

## KEY BENEFITS

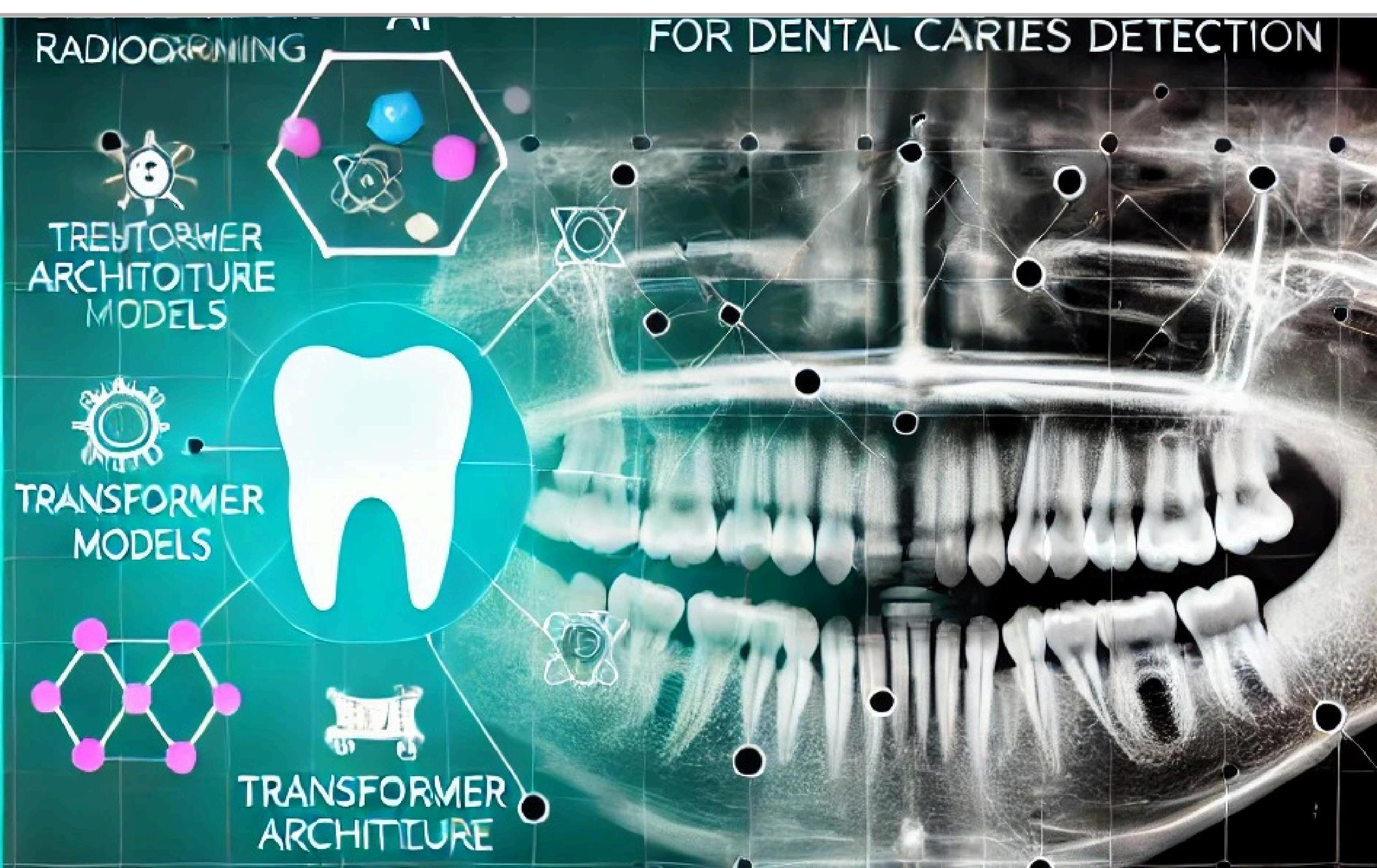
- Modularity: Easy to maintain and scale.
- Versatility: Supports various clustering algorithms and statistical analyses.
- Visualization: Enhances data interpretation with multiple plots.

