About Sectra
Sectra’s head office is located in Mjärdevi, Linköping and consists of two operations: Medical IT and Cyber Security. The Medical IT operation develops and sells IT solutions to make the world’s healthcare more efficient. The cyber security operation, develops and sells security solutions for government and defense organizations in Europe.

Sectra Orthopaedic Solutions
Sectra Orthopaedic Solutions provides cutting edge applications for pre-operative planning and post-operative followup to orthopaedic surgeons across the world. Our innovative 2D and 3D tools for arthroplasty, trauma and spine surgery are unsurpassed in their effectiveness and user friendliness and we constantly strive to be the technology leader in every field we enter. We are a small but growing entrepreneurial unit within Sectra Business Innovation with very ambitious goals and the passion to exceed them.

Next-generation segmentation of bone in computed tomography images
One of the primary concerns of three-dimensional (3D) orthopaedic applications is the ability to segment—or extract—bone tissue from volumetric computed tomography (CT) images. While Sectra’s orthopaedic software currently comes equipped with an intuitive and well-liked segmentation tool, relatively recent publications suggest more effective algorithms may be available, which along with careful GUI design holds the promise of being able to generate satisfactory results in many more of the really challenging cases, with minimal negative impact on the user experience. This thesis work aims to explore whether this is indeed the case, through literature studies as well as prototype development in Sectra’s .NET based medical imaging framework and/or a sandbox environment based on the Unity game engine.

Prerequisites: object-oriented programming, 3D math & algorithms, image analysis. Medical visualization a plus.

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Transfer of vertebral orientations from 2D to 3D medical images

Threedimensional (3D) medical imaging has many advantages over traditional twodimensional (2D) x-ray imagery when doing pre-operative planning of spine surgery. However, the latter still has the huge advantage of being possible to perform while the patient is in an erect, load-bearing position, as opposed to the former case where the bulkiness of the machinery enforces a relaxed, supine position. Since the information about the configuration of the vertebrae available in a load-bearing x-ray is of the utmost importance when planning spine surgery, this thesis work aims at combining the power of the two imaging techniques by transferring the positions and rotations of each vertebra obtained from two orthogonal x-ray images of a patient onto a 3D scan of the same patient.

Prerequisites: 3D math and algorithms, image analysis. Object-oriented programming, machine learning and medical visualization a plus.

Custom thesis work in Orthopaedics

Sectra is always looking for the best and the brightest to join our ranks, and this also goes for thesis workers. If you have a great idea for a thesis in the field of orthopaedics and think you have what it takes to carry it through, please don’t hesitate to contact us. We’re always open to new ideas!

Deploying machine learning solutions in heterogeneous clinical computing environments

Machine learning (ML) holds the promise to revolutionize the field of medical IT, and orthopaedics is no exception. With several ML-based projects on the horizon, a highly relevant issue at Sectra Orthopaedic Solutions is that of deploying a trained model in production in order to make this promising new technology available to users worldwide. This thesis work aims to examine qualities such as performance, cost and maintainability of various deployment models for machine learning, with as much emphasis as possible on experimentation and gathering of empirical data. Options range from deploying a TensorFlow stack in the cloud to shipping a binary based on C# and CNTK.

Prerequisites: object-oriented programming, machine learning, cloud computing.

General qualifications

Enrolled in a Master’s program in software engineering or similar, strong academic records.

Location

Sectra headquarters, Linköping, Sweden

Submit your application along with your resume and university transcripts to www.sectra.com/jobs

If you have any questions regarding this thesis opportunity, please don’t hesitate to get in touch with Mattias Bergbom, +46 73 504 70 96

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