

# Extraction of Sartorius Muscle with Tendon Attachment Sites from MR Images by Using Active Shape Model

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## Abstract

In this paper, a new approach for segmentation of sartorius muscle (MSAR) with the Tendon Attachment Sites (TAS) from 3D Magnetic Resonance (MR) Images is presented. The segmented muscle is used in a human gait modeling software. By means of the modeling, the cause of gait pathologies could be diagnosed.

In this approach, three Active Shape Models (ASM) [Co04] are employed (Fig 1). Two of them are 2D models of cross section of bones which contain the beginning and the end positions of MSAR and they are used to search for the corresponding bones from MR images. By using the searched bones, the Vertical Span Length (VSL) of the muscle can be calculated. The VSL is needed to rescale the third ASM: the 3D MSAR model which is automatically adjusted by global (scale and translation) and local fitting (deformation of ASM) to segment the muscle of the MR images.

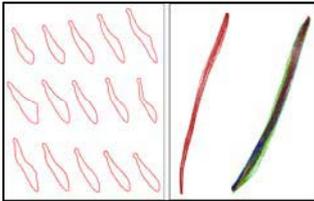


Figure 1: Examples of ASM. Left part shows the deformations of one of the 2D bone models. Right part shows the individual 3D muscle sample (red object) and all samples (multi-colours object) that are aligned to get the 3D muscle ASM.

Comparing the results of our approach with manual segmentation by a specialist, the mean deviation of the extraction of TAS position is 4.7 mm and the accuracy of muscle segmentation is 82%. Figure 2 shows some segmented MSAR results.



Figure 2: Examples of segmented muscle, white contours are the results of our approach. Black contours are the manually segmented results.

## Reference

[Co04] Cootes, T.F.; Taylor, C.J: Statistical models of appearance for computer vision, Technical Report, Imaging Sc. and Biomedical Eng., University of Manchester, 2004.