## AFFILIATIONS

Analyze pixel intensity distributions, particularly for X-ray images.

# COMPARATIVE ANALYSIS OF IMAGE SEGMENTATION TECHNIQUES: GMM, K-MEANS, DBSCAN, AND FUZZY C-MEANS

Many technologies and breakthroughs would not be possible without research. It is important to keep members of the community informed about the latest updates. One way to do that is through research posters.



## 01. Introduction

In the ever-evolving field of computer vision, image segmentation and statistical analysis stand out as pivotal techniques for extracting meaningful information from visual data. Whether applied in medical diagnostics, autonomous driving, or digital image processing, these methods enable the partitioning of images into coherent regions and the extraction of valuable insights from pixel data.

## 02. Objective

PRESENT A ROBUST IMAGE

SEGMENTATION PIPELINE.

## Applications

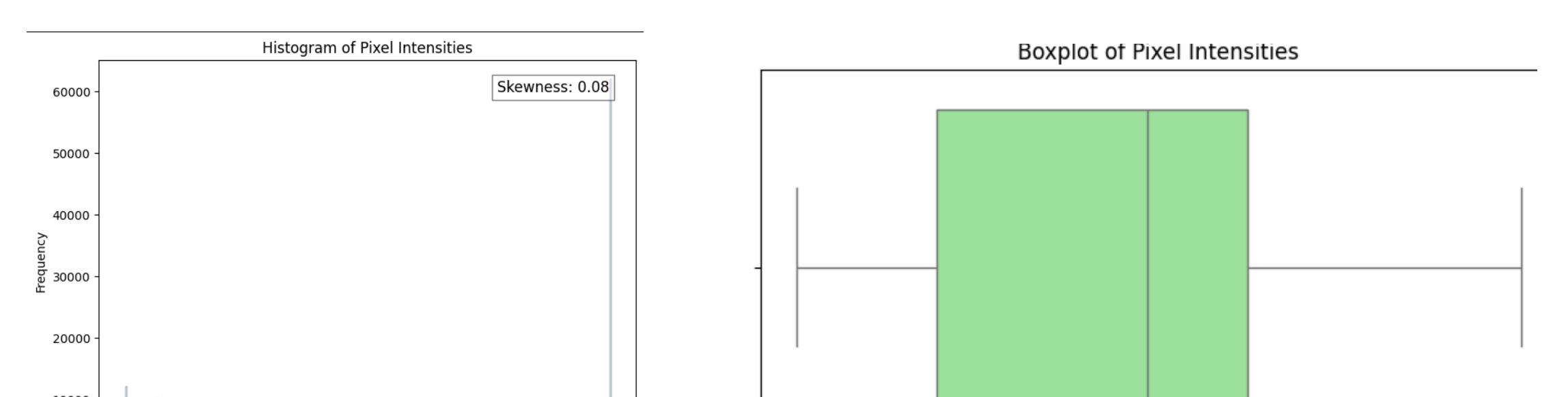
Medical Imaging  
dental caries  
detection  
Object Recognition  
Industrial Image  
Analysis Research in  
Computer Vision.

