

Automatic Template-based Brain Extraction in Fetal MR Images

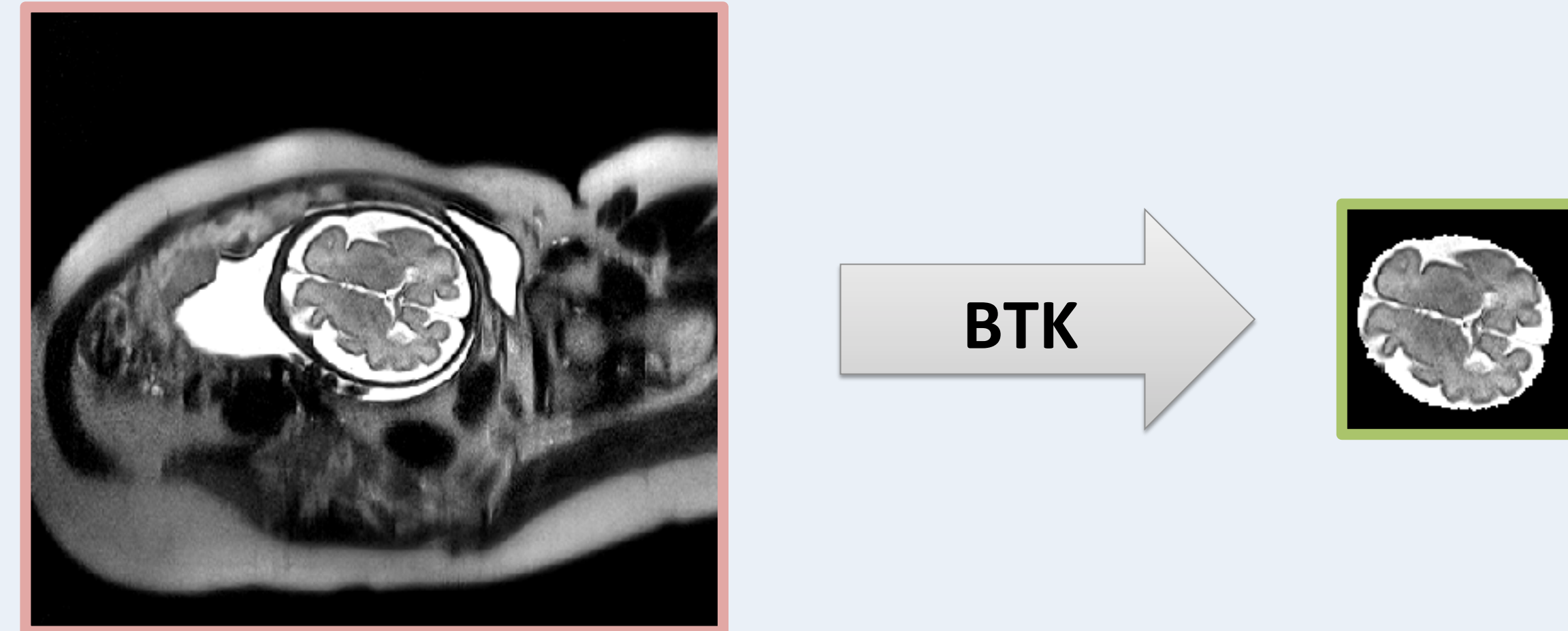
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² BICG, University of Washington, Seattle

