User Manual:

Pelvis CT Image Segmentation App

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1. Introduction

The **Pelvis CT Image Segmentation Application** is a tool designed to segment the prostate and organs at risk (OAR) from pelvis CT images using deep learning algorithms. The primary goal of this application is to aid medical professionals in identifying critical structures in medical imaging for radiotherapy and other medical treatments.

This user manual will guide you through the installation process, explain the user interface, and provide a step-by-step guide on how to use the application.

2. System Requirements

- **Operating System:** Windows 10/11, macOS, Linux
- **MATLAB Version:** R2021a or later
- **Required Toolboxes:**
  - Deep Learning Toolbox
  - Image Processing Toolbox
- **RAM:** 8 GB
- **Disk Space:** 2 GB free for installation

3. Installation

Follow these steps to install the application:

1. **Download the application file:** Download the application file from the repository.
2. **Add the application to MATLAB path:** Open MATLAB and navigate to the folder where the application file is stored. Add the folder to the MATLAB path by running the following command:

   addpath('C:/path_to_application_folder');

3. **Run the application**: In the MATLAB command window, type the following to start the application: ´

   Pelvis CT Image Segmentation App

4. User Interface

- **Main Window description.**

When the application is launched, the main window will appear. It contains several key areas (Fig. 1):

- **Patient Data Panel:** Displays patient information such as:
    - Name: [Patient Name]
    - Birth Date: [Date of Birth]
    - ID Number: [Patient ID]
- **View Area:** Shows the loaded CT image and displays the segmented organs after processing.
- **ROI Structure Area**: Lists all segmented organs with a corresponding color legend for each organ's contours.
- **Control Panel**: Contains buttons for user interaction.

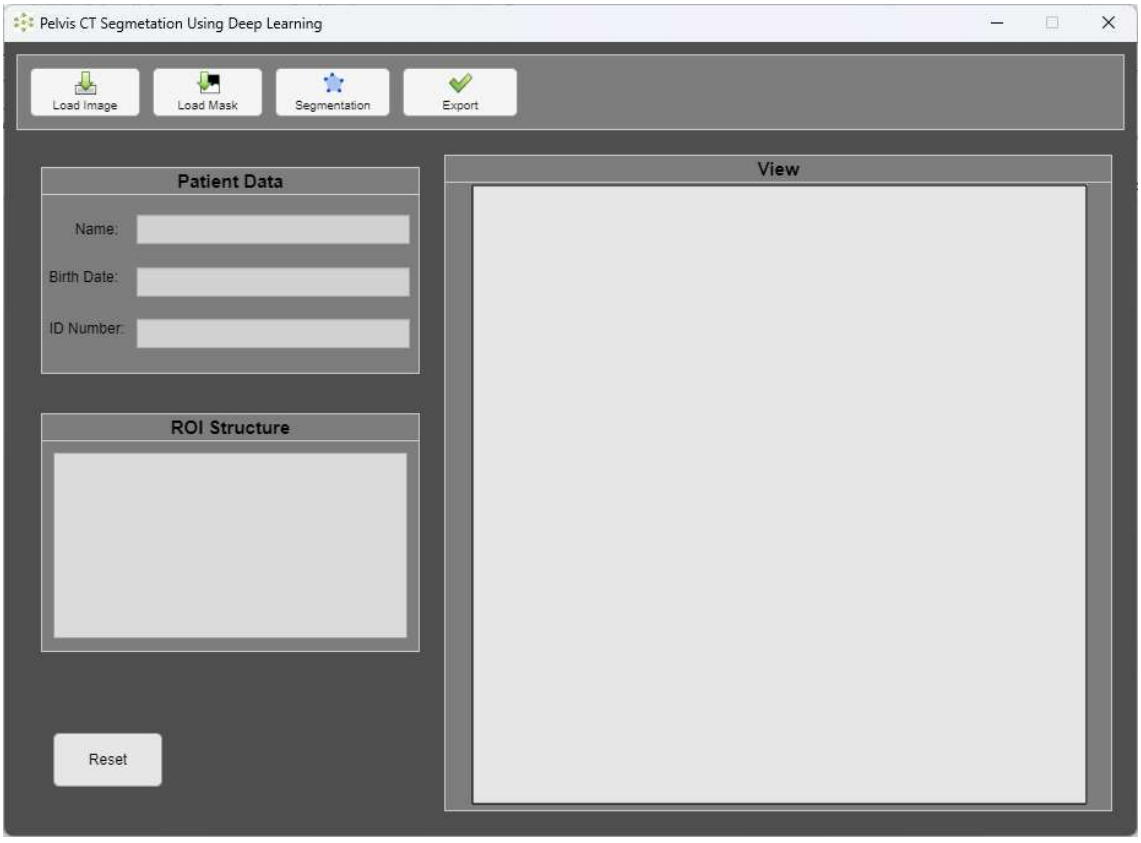

Figure 1. Main Window

- **Buttons Description**

Button	Description
Load Image	Allows the user to load a CT image (in .dcm format) from the local computer.
Load Mask	Loads a previously saved segmentation mask from a .png file.
Segmentation	Executes the deep learning model to perform organ segmentation.
Export	Saves the segmented mask in .png files.
Reset	Resets the application to its initial state.

5. Usage Example

Here is an example of how to use the Pelvis CT Image Segmentation Application:

Step 1: Load a CT image

- Click on the **Load Image** button. A file dialog will open, allowing you to select a CT scan file. The patient's information (Name, ID, Birth Date) will automatically display in the **Patient Data** Panel, and the image will appear in the **View Area**.
- **Note**: The repository includes a folder named **Database Image Samples** containing example images you can use to test the application. These images have been anonymized and are safe to use for testing and demonstration purposes.

Step 2: Segment organs

- Click the **Segmentation** button. The deep learning model will process the image, and after a few seconds, the segmented organs will appear in the **View** Area over the CT image. These segmented organs will be listed in the ROI Structure Area, with the corresponding color-coded contours shown in the View Area (Fig. 2).

Step 3: Save the results

- After verifying the segmentation, click the **Export** button to export and save the segmented mask in format like .png.
- **Note:** To load a previously saved mask, click the **Load Mask** button. Select a .png file containing the segmentation mask. The loaded mask will appear over the CT image, and the associated organs will be reflected in the ROI Structure Area.

Step 5: Reset or exit

- You can reset the application by clicking the **Reset** button

Figure 2. Example of two CT images segmented using the application. The ROI

6. Troubleshooting

Issue	Solution
The application does not launch	Ensure the path to the application folder is correctly added in MATLAB and you are using MATLAB R2021a or later.
Patient data does not appear	Ensure the CT image file contains patient metadata. DICOM files usually store patient information, but other files might not.
Segmentation button is unresponsive	Ensure a CT image is loaded before attempting segmentation. Verify the image format is supported
Cannot load segmentation mask	Verify that the mask file is in .png format and that it corresponds to the loaded CT image.

7. Contact and Support

For assistance with the application or any inquiries, please reach out to:

- **Email:** gutierrezramossilvia@gmail.com