## 03. Methodology

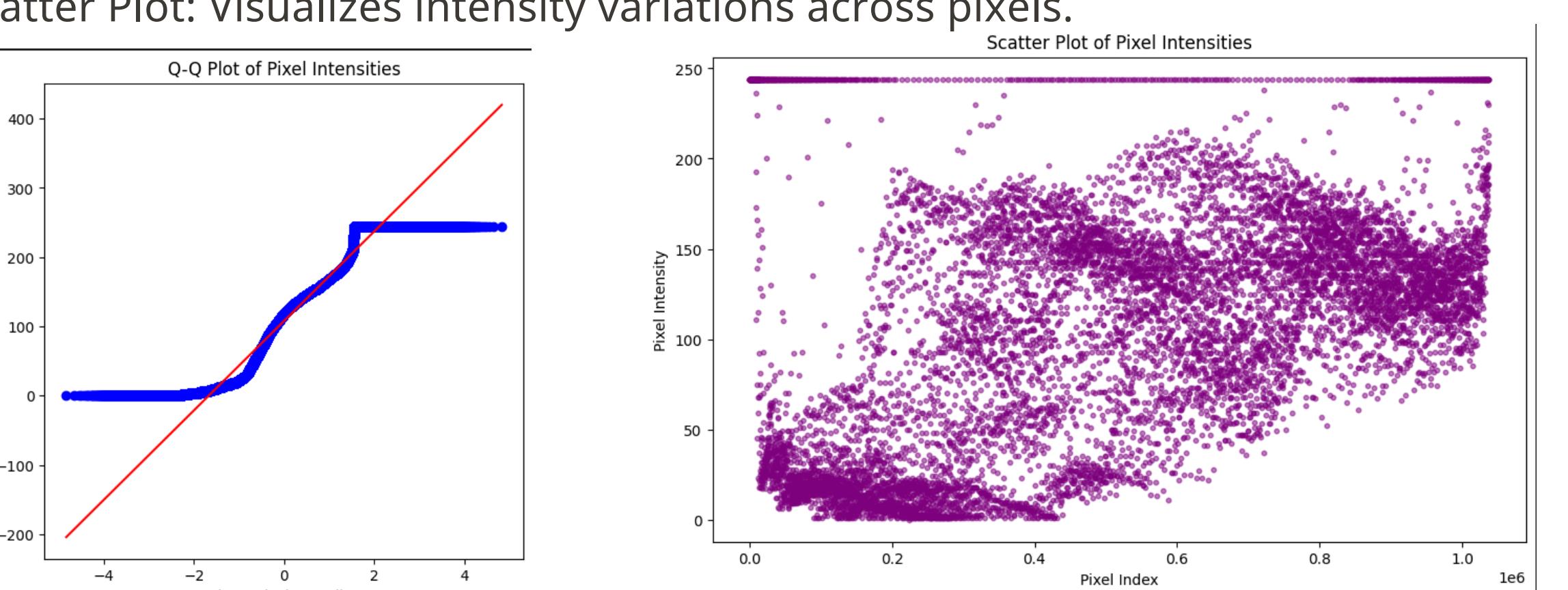
Image Loading & Preprocessing  
Feature Extraction  
Dimensionality Reduction  
Clustering Algorithms Post-processing & Visualization

## 05. Statistical Analysis

- Histogram: Displays pixel intensity distribution with KDE.
- Boxplot: Shows spread and central tendency with outliers.

