C-RAD is a global medical device company with head quarter in Uppsala. We develop, produce and sell innovative solutions to healthcare customers. The focus is on patient positioning, monitoring and imaging within radiation therapy. We are market leader in the field of optical patient positioning. C-RAD is a stock listed company at NASDAQ OMX Nordic Exchange. C-RAD group consists of three daughter companies in Sweden and sales offices in the USA, Germany, France and China. C-RAD is ISO 13485 certified. Please read more about C-Rad on www.c-rad.com.

We are currently looking for a master thesis student to study, optimize and evaluate a method for open mask isolation for use in surface guided radiation therapy.

Patient face and mask separation for surface image guided radiation therapy

30 hp, Master thesis work

In the modern era of radiation oncology with Stereotactic Radiotherapy Treatments (SRT), in which very high treatment dose is delivered to tumors often located in the patient head, accuracy and precision is crucial for the treatment success. For this purpose, head and neck patients are constrained with immobilization masks molded tight over the patient’s face and fixated to the couch.

The field of Surface Guided Radiotherapy Treatment (SGRT) is becoming part of the standard of care in most daily treatment of cancer and is also becoming a key component for confident and safe SRT cancer treatments. One of the big challenges for the SGRT in these treatments is to maintain the focus on the patient and make sure that the patient is in the correct position. For this purpose, open head masks have been introduced for SRT where an opening for the patient face has been cut out to expose patient surface and to also prohibit anxiety and claustrophobia. For SGRT, the performance of the calculated patient position could potentially be jeopardized if the mask areas still would be included in the patient surface. In SGRT for SRT, one of the challenges is therefore to extract and decouple the patient surface and motion from the mask.

You will explore and evaluate a brand new concept and method including algorithm development to isolate the surface of the patient’s face from the immobilization mask, to be included in the future cutting edge SGRT products installed worldwide. One task is to evaluate the robustness of the proposed algorithm and the sensitivity to different parameter changes.
Another task is to optimize the robustness of the immobilization mask detection for different mask and skin types.

Test data can e.g. be based on 3D scanner data from SRT scenarios, using different types of immobilization masks. You will have the possibility to design and perform experiments using C-RAD hardware at our Uppsala office in addition to using clinical data.

The project will include

- Literature study
- Selection of clinically relevant scenarios
- Study of parameters for the stabilization mask detection algorithm
- Evaluation of the results and suggestion of further improvements
- Writing your thesis that doubles as a comprehensive report on your findings
- Presenting your findings to project managers

Preferred skills & experience

- You have an interest in medical device technology
- You have theoretical knowledge in signal processing and/or image processing
- Experience in C++, C# and .NET application programming is a plus
- Fluent in Swedish or English is mandatory, other language skills are an advantage

Education

Aiming for a master’s degree in Physics, Medical or Computer engineering,

Primary location

Uppsala, Sweden

If this Master thesis is interesting to you, please send us your application. Interviews are being held on a current basis, please send in your application as soon as possible.

Contact person

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