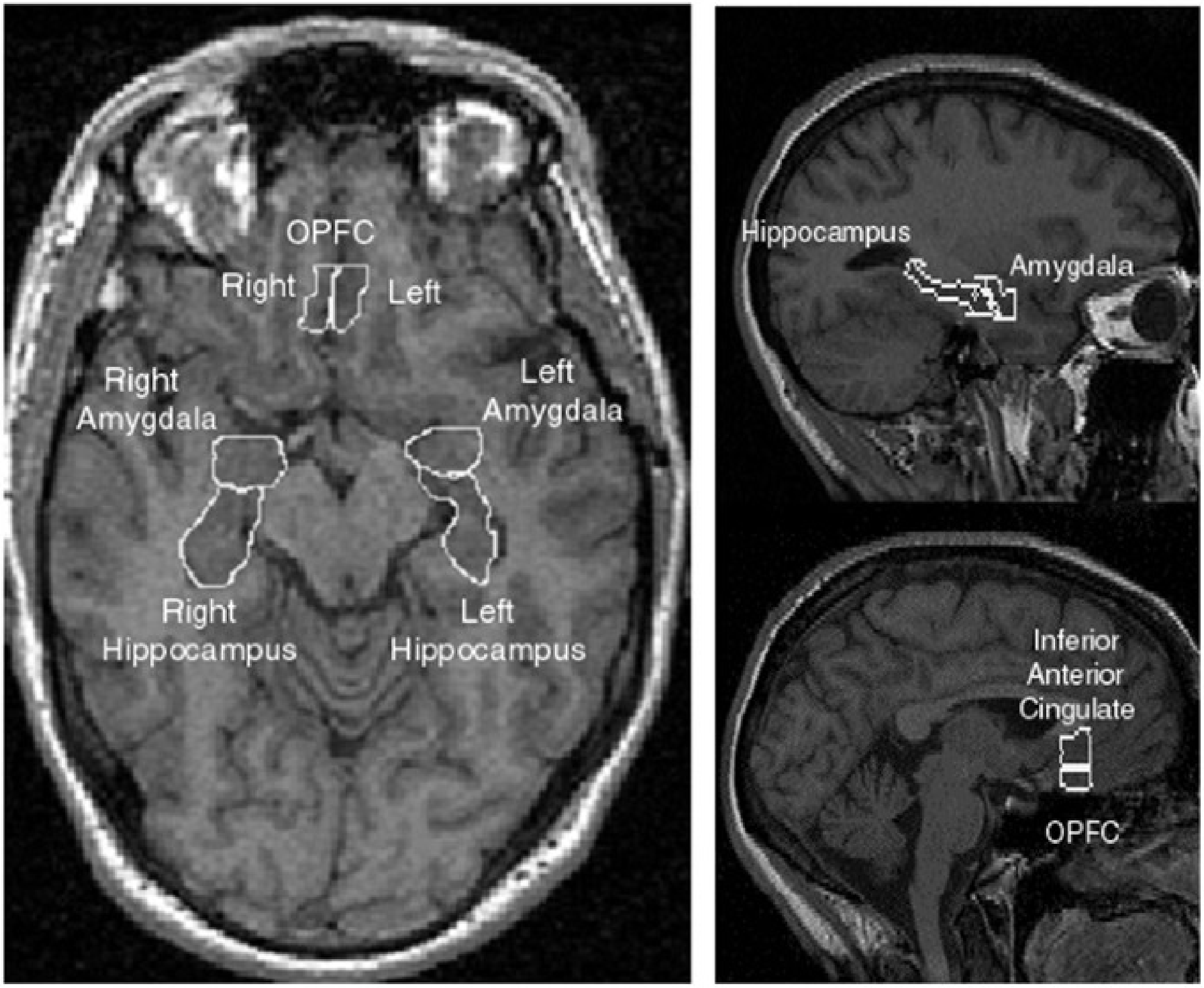
Data	Landmarks
0022	

0095	
0069	
0237	

0301	
0323	
0154	

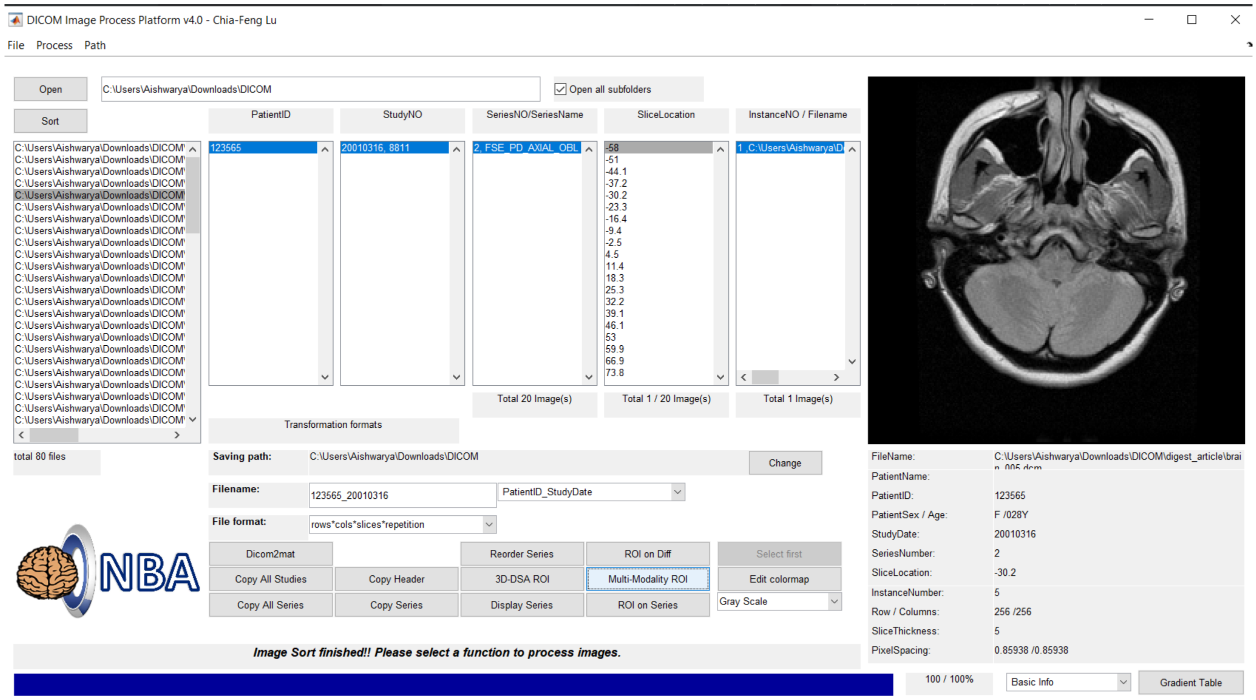
0276	
0177	
0167	

REF IMAGE FOR AMYGDALA



Multimodal Radiomics Platform (MRP) & Machine-Learning Models Platform is used to extract radiomics features.. This is supported by Matlab