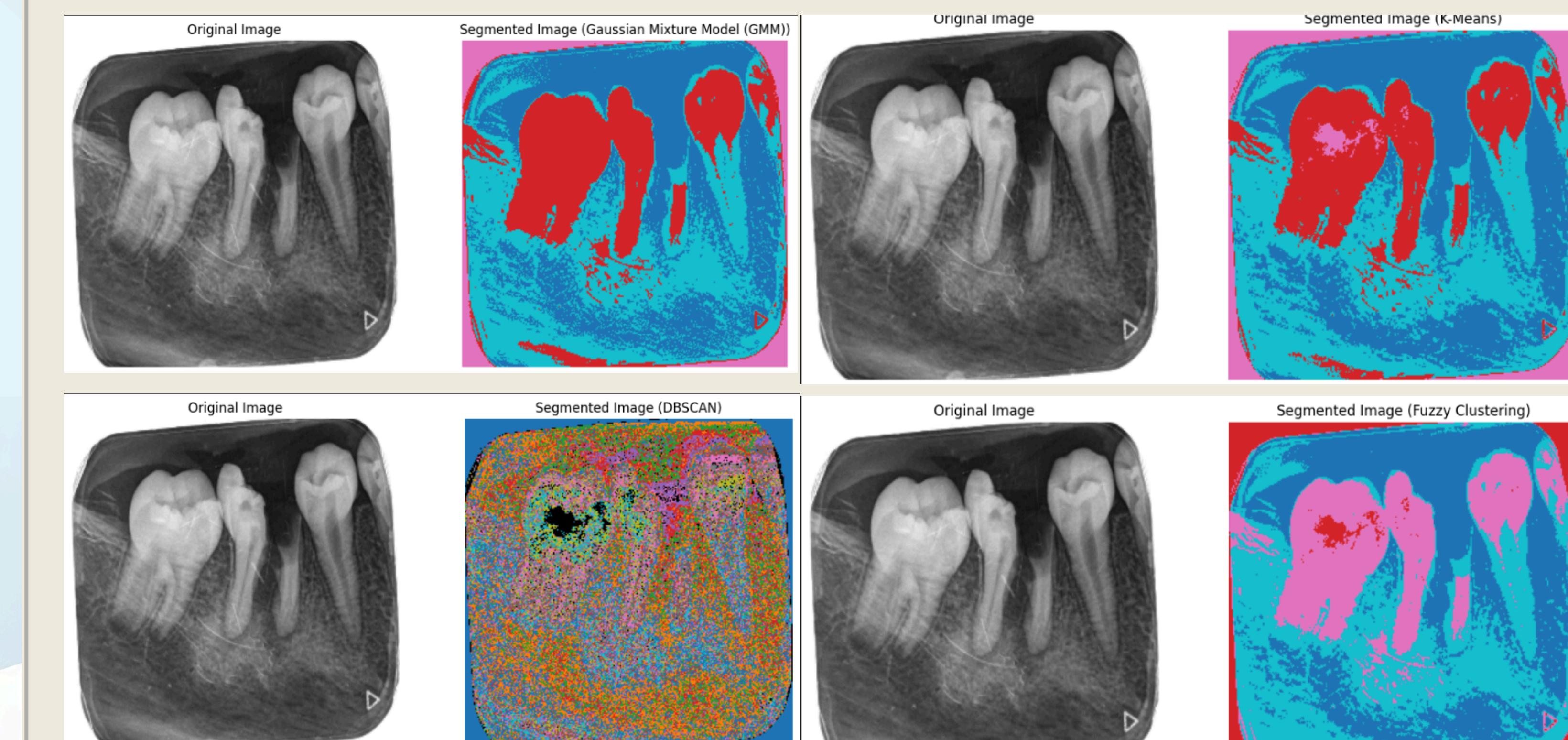


- Q-Q Plot: Assesses normality.
- Scatter Plot: Visualizes intensity variations across pixels.



## 04. Results/Findings

- Performance metrics (e.g., processing time).
- Example segmented images comparison



## 06. Conclusion

Summary of effectiveness. Integration of advanced methods & diverse datasets

- Image segmentation using advanced clustering.
- Statistical analysis of grayscale images.

## 07 FUTURE WORK:

using clustering techniques in deploy a u-net transformer with GMM

## 08 References:

- OpenCV Documentation: <https://docs.opencv.org/>
- <https://docs.opencv.org/>
- Scikit-learn User Guide: [https://scikit-learn.org/stable/user\\_guide.html](https://scikit-learn.org/stable/user_guide.html)
- [https://scikit-learn.org/stable/user\\_guide.html](https://scikit-learn.org/stable/user_guide.html)
- Krishnapuram, R., & Keller, J. M. (1996). Image Segmentation Using the C-Means Clustering Algorithm.

## team members

Mohamed rady salah	222200004
Nada Abd el karim Ahmed	222101758
Abanoub Maged Ageb Elsayed	222100001
Ibrahim elgaaly	A2000001
Mazen sherif attia	222101273
Abd elrahman Mohamed negm	222200016
amira yasser	222100305