Purpose

Automatic brain extraction
in fetal MR images
using age-specific template

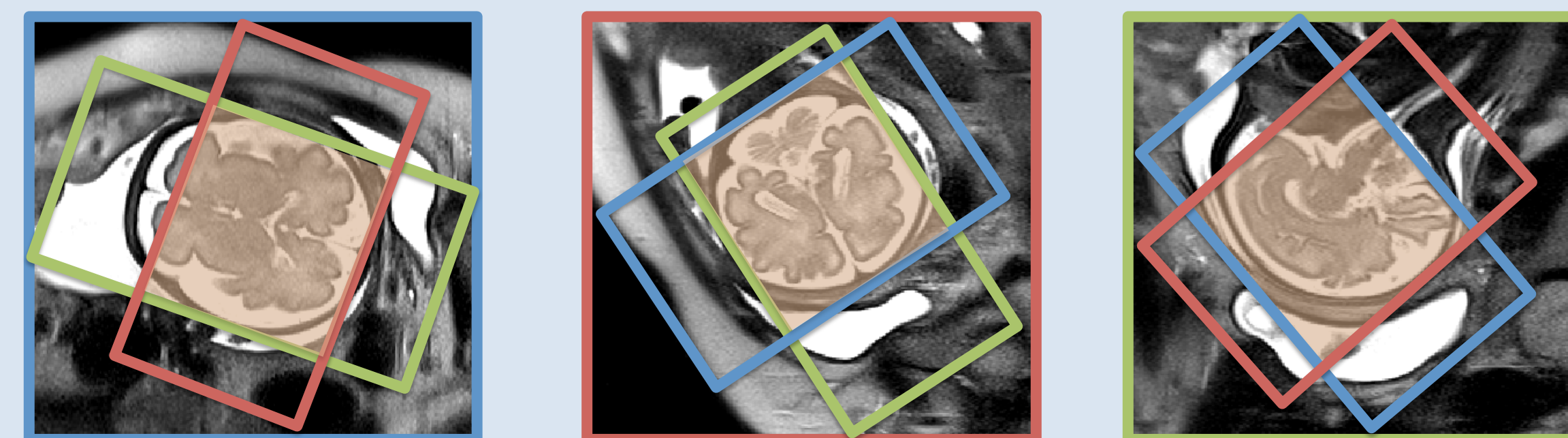


Pipeline

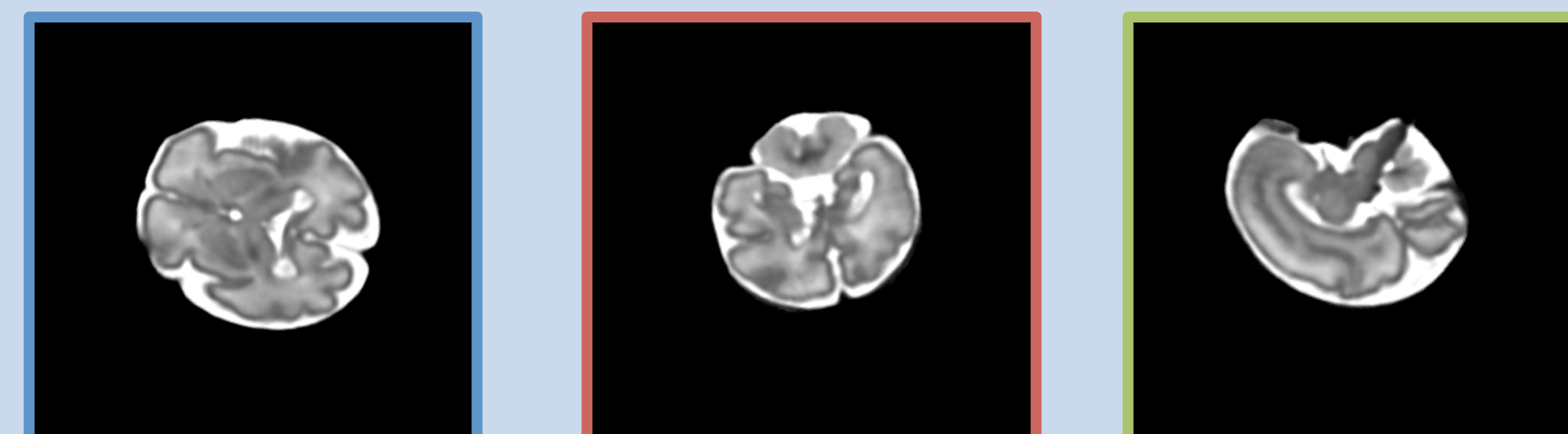
3 orthogonal In utero fetal
brain MR images
(axial, coronal, sagittal)