PROCESS IN DICOM IMAGE PROCESSING



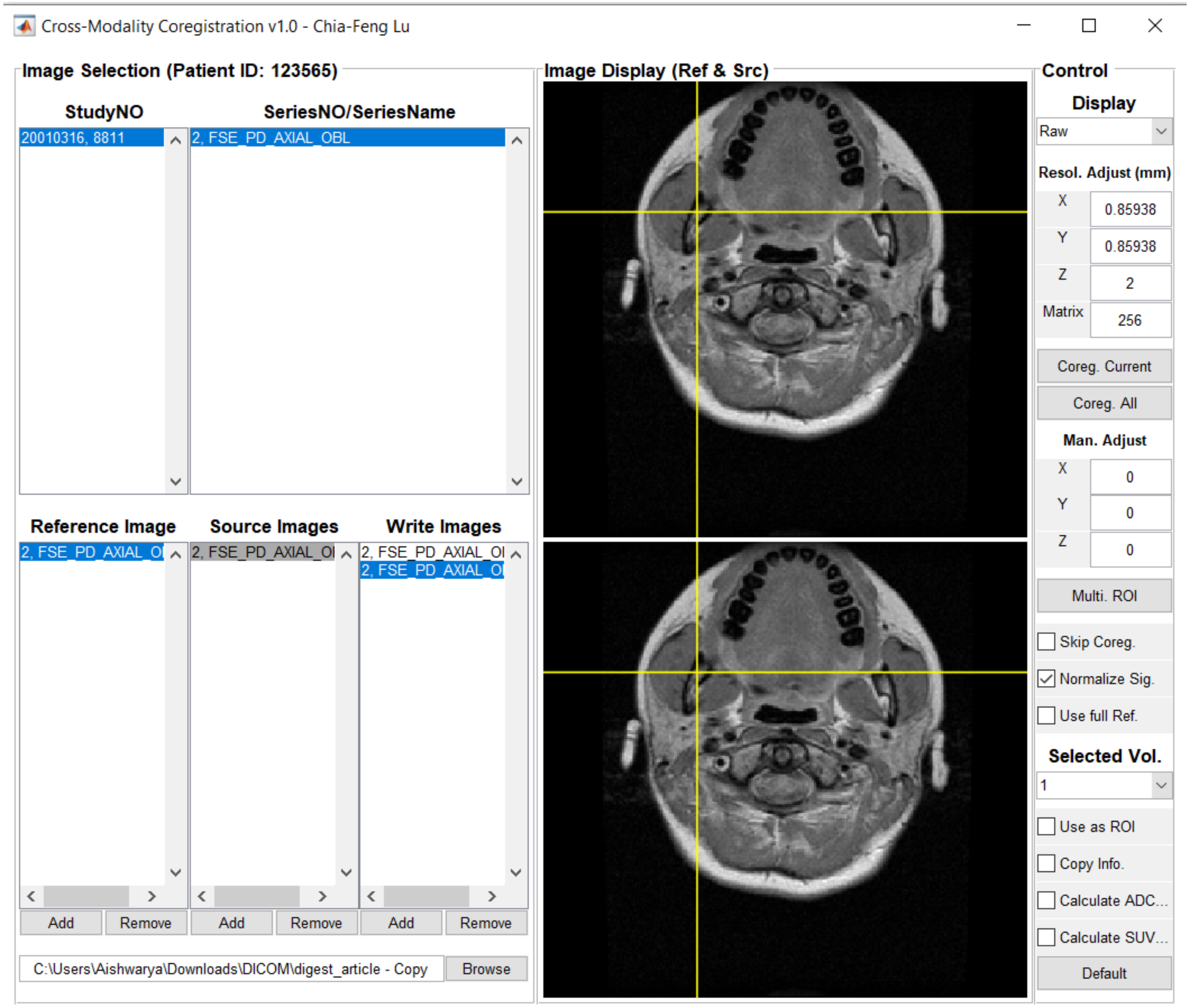
INTERPOLATION

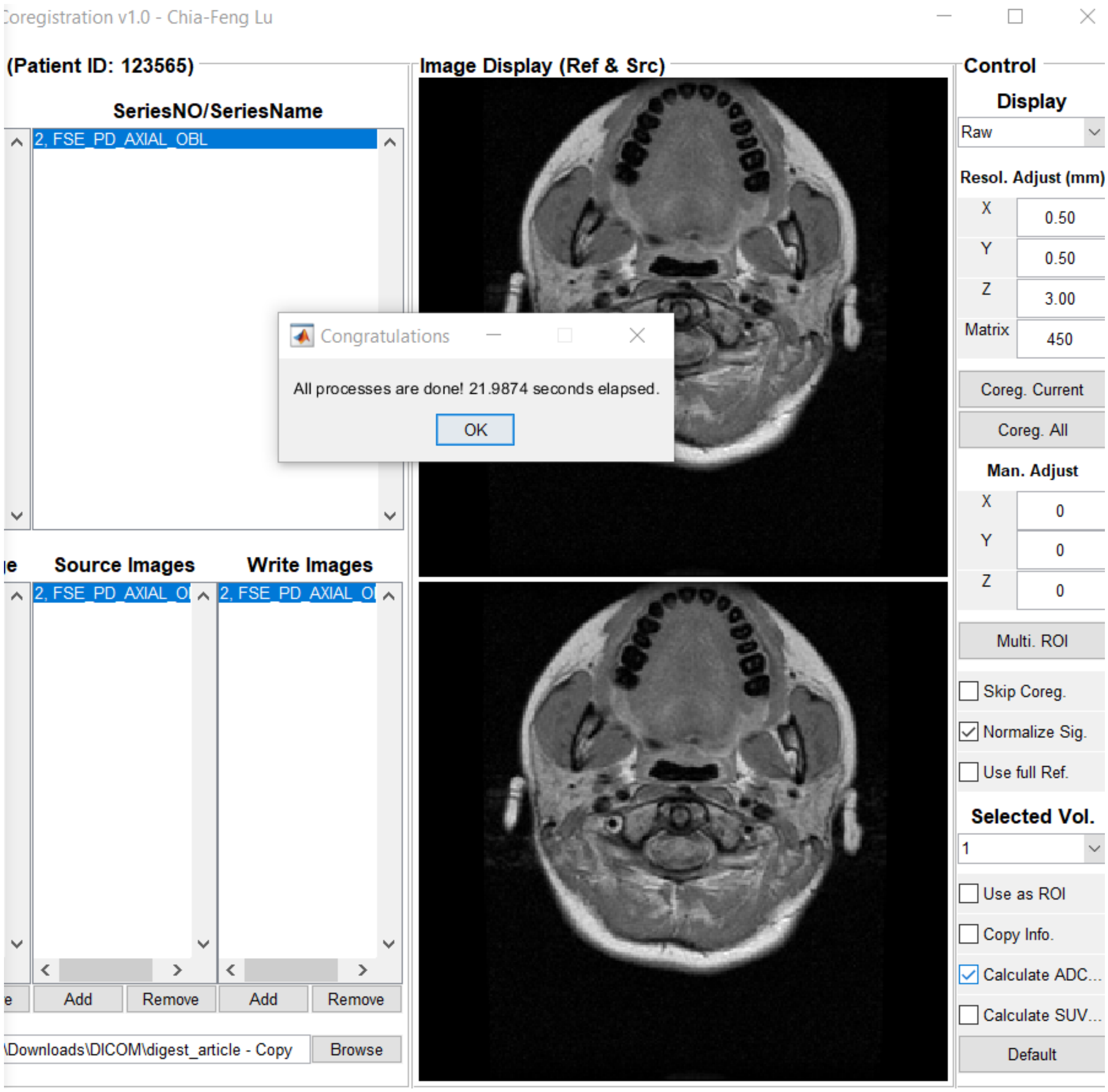
Image interpolation occurs when you resize or distort your image from one pixel grid to another. Image resizing is necessary when you need to increase or decrease the total number of pixels, whereas remapping can occur when you are correcting for lens distortion or rotating an image.

