

fP-CMC: Fast Patch-based Continuous Min-Cut segmentation

1. Summary : This software presents a **semi-supervised segmentation framework for B-mode ultrasound imaging**. It is applicable to any kind of target and imaging settings. Our methodology uses **a graph of image patches** to represent the ultrasound image and **user-assisted initialization with labels**, which acts as soft priors. The segmentation problem is formulated as a **continuous minimum cut problem** and solved with an efficient optimization algorithm.

2. Works using fP-CMC should cite :

Anca Ciurte, Xavier Bresson, Olivier Cuisenaire, Nawal Houhou, Sergiu Nedevschi, Jean-Philippe Thiran, Meritxell Bach Cuadra, **Semi-Supervised Segmentation of Ultrasound Images based on Patch Representation and Continuous Min Cut**. *Plos One*, 9(7), p. e100972, 2014.

3. How to use:

3.1 Launch main.m

3.2 Select the image (2D B-mode ultrasound) that you want to segment (USImages folder contains some examples of eye tumor, fetal head and liver tumors).

3.3 Proceed to the label definition:

3.3.1. Foreground object to be segmented: draw the label with the polygonal tool of Matlab. Define some area inside the object by different lines (one click) and followed by a double click to close the polygon.

3.3.2. Background area: draw the label as an ellipse outside the object (thus including the object as less background area as possible. This is done by the click and drag tool of Matlab, select a upper/left corner for instance and enlarge the ellipse, finish by one (any) key pressed.

3.4 The evolving contour through iterations is presented in magenta in figure 100.

4. Code Copyright :

License: GPLv3 - 29 June 2007

Copyright (c) 2014, anca.ciurte@cs.utcluj.ro (Anca Ciurte), olivier.cuisenaire@gmail.com (Olivier Cuisenaire), meritxell.bachcuadra@unil.ch (Meritxell Bach), xavier.bresson@unil.ch (Xavier Bresson) with Radiology Department, Medical Image Analysis Laboratory (MIAL), CIBM (UNIL and CHUV), Signal Processing Laboratory (LTS5 - EPFL), and Computer Science Department, Technical University of Cluj-Napoca (UTCN).

All rights reserved.

These files are the Fast Patch-based Continuous Min-Cut (fP-CMC) segmentation software

fP-CMC is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version.

fP-CMC is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with fP-CMC. If not, see <<http://www.gnu.org/licenses/>>.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.