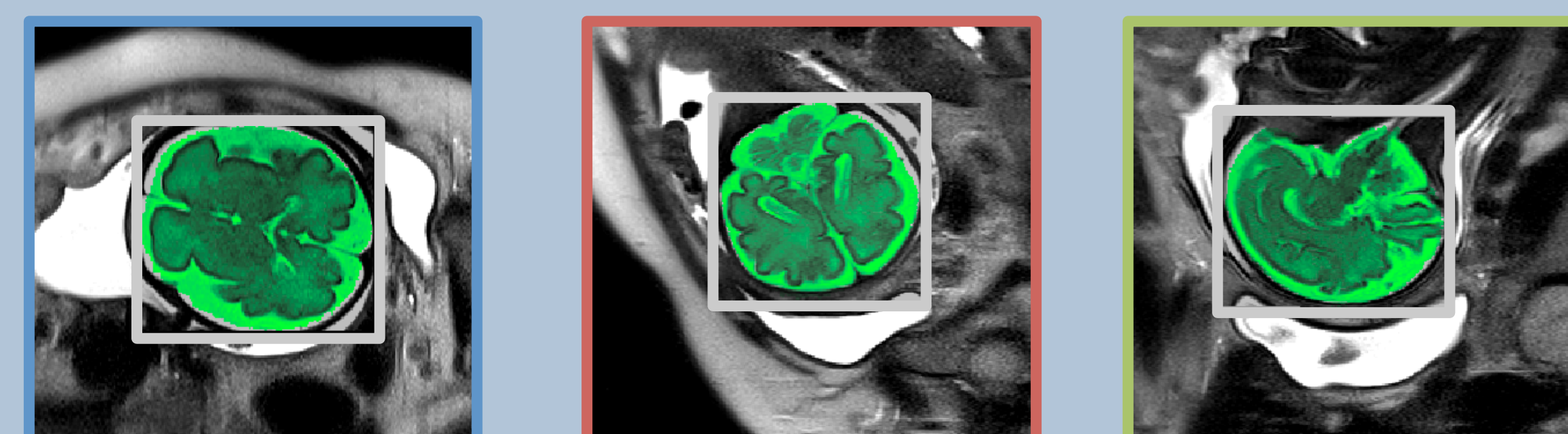
3D intersection defines
a first estimate of the brain mask



Age-specific template registration
using FSL flirt



Template-based brain masks are fused
into a consistent mask



Data

T2 weighted HASTE sequence

TE = 147ms

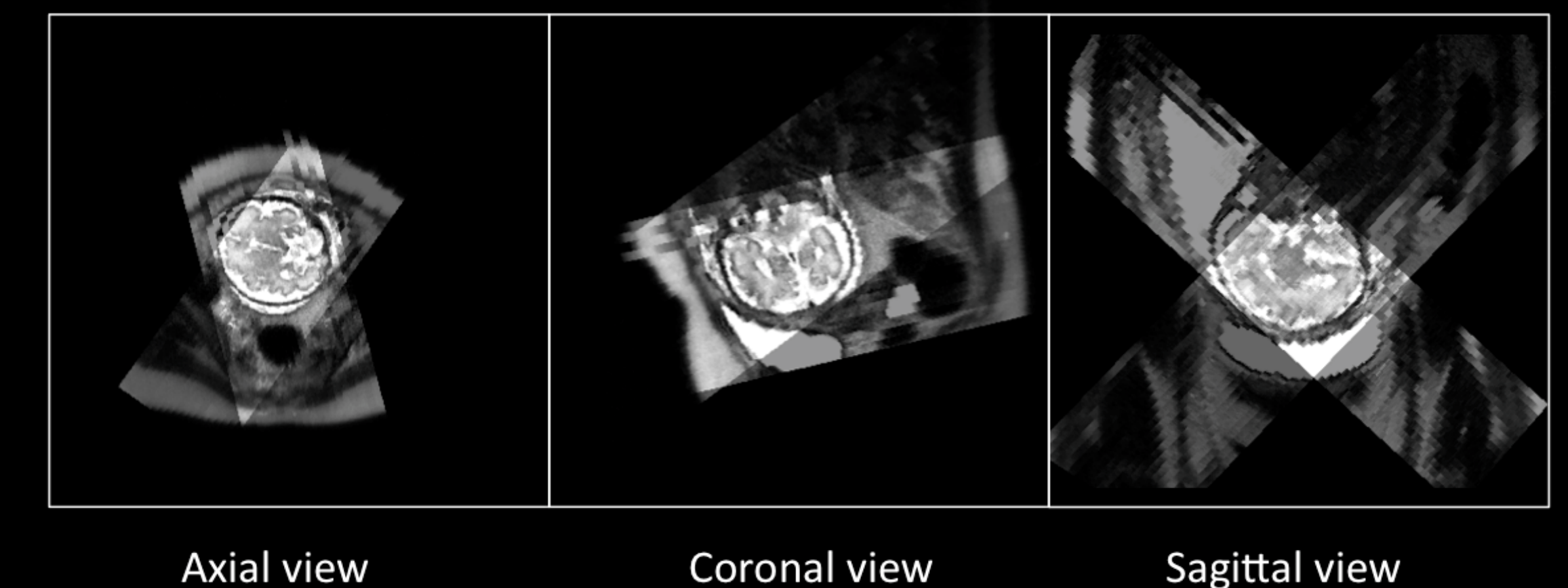
TR = 3190ms

Resolution: 0.74 x 0.74 x 3.45mm
1.5T Siemens Avanto MRI scanner

34 subjects

163 images

Figure 1: Overlay of two (axial and coronal) fetal brain images



Results

Successful estimation:

