# Project Proposal: Exploration of Segmentation Techniques in Biomedical Image Processing

**Introduction:** This project aims to explore, investigate, implement, and compare different segmentation techniques applied to images acquired through specific medical imaging technologies, such as Magnetic Resonance Imaging (MRI), Computed Tomography (CT), ultrasound, among others. Identify and apply segmentation techniques based on scientific literature and evaluate their effectiveness on a set of images.

**Project Steps:**

1. **Literature Review**:
    - Search for one or two scientific articles related to classical segmentation strategies applied to images acquired during the second workshop.
    - **Suggested platforms for the search**: Google Scholar, IEEE Xplore, PubMed, typeset.io, among others.
    - Ensure that the selected articles discuss segmentation methods (such as thresholding, region growing, watershed, K-means, etc.) and are recent.
2. **Implementation of Segmentation Strategies**:
    - Implement at least **two segmentation strategies** found in the literature. These strategies can include classical techniques such as thresholding, region growing, watershed, and more advanced techniques such as K-means.
    - Implement a GUI (kivy) for loading an image, and applying the segmentations strategies with objects for parameter configuration (such as: threshold, seeds, number of centroids). The GUI should present the original and segmented image.
3. **Comparison of Results**:
    - Visually compare the results of the different segmentation strategies applied to the same images.
    - Use quantitative evaluation metrics that are used in the documented articles, and perform a visual evaluation of the segmentation.
4. **Critical Analysis**:
    - Discuss the advantages and limitations of each technique in terms of segmentation quality, processing time, and applicability in real clinical settings.
    - Analyze how image characteristics (noise, contrast, resolution) affect the segmentation results.

5. **Final Report and Presentation**:
    - Prepare an academic report, which will include:
        - Introduction and objectives of the project.
        - Literature review on the selected segmentation techniques.
        - Description of the implemented segmentation methods.
        - Captures of the GUI usage.
        - Comparative analysis of the results.
        - Conclusions and recommendations for the application of the techniques in medical scenarios.
    - **Report format**: Written in LaTeX, following IEEE standards or other academic journal formats.