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A Robust Technique for Detecting Abdominal Aortic Calcification Using Dual Energy X-Ray Absorptiometry

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Background:

Abdominal aortic calcification (AAC) is a marker of atherosclerosis and a predictor of subsequent vascular disease. To date, there has been little research into the automatic detection and quantification of AAC.

Methods:

In this study, lateral dual energy X-ray absorptiometry (DXA) scans are used to detect AAC; this is possible because of the anatomical position of the abdominal aorta anterior to the lumbar spine. The deformable shape modelling techniques active shape (ASM) and active appearance (AAM) models are used to model the calcified aorta and four vertebrae of the lumbar spine L1-L4.

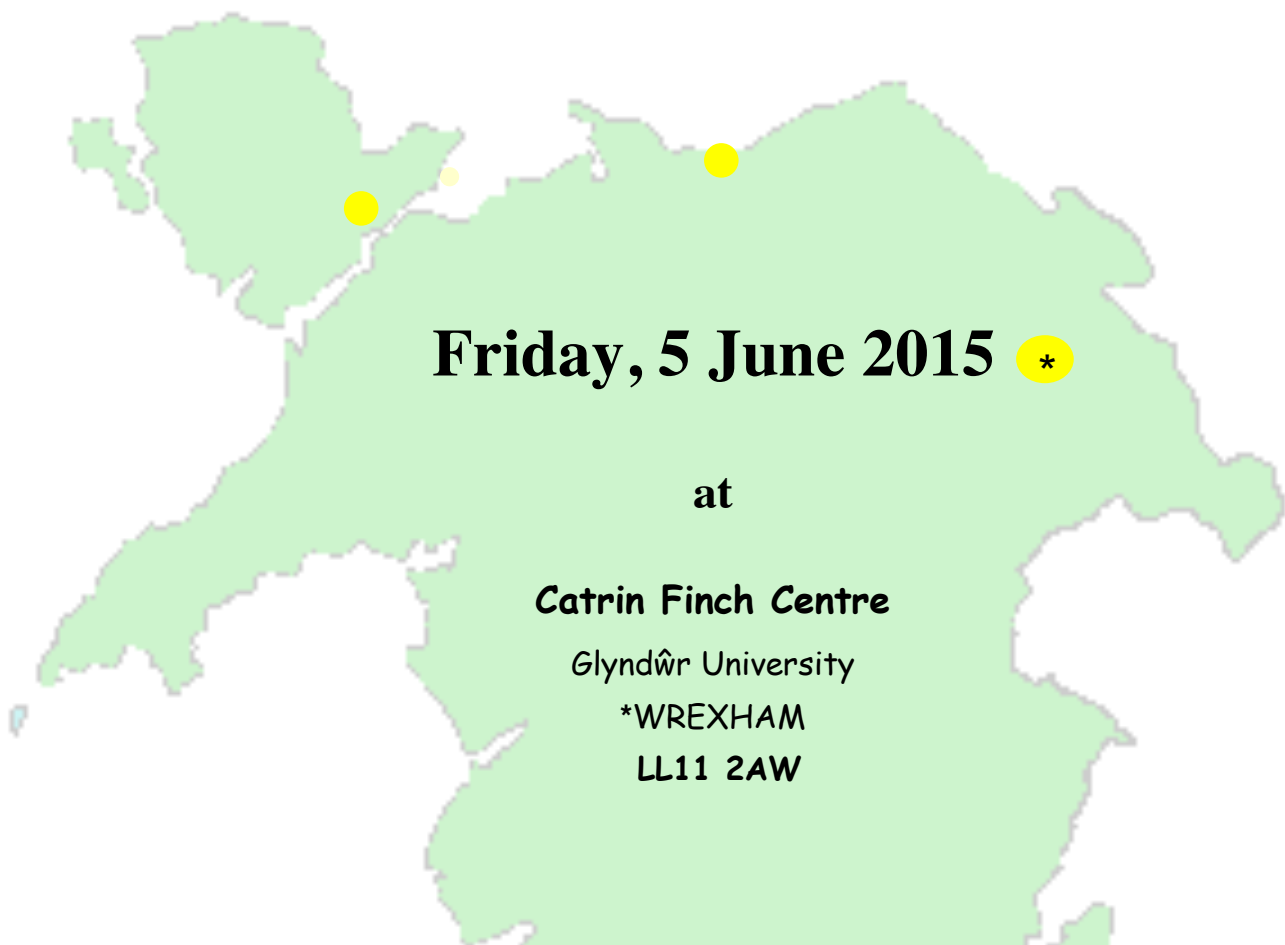
Results:

ASM and AAM were trained and tested on 14 DXA images. The shape of both calcified aorta and four lumbar vertebrae were extracted automatically from the DXA scans using combined shape and appearance models.

Conclusion:

ASM and AAM were implemented successfully. The calcified aorta obtained from the DXA scans was segmented using this modelling technique. The next step is to develop a new automated method to quantify the calcification within the aorta.

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