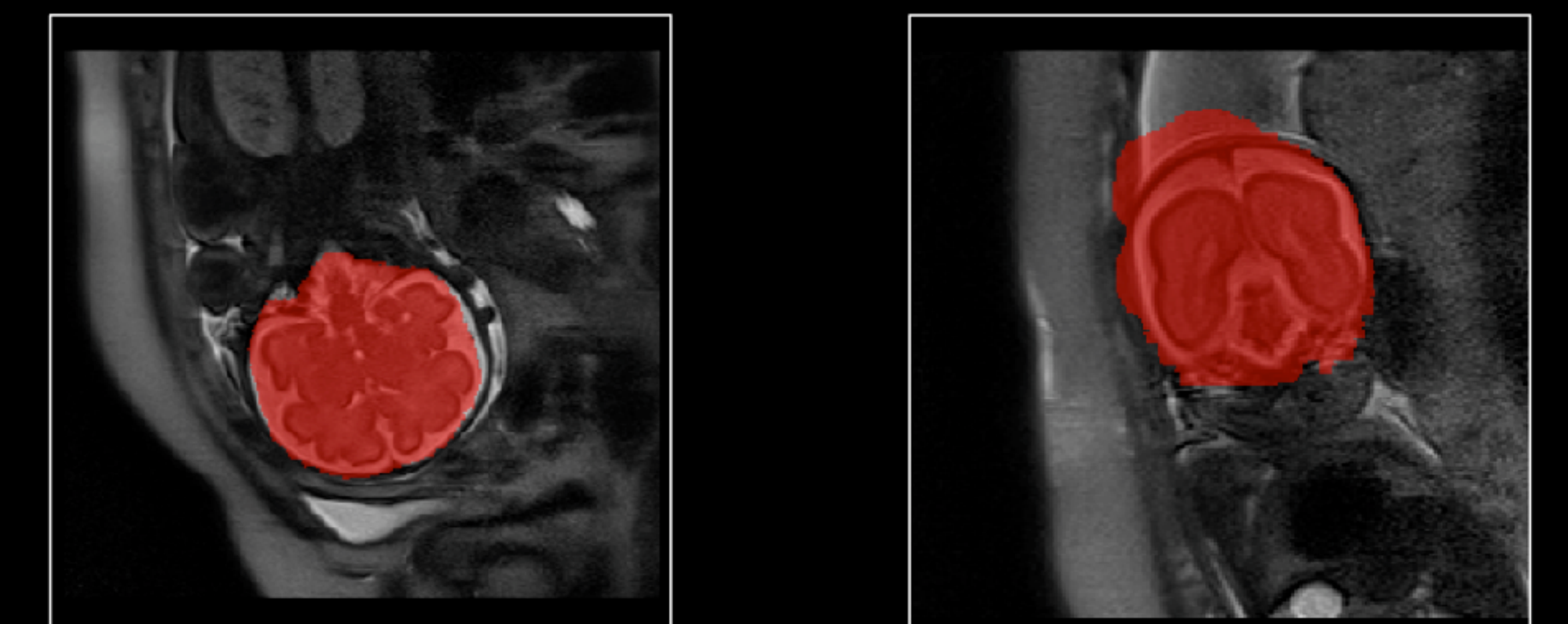
82%

(134 images)

In **17%** of subject cases,
no brain masks have been
correctly estimated.

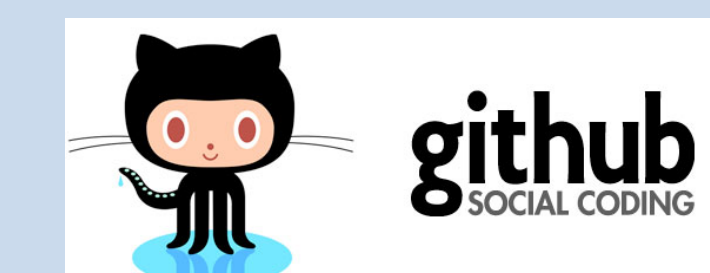
User warning is provided
using mask consistency.

Figure 2: results of the brain extraction method



This brain extraction tool is available in a free
software: **Baby Brain Toolkit (BTK)**

BTK includes also tools for motion correction,
segmentation, tractography, atlas building...



github.com/rousseau/fbrain



www.nitrc.org/projects/btk

F. Rousseau, E. Oubel, J. Pontabry, M. Schweitzer, C. Studholme, M. Koob, J.-L. Dietemann

BTK: An open-source toolkit for fetal brain MR image processing. Computer Methods and Programs in Biomedicine, 2013