ADC

Apparent Diffusion Coefficient (ADC)
The ADC value is automatically calculated by MR scanner by placing the smallest Region of Interest (ROI) on the area of interest.
Lower ADC values suggest a malignant high-grade astrocytoma, whereas higher ADCs suggest low-grade astrocytoma.

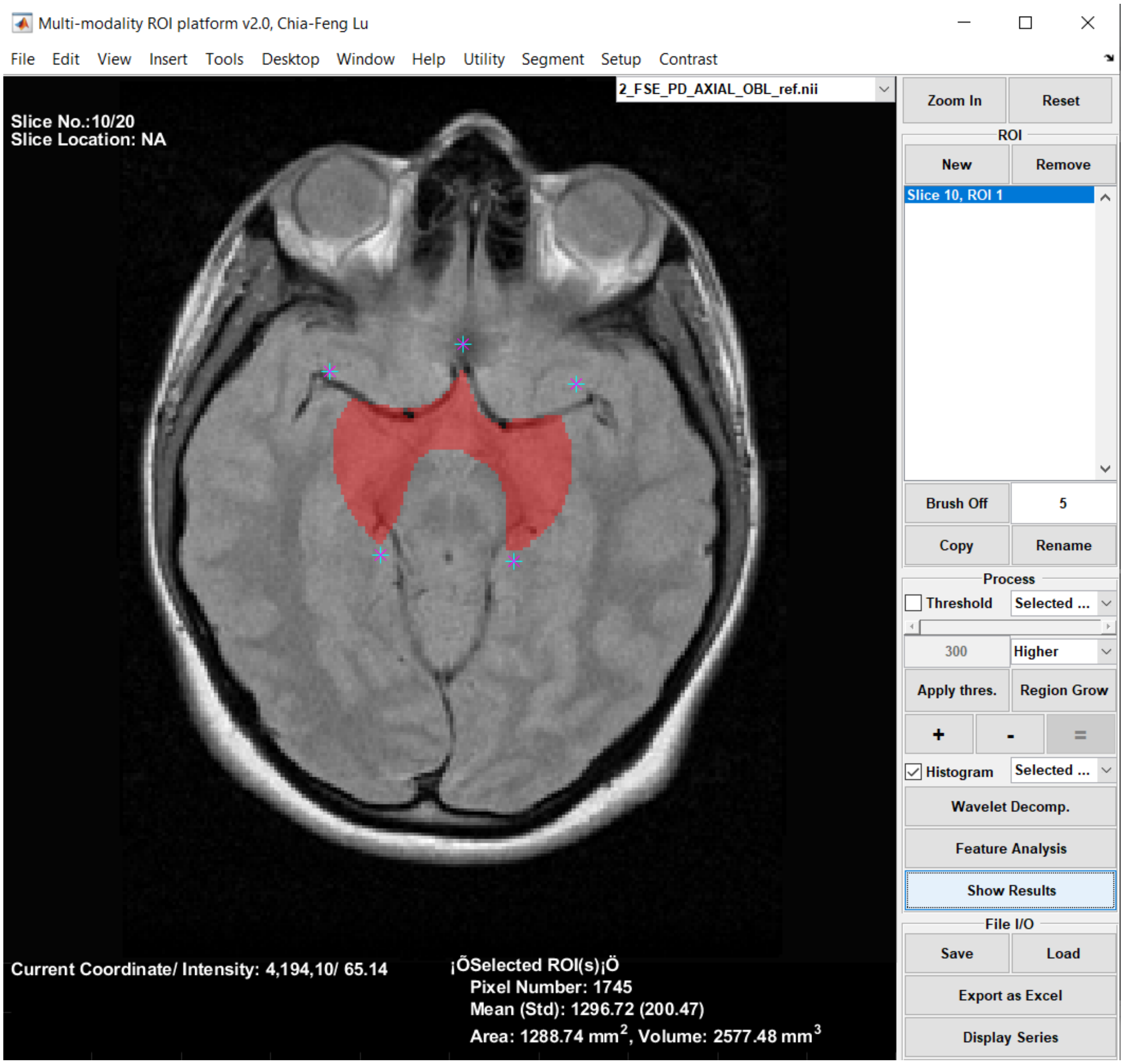
CROSS MODALITY COREGISTRACTION


Cross-Modality Coregistration v1.0 - Chia-Feng Lu
Image Selection (Patient ID: 123565)
StudyNO
SeriesNO/SeriesName
20010316, 8811
2, FSE_PD_AXIAL_OBL
Reference Image
Source Images
Write Images
2, FSE_PD_AXIAL_OI
2, FSE_PD_AXIAL_OI
2, FSE_PD_AXIAL_OI
2, FSE_PD_AXIAL_OI
Add
Remove
Add
Remove
Add
Remove
C:\Users\Aishwarya\Downloads\DICOM\digest_article - Copy
Browse
Image Display (Ref & Src)
Control
Display
Raw
Resol. Adjust (mm)
X
0.85938
Y
0.85938
Z
2
Matrix
256
Coreg. Current
Coreg. All
Man. Adjust
X
0
Y
0
Z
0
Multi. ROI
Skip Coreg.
Normalize Sig.
Use full Ref.
Selected Vol.
1
Use as ROI
Copy Info.
Calculate ADC...
Calculate SUV...
Default



MULTIMODALITY ROI

Multimodal imaging or multiplexed imaging refers to simultaneous production of signals for more than one imaging technique. For example, one could combine using optical, magnetic, and radioactive reporters to be detected by SPECT, MRI, and PET. The goal of multimodal or multiplexed imaging is to improve early detection and localization of cancer


Multi-modality ROI platform v2.0, Chia-Feng Lu
File Edit View Insert Tools Desktop Window Help Utility Segment Setup Contrast
2_FSE_PD_AXIAL_OBL_ref.nii
Slice No.:10/20
Slice Location: NA
Zoom In
Reset
ROI
New
Remove
Slice 10, ROI 1
Brush Off
5
Copy
Rename
Process
Threshold
Selected ...
300
Higher
Apply thres.
Region Grow
+
-
=
Histogram
Selected ...
Wavelet Decomp.
Feature Analysis
Show Results
File I/O
Save
Load
Export as Excel
Display Series
Current Coordinate/ Intensity: 4,194,10/ 65.14
¡ÕSelected ROI(s)¡Ö
Pixel Number: 1745
Mean (Std): 1296.72 (200.47)
Area: 1288.74 mm2, Volume: 2577.48 mm3

HISTOGRAM

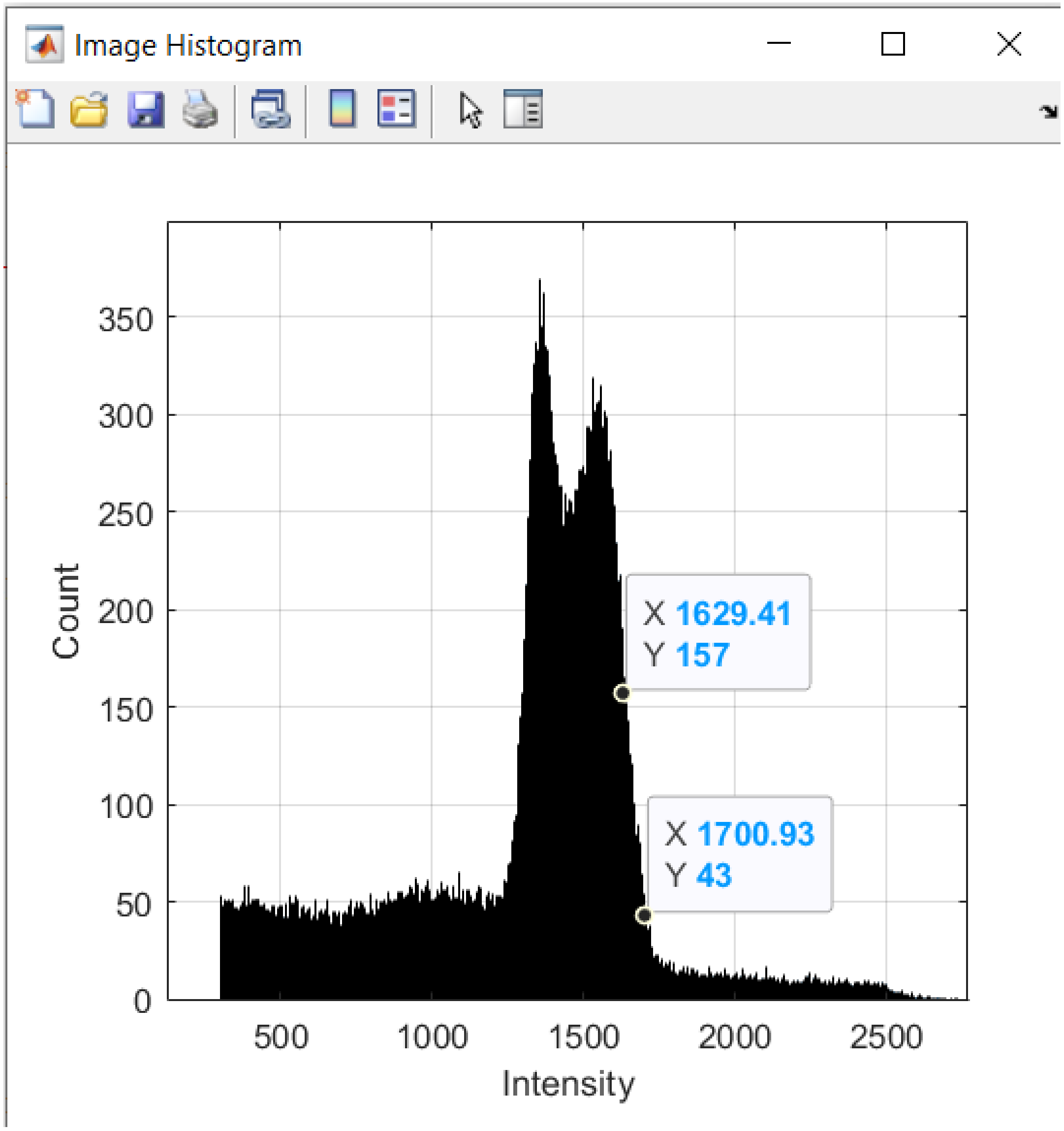


Image Histogram
Count
Intensity
350
300
250
200
150
100
50
0
500
1000
1500
2000
2500
X 1629.41
Y 157
X 1700.93
Y 43

RADIOMICS FEAUTURES:

Report of Radiomics Features of Lesion #1, Chia-Feng Lu

First order statistic

1. Energy:	3004270782.
2. Entropy:	7.7706
3. Kurtosis:	3.2395
4. Maximum:	1665.6298
5. Mean:	1296.7187
6. Mean absolute deviation:	147.095
7. Median:	1345.658
8. Minimum:	314.4885
9. Range:	